Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol.8, No.7, 2018

Introduction and Evaluation of Dual Purpose Chicken (Potchefstroom KoeKoek) Breed at Bako Agricultural Research Center (BARC)

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Abstract
To increase the production and productivity of chicken in the area, it is important to introduce and evaluate the exotic chicken breeds with higher productivity. To this effect introduction and evaluation of dual purpose chicken breed was undertaken at Bako Agricultural Research center. The dual purpose chicken (Potchefstroom Koekoek breed) was a day old when the test was started. The experiment was undertaken for forty eight (48) weeks of period 2015/ 2016. The management and the data on the performance of chickens were divided into three parts (0 to 8, 12 to 20, 27 to 48 weeks of age). The chickens were kept in open house. It is concert floor with saw dust bedding at thickness of 5 to 7cm. The feed for the chicks were purchased from "kalit" feed processing plant. The average feed intake of this dual purpose breed (Potchefstroom Koekoek) during starter phase in (g/bird/day) and (g/bird/week) for both sexes are 33.04 and 231.32 respectively. The average weekly total body weight (g/bird/week), weight gain (g/bird/week) and mortality (%) of dual purpose breed for both sexes are 150.92, 42.75 and 3.26 respectively. This is comparable with the breed manuals (standard) of the layers and also that of the trail made at Debre Zeit Agricultural research center on the same breed. The average feed intake of this dual purpose breed during grower stage in (g/bird/day) and (g/bird/week) for female and male are 78.24, 75.68, 547.66 and 529.73, respectively. And also their average weekly total body weight (g/bird/week), weight gain (g/bird/week) and mortality (%)/week of dual purpose breed for female and male are 840.03, 1085.71, 88.32, 133.49, 1.60 and 1.41, respectively. This is also comparable with the breed manuals (standard) of the layers and also that of the trail made at Debre Zeit Agricultural research center on the same breed. The average feed intake of this dual purpose breed during later stage in (g/bird/day) and (g/bird/week) for female is 118.88 and 848.42 respectively. The average total body weight (g/bird/week) and weight gain (g/bird/week) and mortality (%)/week of these dual purpose breed during layer stage (27 to 48 weeks) for female and male is 1792.54, 2542.59, 7.24, 52.10, 0.44, 0.38 and 0.0, respectively. This is again comparable to the breed manuals (standard) of the layers and also to that of the trail made at Debre Zeit Agricultural research center on the same breed. The average egg production per week at minimum and maximum in percentages are 56.97% and 63.73% during the later stage of 27 to 48 weeks). Majority of the egg shape are oval and shell color are brown and the average egg weight and shell thickness were 50.8gm and 0.34, respectively. The average albumen weight, yolk weight, yolk color, and yolk/albumen ratio of these dual purpose breed are 26.13gm, 13.62gm, 3 and 56.86, respectively. These dual purpose breeds are good in fertility (90%) and they start to lay eggs at 22th weeks of age that is comparable to the standard breed of layers.
Keywords: Potchefstroom Koekoek, dual purpose breed

Introduction

In Ethiopia, there are about 56.87 million chickens with regard to blood level of chicken, 95.86 %, 2.79 % and 1.35 % of the total poultry were reported to be indigenous, hybrid and exotic respectively; excluding pastoral and agro pastoral areas (CSA 2014/15). However; the majority of the population is composed of low producing scavenging chickens.

Breeders usually aim at conserving and increasing the productive efficiency of native chicken genetically for economic traits (R.Sh. 2014).

Comparatively little research and development work has been carried out on exotic chicken production and management, despite the fact that they are more demand in the area. Most results showed that the overall performance of the crosses was better than either the native or the exotic parents under the existing management condition (Melesse *et al.,* 2005). To this effect it is better to import exotic chicken and see their adaptability to carry out for either cross breeding or multiplication of the breed for distribution to end users.

The supply of day-old chicks is very important for the success of the poultry production chain (King'ori, 2011). Chicken are an affordable source of animal protein which is one of the fastest growing segments of the agricultural sector in Ethiopia.

The expansion of commercial chicken is almost walking on its knee. Poultry (chicken) can be managed udder different feeding systems, depending on the husbandry systems and available feed (Pousga *et al*., 2005). However majority of the chicken population is composed of low producing scavenging chickens. The sector shows a clear distinction between traditional, low input systems on the one hand and improved production

systems using relatively advanced technology on the other hand (Alemu,1995). The system is characterized by its low input and corresponding low output (Tadele *et al*., 2000).

Objectives

- To evaluate and recommend the promising dual purpose breed technologies on station
- To evaluate the productive and reproductive performance of the dual purpose chicken breed at BARC

Methodology

Dual purpose breed was brought from Debre Zeit Agricultural Research Center (DZARC). Originally this breed was from Lesotho University and South African Poultry industry. The first 72 hours in the life of chicken was very critical. Therefore necessary precautions were taken in order to guarantee their future performance. The breeders' manual was therefore strictly followed in this regard.

The management of the chickens was divided into three parts (0 to 8, 12 to 20, 27 to 45 weeks of age). The chickens were kept in open house. It was concrete floor with saw dust bedding at thickness of 5 to 7cm. The chickens were housed at a recommended stocking density ($4m^2$). The standard lighting program by the breeders' was also applied. The feed for the chicks were purchased from kalit feed processing company. Feeders and drinkers were placed in the house according to the recommendation of the breeders. The necessary vaccines were purchased from National Veterinary Institute (NVI), Debre Zeit and also hygienic procedures were employed. When the growers were about to start laying (Usually at the age of 18 weeks), individual nest which were made from local carton was provided to them in the ratio of 1 nest to 8 layers.

All necessary data were taken. Generally the data collected were the averages feed intake (g/bird/day) and (g/bird/week), growth rate (group) (g/bird/day) and (g/bird/week), Feed Conversion Ratio (FCR), mortality in % week, average egg production (bird/week in %). The external egg quality (egg shape, egg shell color, shell thickness, average egg weight) and internal egg quality (Albumen weight, yolk weight, yolk color, yolk/albumen ratio) and the reproductive performance were evaluated via, age at first egg laying, fertility and hatchability.

Result and Discussion

The performance of dual purpose breed (Potchefstroom Koekoek) under Bako Agricultural research center through the experimental period were expressed as average feed intake, average total body weight, body weight gain, mortality, average egg production, the external and internal egg quality measurements, age at 1st egg laying, fertility, hatchability were expressed as follow.

Average Feed intake during the starter phase (0 to 8 weeks)

The average feed intake for this dual purpose breed (Koekoek) during starter phase in (g/bird/day) and (g/bird/week) for both sex are 33.04 and 231.32 respectively (Table 1).

Table 1: Average feed intake (g/bird/day) of female and male dual purpose breed (Koekoek) during starter phase (0 to 8 weeks)

Weeks	No of birds(F&M)	Feed intake(g/b/day)	Feed intake(g/b/week)
1	508	8.65	60.55
2	458	14.42	100.94
3	440	22.76	159.32
4	438	27.24	190.68
5	438	37.61	263.27
6	437	40.52	283.64
7	437	54.82	383.74
8	429	58.34	408.38
Mean		33.04	231.32

Key :(g=gram b=bird)

Average Body weight during starter Phase (0 to 8 weeks)

The average weekly total body weight (g/bird/week), weight gain (g/bird/week) and mortality in % week of dual purpose breed (Koekoek) during starter phase for both sexes are 150.92, 42.75 and 3.26 respectively (Table 2).

Table 2. Average weekly total body weight, weight gain and mortality of female and male during starter phase (0 to 8 weeks)

Week	No of birds(F&M)	Av. Weekly weight (g/b/week)	Av. Weekly weight gain (g/b/week)	Mortality (%week)
1	508	52.08	40.00	9.84
2	458	89.89	6.21	3.90
3	440	97.29	18.62	0.50
4	438	115.75	17.37	0.00
5	438	135.68	56.34	0.20
6	437	189.61	30.41	0.00
7	437	217.22	88.29	1.80
8	429	309.85	84.72	9.80
Mean		150.92	42.75	3.26

Key :(g=gram b=bird)

Average Feed intake during Grower stage (12 to 20 weeks)

The average feed intake of dual purpose breed (Koekoek) during the growers' stage in average (g/bird/day) and (g/bird/week) for female and male are 78.87, 75.68, 547.66 and 529.73 respectively.

Table 3: Average feed intake (g/bird/day) and (g/bird/week) of dual breed (Koekoek) during the growers stage (12 to 20 weeks)

Weeks	No of birds		Feed intake (g/b/day)		Feed intake (g/b/week)	
	Female	Male	Female	Male	Female	Male
12	215	214	65.32	69.54	457.24	486.78
13	210	213	69.94	74.8	489.58	523.6
14	208	211	71.54	77.22	500.78	540.54
15	205	209	75.86	69.01	531.02	483.07
16	203	209	83.08	76.67	581.56	536.69
17	201	205	84.24	77.34	589.68	541.38
18	197	201	83.65	76.66	585.55	536.62
19	194	195	73.87	76.98	517.09	538.86
20	189	191	96.64	82.86	676.48	580.02
Mean			78.24	75.68	547.66	529.73

Key :(g=gram b=bird)

Average Weekly Body Weight during Grower Stage (12 to 20 weeks)

The average weekly total body weight (g/bird/week), weight gain (g/bird/week) and mortality (%) week of dual purpose breed (koekoek) during growers' stage for female and male are 840.03, 1085.71,88.32,133.49,1.60 and 1.41 respectively but when compare our findings within (South Arica ARC-Animal production institute,2002) findings there is a difference in average body weight for example at 16 and 20 weeks of age female and male are 784.59 and 1399.09 but South Africa at the same week of age female and male are 1400 and 1840, respectively.

Table 4: Average body weight, weight gain and mortality during the growing stages (9 to 20 weeks).

Weeks	No of birds		Average weekly weight (g/b/week)		Average weekly weight gain (g/b/week)		Mortality (% week)	
	Female	Male	Female	Male	Female	Male	Female	Male
12	215	214	592.32	612.88	64.69	85.88	2.33	0.47
13	210	213	657.01	698.76	65.23	65.58	0.95	0.94
14	208	211	722.24	764.34	-106.14	161.55	1.44	0.95
15	205	209	616.10	925.89	178.49	142.33	0.98	0.00
16	203	209	794.59	1068.22	67.64	90.96	0.99	1.91
17	201	205	862.23	1159.18	34.45	133.36	1.99	1.95
18	197	201	896.68	1292.54	223.52	276.24	1.52	2.99
19	194	195	1120.2	1568.78	178.67	112.03	2.58	2.05
20	189	191	1298.87	1680.81	-	-	0.00	0.00
Mean			840.03	1085.71	88.32	133.49	1.60	1.41

Key :(g=gram b=bird)

The Average Feed Intake during the Later Stages (27 to 48 weeks)

The average feed intake of dual purpose breed (Koekoek) during the later stages in (g/b/day) and (g/b/week) for female is 118.88 and 848.42, respectively. According to the report of Ernest (1996) the amount of feed that is to be consumed /bird/ day was various because the feed intake largely depends on factors like feed quality,

palatability, climates, housing systems, health, management and others.

Average Body Weight during the Layer Stages (27 to 48 weeks)

The average weekly total body weight (g/b/week), weight gain (g/b/week) and mortality (%) week of dual purpose breed (Koekoek) during layer stage (27 to 48 weeks) for female and male 1792.54, 2542.59, 0.44, 0.38 and 0.00 respectively.

Average Egg Production during the Later Stages (27 to 48 weeks)

Average weekly egg production/ week in percentages of dual purpose breed (Koekoek) during layer stage (27 to 48 weeks) are expressed below. The average egg production/week in percentages are from 57.79% to 62.63% during the later stages of (27 to 48 weeks) when we compare our finding with the South African (ARC-Animal Production Institute, 2010) egg productions in percentage are 60.35 and 61.09 respectively and that of Wondemeneh E. *et al*; 2012 at Debre Zeit agricultural research center which was reported as 56.97% to 63.73% this is a very good results for Bako area and other areas with similar agro-ecologies.

External Egg Quality Measurements

The average egg shape, egg shell color, shell thickness, average egg weight of dual purpose breed (koekoek) are Oval, brown, 0.34 and 50.8gm respectively but the average egg weight of this breed in South Africa is 55.7gm (South Africa ARC-Animal Production Institute,2010).

Internal Egg Quality Measurements

The average albumen weight, yolk weight, yolk color and yolk/albumen ratio of dual purpose breed (koekoek) are 26.13gm, 13.62gm, 3 and 56.86, respectively.

Reproductive Parameters

The dual purpose breed (koekoek) showed in Figure 1 is good in fertility (90%) and hatchability (78%) and it start to lay egg at 22nd weeks of age that is comparable to the standard breed 20 weeks of age (South Africa ARC-Animal Production Institute,2010) and that of Wondemeneh *et al*; 2012 at Debre Zeit Agricultural Research Center.

Conclusion and Recommendations

It is possible to conclude from the data analyzed that, the result is similar with the result found at DARC (Debre Zeit Agricultural research center) and are also comparable with their breed standard manuals, South African (ARC-Animal Production Institute, 2010) therefore; we can say that the breed is adapting the Bako Agricultural research center without any significant problems and we can recommend for our beneficiaries (Small scale farmers, researchers, NGos and others) to use the breed without any fear in Bako area and other areas with similar agro ecologies.

Figure 1. Koekoek chicken breed (Potchefstroom KoeKoek) taken at bako Agricultural research center during 2016/17 evaluation trial

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