

Short communication

**GROWTH PERFORMANCE AND SURVIVAL OF LOCAL AND WHITE
LEGHORN CHICKEN UNDER INTENSIVE MANAGEMENT SYSTEM**

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ABSTRACT: This study was conducted to evaluate the comparative growth, sexual maturity, survival, and feed utilization efficiency of local and White Leghorn chicken under intensive management condition. Five groups of each of the two breeds, with 200 baby chicks each, were subjected to appetite feeding with commercial layer's type starter's and grower's ration at day old to eight weeks and eight weeks to twenty weeks of age respectively in a completely randomised design with 5 replication. The results showed that mean daily feed intake and total feed consumption from hatching to maturity were significantly higher ($P<0.05$) for the local chicken the value of which seem to be overestimated due to their highly pronounced selective feeding and feed scratching behaviour. They attained 90 and 94% of the mean body weight of leghorn chicken at an age of 2 and 5 months, respectively. Mortality and the amount of feed required to raise day old baby chicks to maturity were also significantly higher ($P<0.05$) for the local chicken. Local chickens were inferior to the leghorn breed in terms of feed utilization efficiency and survival when kept in confinement. The results of this study suggested that there is no economic justification for keeping local chicken under intensive management systems due to their poor feed utilization efficiency and survival.

Key words/phrases: Growth, intensive, local chicken, survival, White Leghorn

INTRODUCTION

Poultry production is a sector of livestock production where human food production is relatively rapid. Poultry meat and eggs provide proteins of high biological value. Poultry production is a relatively simpler means of generating family income and employment opportunities. Compared to other species of animals, poultry production (particularly, family poultry) requires low capital investment and can easily be operated using readily available household labours.

Ethiopia has a huge potential for the future development of poultry industry. The indigenous chicken population of the country is estimated to be over 56 million, all of which are kept under rural household conditions (AACMC, 1984). There is no purposeful feeding of chicken under these conditions and scavenging is almost the only source of their diet. Although lack of fortified feeds and micronutrients in Ethiopia make poultry keeping under free ranging conditions necessary, full day scavenging chicken are vulnerable to predators and disease. Very little has been done to evaluate the production performance of local chicken both under traditional and improved

conditions (Alemu Yami and Tadelles Dessie, 1997). The AACMC (1984) reported that local males may reach 1.5 kg live weight at 6 months of age and females about 30% less. Teketel Forsido (1986) also found that local stocks reach 61 and 85% of leghorn body size at 6 months and maturity, respectively. Abebe Hassen (1992) reported that local birds in eastern Ethiopia attain 71.5% of weight of leghorns at 6 months of age. Burley (1957), and Teketel Forsido (1986) found increased production performance of local chicken with improvement in feeding, but not to economically acceptable level. Feed efficiency of local hens were very low and keeping local chicken under intensive management system is not economically viable due to their low survival and poor egg production performance (EARO, 2002). Teketel Forsido (1986), and Abebe Hassen (1992) found higher mortalities among local chicken than among leghorns when raised under intensive management in Awassa, and Alemaya, respectively. Unfortunately, however what has been studied so far in Ethiopia is not tangible enough to show the relative effect of genetic and non-genetic factors on the performance of the local chicken (Alemu Yami and Tadelles Dessie, 97). The major objective of this study was to evaluate the comparative growth, sexual maturity,

survival and feed utilization efficiency of local and White Leghorn chicken under improved management system.

MATERIALS AND METHODS

Experimental site

This study was conducted at the Jimma College of Agriculture (JCA) located at an altitude of 170 m and 335 km southwest of the capital, Addis Ababa. The mean daily ambient temperature and relative humidity of the experimental site was 18°C and 65%, respectively.

Production and management of experimental chicks

Local eggs were purchased from Jimma town and eggs of White Leghorn chicken were collected from the flock of JCA poultry farm. About 2000–3000 eggs of each breed were incubated for hatching the experimental chicks. The chicks were then transferred to a brooder house and offered layer's type standard starter's ration containing 2.8 kcal of metabolizable energy per kg and 19% crude protein. At the age of 10 day, 1000 baby chicks of each breed were randomly selected and divided into 5 groups, each with 200 chicks (5 groups of local and 5 groups of leghorn). Each group was housed in separate experimental pens equipped with all the necessary facilities. The treatments (breeds), were then evaluated according to the completely randomised design with 5 replications for study period of 2 months. At the end of the brooding period each group was removed from the brooder house and transferred to one of the 10 experimental pens in the grower's house equipped with chick rearing facilities. Each group (of about 1:1 male to female ratio) was subjected to appetite feeding with commercial grower's ration containing 2.7 kcal of metabolizable energy per kg and 16% crude protein, for a study period of 3 months.

In both cases, clean water was made available at all times. Feed was offered 10% above the actual daily intake (adjusted daily) and orts were collected and weighed once a day. The chicks were weighed once a week. Feed consumption, chick growth, rate of sexual maturity, feed conversion efficiency and rate of survival were used to compare the performance of the breeds. Analysis of variance was carried out using fisher's method (Snedecor and Cochran, 1972).

RESULT AND DISCUSSION

Feed consumption

The comparative production performances of local and leghorn chicks kept under intensive management system are shown in Table 1. According to Preston (1989), modern productive breeds of chicken are characterized by high feed intake and feed conversion efficiency, when placed on grain based commercial poultry ration. However the current work showed that there was no significant difference between local and leghorn chicks in mean feed consumption during the first one month of their life. The difference turned out to be significant ($p < 0.05$) starting from the 5th week of brooding. The mean daily feed intake and total feed consumption from hatching to maturity (defined as age at first egg) was significantly higher for local chicken raised under intensive management system compared to the leghorn ($p < 0.05$). Nevertheless, the present values on feed consumption of the local chicken seem to be overestimated due to their highly pronounced selective feeding and feed scratching behaviour, which might have resulted in considerable portion of the feed offered being wasted.

Chick growth

The mean hatching weight of White Leghorn chicks was 42 g (Table 1). They attained mean body weight of 0.35 kg and 1.4 kg at an age of 2 and 5 months, respectively. Sexual maturity measured as age at first egg was attained after 149 days (about 5 months). The mean body weight of White Leghorn chicken at 6 months of age ranged from 1.3 kg at Alemaya (Abebe Hassen, 1992), to 1.66 kg at Awassa (Teketel Forsido, 1986). Brannang and Persson (1990) reported mean body weight of 1.05 kg at an age of 5 months for leghorn chicken kept under intensive management regime at Assela, Ethiopia. The results of this study compare fairly with the above reports.

The mean hatching weight of local chicks was 38 g (Table 1). They attained only 90% of the mean hatching weight and 90 and 94% of the mean body weight of the leghorn chicks at 2 and 5 months of age, respectively. Sexual maturity was attained after 153 days (about 5.1 months) in local pullets, almost similar to the leghorn pullets. Thus leghorn and local chicken kept under intensive management regimes did not show significant differences in terms of chick growth and rate of sexual maturity, ($p > 0.05$).

Table 1. Production performance of local and White Leghorn chicken under intensive management system.

Item	Exp. 1		Exp. 2	
	Brooding period (60 days)		Growing period (90 days)	
	L	WL	L	WL
Feed cost (Birr/quintal)	129	129	129	129
Mean daily feed intake (g/h)	45 ^b	34 ^a	131 ^b	109 ^a
Mean hatching weight (g)	38	42	-	-
Mean initial body weight (g/h)	38	42	318	354
Mean final body weight (g/h)	318	354	1299	1384
Mean daily weight gain (g/h)	4.67	5.20	10.9	11.4
Feed conversion efficiency	9.6 ^b	5.8 ^a	12 ^b	8.9 ^a
Feed cost/1.5 kg L.W. (Birr)	-	-	23.3 ^b	14.2 ^a
Mortality (%)	22 ^b	8.1 ^a	26 ^b	6.5 ^a
Age at 1 st egg (days)	-	-	153	149
Feed cost to sexual maturity (Birr)	-	-	19.4 ^b	14 ^a

L, local; WL, White Leghorn chicken; a and b within each experiment, values in the same row with different superscript are significantly different from each other ($p < 0.05$).

Biological and economic efficiencies

Local chicken had significantly higher ($P < 0.05$) feed conversion ratio (the amount of feed needed to produce a unit of body weight gain) compared to the leghorn. They consumed about 12 kg of poultry ration to produce 1 kg of live weight, while leghorn chicken required only 8 kg of feed to attain a similar weight (Table 1). The amount of feed required to raise local chicken from day-old to sexual maturity was also significantly higher ($P < 0.05$). Therefore, local chickens kept under intensive management system were inferior to the leghorn in feed conversion efficiency.

The price of live chicken varies depending on sex, colour, size, age and market locations and the demand for eggs and live birds are subject to seasonal variation (AACMC, 1984). Similarly, feed cost also varies from place to place and in many instances the cost of mixed feed does not follow reduction in ingredient cost. Prices of mixed feed remain unduly high even at times when the price of the major component of mixed rations, corn, was below 40 Birr/quintal (Alemu Yami and Tadelles Dessie, 1997).

At the time of conducting this experiment, the price of commercial poultry ration (both starter's and grower's) was 129 Birr per 100 kg in Addis Ababa (farm gate price) and the market price of a mature bird in Jimma was about 15 Birr. About 18 kg of feed (worth 23 Birr) was required to raise a day-old local chick to slaughter weight of 1.5 kg as compared to 11 kg of feed (worth 14 Birr) required to raise a day-old Leghorn chick to a similar weight. This implies that local chicken could rather be appropriate for the traditional low input-output

system, where they make the best use of locally available resources. Therefore, according to the results of this study, there is no economic justification, what so ever for keeping native chicken under intensive management system. This is in agreement with earlier reports of Burley (1957), and Teketel Forsido (1986), who found increased production performance of local chicken with improvement in environment (feeding) and management, but not to economically acceptable level.

Morbidity and mortality

Observations made during the experimental period showed that the local chicken under the current management were inferior to the leghorn in health status. The White Leghorn remained bright, active and clean, while lack of interest in their environment, wing droppings, huddling at the corners, leg weakness and cannibalism were frequently observed among the local chicken. The latter were also slow in rate of feathering and exhibited recurrent out breaks of disease.

Mortality was high in both breeds during the first 2-weeks of brooding. Mortality reduced significantly ($P < 0.05$) in leghorn chicken with advance in age, whereas, persistent high rate of mortality sustained throughout the brooding and rearing periods of the local chicken. Percent mortality from hatchling to maturity was higher ($P < 0.05$) in local chicken (24%) compared to the leghorn (7.3%) chicken (Table 1). Higher mortalities, have also been reported earlier for local birds raised under intensive management conditions in Awassa (26%) (Teketel Forsido,

1986), and Arsi (34%) (Brannang and Persson, 1990). The reason for the high mortality of local birds under intensive management system is not clear.

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