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Research Paper

Laying Performance and Egg Quality Traits of Naked neck, Noiler, Frizzle and Normal Feathered Chickens in South-South, Nigeria

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ABSTRACT
This study was conducted to determine the laying performance and egg quality traits of Naked neck, Noiler, Frizzle feathered and Normal feathered chickens. Eighty birds were selected at random from 240 birds consisting of four Strains (20 Frizzle feathered, 20 Normal feathered, 20 Naked neck and 20 Noiler) of chickens used for this study. From point of lay to 40 weeks, eggs were collected from each strain to evaluate the external and internal egg quality parameters of the four stains of chickens. Data generated was subjected to one way analysis of variance (ANOVA) using the General Linear Model procedure (SAS, 2008). Result shows that the effect of strains on short term egg production characteristics of the four strains of chickens were significantly ($p<0.05$) different for all parameters. The effect of strains and weeks on short term external and internal egg quality traits was highly significant for all parameters studied. It also revealed that the Noiler strain had higher values for all the short-term egg production characteristics of the four Strains of Nigerian local and improved chickens which could also serve as baseline information for future improvement and selection.
KEYWORDS; *Strains, egg quality, venire caliper, digital electric balance, micrometer screw gauge*

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I. INTRODUCTION

Local chickens has been extensively studied and evaluated for meat and egg production and was found to be dual purpose (Nwosu, 1990) with heavy ecotype tending to have potential for meat production while the light having potential for egg production (Momoh, 2005). Egg production in birds can be reported as whole record performance (annual production) or part-period performance (short term egg production). The evaluation of external and internal quality of the egg is essential for consumers' preference. Many factors are known to influence egg quality traits. These include breeds/strains/variety, temperature, relative humidity, rearing practice and season (Washburn, 1990), though many reported works on egg quality traits abound, there is need for more work to be done on egg production and quality characteristics of Frizzle, Naked-neck, Noiler and Normal feather chickens. Though other researchers had done some work in this area, there is still need for more research on this area of study for more database on short term egg production and egg quality characteristics of Nigerian indigenous local and improved breeds for better selection and breeding programs.

II. METHOD AND MATERIALS

Location of Study

This research was carried out at the Poultry Unit of the Research and Teaching Farm of the Faculty of Agriculture, University of Port Harcourt, Port Harcourt suited in Obio-Akpor Local Government Area of River State, Nigeria. The site is located at longitude and latitude of 4.77N and 6.45E with an average temperature of 26^{o}C.

Management of birds/Data collection

Eighty birds were selected at random from the four Strains of chickens used for this study; 20 Frizzle feathered, 20 Normal feathered, 20 Naked neck and 20 Noiler. The birds were fed with the best commercial laying diet with 17% crude protein, water was also provided at times. From point of lay to 40 weeks, eggs were collected from each strain and external and internal egg quality parameters were evaluated as described by Fayeye *et al*. (2005). The external and internal egg quality parameters analyzed included egg weight, egg length, shell thickness, shell weight, egg number, egg width, yolk percent, albumen percent, egg production rate (hen housed production) and egg mass, albumen weight, yolk weight. These were analyzed using digital electric balance, vernier calipers and micrometer screw gauge respectively.

III. RESULT

Table 1 showed the short-term egg production characteristics of four Strains of Nigerian local and improved chickens. The parameters considered for the short-term egg production characteristics of Frizzle, Naked neck, Noiler and Normal feathered were: weekly hen housed percentage, egg number, egg weight and egg mass. Chicken strain had significant ($p<0.05$) effect on short term (20 weeks) for percentage weekly hen housed production, egg mass, egg number, and egg weight. The least squares mean showed that the Noiler chickens had higher weekly hen house production value (87.95%) followed by Frizzle feathered (87.85%), Naked neck (73%) and lastly Normal feathered (71.75%). Noiler breed also had higher least Squares means value for egg weight (52.80+1.80) followed by Naked neck (44.85 + 0.74), Normal feather (43.05 + 0.80) and lastly Frizzle feathered with least squares means value (40.15+ 0.91). Naked neck had the highest least squares means value(929.89 + 66.32) for egg mass followed by Normal feathered (858.95 + 80.30), Noiler (622.53 + 23.85) and lastly Frizzle (251.45 + 15.16). Table 2 showed the analysis of variance which revealed that the breed effects on all the short-term egg production characteristics (weekly hen housed %, bird number, egg number, egg weight and egg mass) were significantly very high ($p<0001$).

Tables 2 represent the results of least squares means of the effect of the external and internal egg quality traits of four strains of local chickens (Frizzle feathered, Naked neck, Noiler and Normal feathered chickens). The traits considered were egg weight, albumin weight, yolk weight, shell weight, shell thickness, yolk%, albumin%, egg length and egg width. Table 2 showed that the chicken stain effect was significant ($p<0.05$) for all the parameters or egg quality traits studied. The egg weight ranged from 40.42g - 51.07g , albumin weight ranged from 21.90g - 28.49g, yolk weight from 13.91g - 16.80g shell thickness ranged from 0.37mm - 0.43mm, albumin % ranged from 51.55% - 53.13%, yolk % ranged from 34.45% - 36.05%, egg length ranged from 61.15 mm-69mm, egg weight ranged from 57.92 mm- 62.25mm.Noiler chickens had highest least squares means value in all the egg quality traits: egg weight (51.07 + 0.41), albumin weight (28.49 + 0.28), yolk weight (16.39 + 0.12), shell weight (5.85 + 0.85), shell thickness (0.43 + 0.00), albumin % (53.43 + 0.49), egg length (59.00 + 0.20) and egg width (42.29 + 0.95) followed by Naked neck chickens.

Table 3 present the effect of weeks on short-term egg quality parameters. The week effect was significant ($p<0.05$) for all the egg quality parameters with highest least squares means value observed in the 20^{th} week which indicated that egg quality traits improved with increase weeks. The results revealed that the analysis of variance for the effect of weeks on the short-term egg quality parameters was significantly very very high ($p<0.0001$) for all parameters except shell thickness which was not significant ($p>0.05$).

Table 4 present the least squares means for the effects of strain and week on short term egg quality traits of Frizzle feathered, Naked neck, Noiler and Normal feathered. The Chicken strain and week effects on the short-term egg quality parameters studied were significantly different ($p>0.05$) among breed except for all parameters except for shell thickness, shell weight at 4, 8 and 10 weeks and egg width at 3^{rd} and 4^{th} week however higher least squares means value was observed in Noiler for all the egg quality traits studied.

Table 1 Least squares means and standard error of short-term egg production characteristics of four strains of Nigerian local and improved chickens

Strain	NO	Weekly hen housed (%)	Birds number	Egg number	Egg weight (g)	Egg mass (g)
Frizzle feathered	20	87.85 ± 4.06^{a}	7.00± 0.00^{c}	6.15 ± 0.25^{c}	40.15 ± 0.91^{c}	251.45 ± 15.16^{c}
Naked neck	20	73.00 ± 4.60^{b}	20.00 ± 0.00^{a}	20.45 ±1.29^{a}	44.85 ± 0.74^{b}	929.80 ± 66.32^{a}
Noiler	20	87.95 ± 3.28^{a}	14.00 ± 0.00^{b}	12.2 ± 0.46^{b}	52.80 ± 1.82^{a}	622.53 ± 23.85^{b}
Normal feathered	20	71.75 ± 4.75^{b}	20.00 ± 0.00^{a}	20.40 ± 1.35^{a}	43.05 ± 0.81^{bc}	858.95 ± 80.30^{a}

"a b c" =Means with different superscripts on same column are significantly different ($p<0.05$).

Table 2 Least squares means and standard errors of effect of strain on egg quality traits of Nigerian local and improved chickens

Strains	NO	Egg WT (g)	Alb. WT (g)	Yolk WT (g)	Shell WT (g)	Shell Thickness (mm)	Alb. %	Yolk%	Egg length(mm)	Egg width(mm)
Frizzle feathered	122	40.42 ± 0.34^{a}	21.90 ± 0.21^{d}	13.91 ± 0.17^{d}	4.79 ± 0.06^{d}	0.38 ± 0.00^{b}	51.55 ±0.00^{c}	36.05 ±0.76^{a}	61.41 ± 1.04^{b}	58.59 ± 1.02^{b}
Naked neck	409	45.69 ± 0.20^{b}	25.20 ± 0.16b	15.02 ± 0.06^{b}	5.28 ± 0.03^{b}	0.43 ± 0.04^{b}	52.26 ±0.40^{b}	35.56 ±0.42^{a}	61.15 ±1.62^{b}	57.92 ± 0.89^{b}
Noiler	244	51.07 ± 0.41^{a}	28.49 ± 0.28^{a}	16.39 ± 0.00^{a}	5.85 ± 0.15^{a}	0.39 ± 0.00^{a}	53.48 ± 0.49^{a}	34.45 ±0.46^{b}	69.00 ± 0.20^{a}	62.27 ± 0.91^{a}
Normal feathered	413	44.08 ± 0.20^{c}	24.15 ± 0.15^{c}	14.62 ±0.06^{c}	5.14 ± 0.03^{c}	0.37 ± 0.00^{b}	52.13 ± 0.38^{b}	35.96 ±0.39^{a}	61.93 ±0.68^{b}	58.59 ± 0.77^{b}
Overall mean	1188	45.39 ± 0.16	25.19 ± 0.11	15.05 ± 0.05	5.29 ± 0.12	0.39 ± 0.02	52.39 ± 0.23	35.69 ± 0.23	64.09 ± 0.62	59.11 ± 0.46

"a b cd" Means with different superscripts on same column are significantly different ($p<0.05$).
Egg WT= Egg weight, Alb WT= Albumin weight, Yolk WT= Yolk weigh, Shell WT= Shell weight, Alb%= Albumin percentage, Yolk%= Yolk percentage

Table 3 Least squares means and standard errors of the effect of weeks on short term egg quality traits of Nigerian local and improved chickens

Weeks	Egg WT (g)	Alb. WT (g)	Yolk WT (g)	Shell WT (g)	Shell Thickness (mm)	Alb. %	Yolk%	Egg length(mm)	Egg width(mm)
1	38.85 ± 1.32^{j}	20.55 ± 0.71^{h}	13.30 ± 0.63^{f}	4.75 ± 0.14^{fg}	0.39±0.01^{ba}	53.15 ±0.81^{fg}	33.41 ±0.87^{cdde}	61.45 ± 0.76^{ba}	57.5 ± 1.05e
2	39.68 ± 0.82^{ji}	21.41 ± 0.53^{hg}	13.41 ± 0.39^{f}	4.84 ± 0.13^{feg}	0.39±0.01^{ba}	53.87 ±0.68^{fedg}	33.81 ±0.61^{cde}	64.75 ±3.76^{dc}	61.92± 0.63dc
3	40.52 ± 0.82^{j}	21.85 ± 0.48^{g}	13.15 ± 0.31^{f}	5.15± 0.13^{cdd}	0.39±0.00^{ba}	54.28 ± 0.63^{fedc}	32.73 ±0.58^{fe}	63.63 ± 0.39^{b}	61.43 ± 0.49bdc
4	40.64± 0.59^{ji}	21.55 ± 0.39^{hg}	14.62 ±0.25^{d}	4.67± 0.08^{g}	0.39±0.00^{ba}	53.33 ± 0.42^{feg}	35.90 ±0.44^{b}	62.76 ±1.19^{b}	60.45 ± 1.60d
5	42.03 ± 0.16^{h}	23.01 ± 0.44^{f}	14.08± 0.28^{a}	4.94 ± 0.13^{fed}	0.38±0.00^{ba}	54.61± 0.38^{bedc}	33.56 ± 0.37^{cdde}	65.38 ± 0.65^{b}	60.65 ± 2.95d
6	43.93 ±0.68^{g}	23.90 ± 0.42^{ef}	14.93 ± 0.27^{dc}	5.03±0.12^{ced}	0.39±0.00^{ba}	54.57±0.31^{bedc}	33.87±0.33^{cde}	65.83±0.63^{b}	63.04± 0.48
7	43.92 ± 0.69^{g}	23.11 ± 0.46^{f}	15.39 ± 0.21^{bac}	5.25±0.09^{cb}	0.39±0.00^{ba}	52.91±0.33^{g}	34.86±0.31^{cb}	67.64±0.67^{ba}	63.67± 0.42bac
8	44.24 ± 0.64^{gf}	23.90 ± 0.43^{ef}	15.13±0.22^{bdc}	5.32±0.06^{b}	0.39±0.00^{ba}	53.79±0.34^{fedg}	34.33±0.28^{cd}	67.79±0.36^{ba}	63.97± 0.34ba
9	46.11 ± 0.51^{dce}	24.88 ± 0.36^{ed}	15.77±0.18^{a}	5.36±0.10^{b}	0.38±0.00^{ba}	54.48±0.25^{edc}	34.04±0.28^{cde}	66.81±0.34^{ba}	64.22± 0.28ba
10	45.08 ± 0.60^{dce}	25.22 ± 0.43^{d}	15.53±0.16^{ba}	5.11±0.07^{cbd}	0.38±0.00^{ba}	54.67±0.34^{bdc}	34.06±0.27^{cde}	64.69±0.65^{b}	64.44± 0.43a
11	45.88 ± 0.61^{fde}	25.11 ± 0.46^{d}	15.56 ± 0.14^{ba}	5.23 ±0.08^{cb}	0.39± 0.00^{ba}	54.33±0.36^{fedc}	34.61±0.44^{ce}	66.79 ± 0.45^{ba}	64.46 ± 0.34a
12	46.05 ± 0.58^{dce}	25.26 ± 0.39^{d}	15.19 ± 0.16^{bac}	5.25 ± 0.08^{cb}	0.36±0.00^{b}	54.86±0.36^{bdc}	33.03±0.31^{ede}	67.22 ± 0.48^{ba}	64.49 ± 0.35a
13	46.55 ± 0.50^{de}	25.27 ± 0.39^{d}	15.26 ± 0.17^{dac}	5.03 ± 0.05^{ced}	0.36±0.00^{b}	55.51±0.35^{bac}	33.96±0.40^{cde}	65.22 ± 0.37^{b}	63.56 ± 0.34bac
14	47.25 ±0.58^{de}	26.35 ± 0.48^{c}	15.41 ± 0.12^{bdc}	5.21± 0.06^{cbd}	0.37±0.00^{ba}	55.51±0.44^{bac}	32.85±0.37^{fe}	65.65 ± 0.37^{b}	61.90 ±1.21bdac
15	47.43 ± 0.52^{bc}	26.61 ± 0.39^{bc}	15.12 ± 0.17^{bdc}	5.33 ± 0.07^{b}	0.37±0.00^{ba}	55.83±0.39^{ab}	32.18±0.47^{f}	65.46 ± 0.99^{b}	64.17 ± 0.31ba
16	48.63 ± 0.51^{ba}	27.48 ± 0.39^{ba}	15.29 ± 0.15^{bac}	5.39 ± 0.08^{a}	0.39±0.10^{ba}	56.28±0.28^{a}	30.82±0.59^{g}	69.65 ± 3.23^{da}	64.98 ± 3.12a
17	48.71±0.58^{ba}	27.53 ± 0.41^{ba}	15.22 ± 0.16^{ba}	5.76 ± 0.07^{a}	0.39±0.13^{ba}	56.43±0.31^{a}	30.63±0.61^{g}	64.85 ± 0.33^{a}	64.22 ± 3.32ba
18	48.83 ± 0.58^{ba}	27.67 ± 0.41^{ba}	15.13 ± 0.14^{bac}	5.73 ± 0.08^{a}	0.39±0.12^{a}	56.56±0.32^{a}	30.92±0.51^{a}	67.30 ± 0.33^{ba}	64.80 ± 0.31a
19	48.95 ± 0.66^{a}	27.71 ± 0.45^{a}	15.75 ± 0.15^{bac}	5.74 ± 0.09^{a}	0.37±0.13^{ba}	56.53±0.35^{a}	30.77±0.54^{g}	67.39 ± 0.36^{ba}	64.91 ± 0.32a
20	49.03 ± 0.65^{a}	27.78 ± 0.46^{a}	15.75 ± 0.16^{bac}	5.73 ± 0.09^{a}	0.37±0.14^{ba}	56.59±0.35^{h}	30.69±0.56^{a}	67.28 ± 0.37^{ba}	64.92 ± 0.39b

"a, b, c, d, e, f, g, h, I, j" Means with different superscripts on same column are significantly different ($p<0.05$).
Egg WT= Egg weight, Alb. WT= Albumin weight, Yolk WT= Yolk weigh, Shell WT= Shell weight, Alb.%= Albumin percentage, Yolk%= Yolk percentage, SE= standard error

Table 4 Least squares means and standard errors of effects of strain and week on short term egg qualitytraits of Nigerian local and improved chickens from 1-20 weeks of lay

Weeks	Strains	Egg WT (g)	Alb. WT (g)	Yolk WT (g)	Shell WT (g)	Shell Thickness (mm)	Alb. %	Yolk%	Egg length(mm)	Egg width(mm)
1	Frizzle feathered	28.66±1.66^{c}	16.66±1.60^{c}	10.33±0.33^{c}	3.66±0.33^{c}	0.38±0.01	53.33±2.30^{b}	29.33±0.66^{c}	56.67±0.60^{c}	50.00±0.01^{c}
	Naked neck	38.60±0.67^{b}	20.20±0.20^{b}	13.40±0.67^{b}	5.00±0.00^{a}	0.41±0.01	52.80±0.15^{b}	34.60±1.40^{a}	60.00±0.00b	55.60±1.92^{b}
	Noiler	45.00±0.65^{a}	23.71±0.91^{a}	15.43±0.78^{a}	5.14±0.14^{a}	0.43±0.01	58.71±1.44^{a}	34.28±1.79^{a}	65.71±0.71^{a}	62.41±0.10^{a}
	Normal feathered	36.60±0.97^{b}	18.80±0.48^{c}	13.20±0.73^{b}	4.60±0.24^{b}	0.36±0.01	51.00±0.00^{b}	33.60±1.60^{b}	60.00±0.01^{b}	57.40±0.05^{b}
4	Frizzle feathered	40.17±0.48^{b}	24.25±0.17^{a}	14.00±0.11^{c}	4.24±0.34	0.39±0.01	53.47±0.92^{b}	35.20±0.36^{a}	64.00±1.00^{b}	62.91±0.52
	Naked neck	40.17±0.48^{b}	24.25±0.17^{a}	14.00±0.11^{c}	4.24±0.34	0.39±0.01	53.47±0.92^{b}	35.20±0.36^{a}	64.00±1.00^{b}	62.91±0.52
	Noiler	45.69±1.61^{a}	21.00±0.00^{b}	14.76±0.30^{b}	4.76±0.16	0.39±0.01	54.38±1.04^{a}	31.52±0.93^{b}	64.01±0.40^{b}	62.81±0.52
	Normal feathered	34.69±0.45^{c}	24.46±0.49^{a}	15.94±0.50^{a}	4.92±0.21	0.37±0.01	56.50±0.35^{a}	34.38±0.75^{a}	66.15±0.60^{a}	62.30±0.59
8	**Frizzlefeathered**	41.85±1.17^{c}	22.42±1.13^{b}	14.57±0.42^{b}	5.00±0.43	0.13±0.01	53.28±0.41	35.00±0.81^{a}	65.00±0.00^{b}	64.50±0.77^{b}
	Naked neck	45.09±0.64^{b}	24.95±0.44^{a}	15.41±0.21^{a}	5.27±0.37	0.39±0.01	54.90±0.99	34.36±0.50^{a}	67.95±0.71^{b}	63.54±0.42^{b}
	Noiler	48.92±1.77^{a}	26.50±1.23^{a}	16.42±0.35^{a}	5.85±0.17	0.40±0.01	53.36±0.76	33.78±0.62^{b}	70.35±1.43^{a}	66.32±0.87^{a}
	Normal feathered	40,85±0.62^{c}	21.45±0.35^{b}	14.10±0.35^{b}	5.10±0.06	0.37±0.01	52.70±0.40	34.45±0.49^{a}	66.18±1.09^{b}	63.32±0.48^{b}
12	**Frizzle feathered**	41.42±0.61^{c}	22.28±0.80^{b}	14.28±0.21^{b}	4.86±0.14^{b}	0.33±0.01	53.57±1.25^{b}	41.71±0.99^{a}	63.00±1.06^{c}	61.50±1.16^{c}
	Naked neck	45.34±0.72^{b}	24.88±0.53^{a}	14.88±0.24^{b}	5.19±0.11^{b}	0.36±0.00	53.15±0.16^{b}	32.30±0.46^{b}	67.50±0.63^{a}	64.25±0.62^{b}
	Noiler	51.35±0.59^{a}	21.85±0.93^{b}	16.14 ±0.59^{a}	5.92±0.22^{a}	0.38±0.01	55.42±0.81^{a}	35.28±0.48^{a}	69.71±1.08a	66.96±0.85^{a}
	Normal feathered	45.15±0.60^{b}	24.45±0.49^{a}	15.23±0.33^{b}	5.03±0.10^{b}	0.36±0.01	54.61±0.61^{b}	34.15±0.52^{a}	66.73±0.85^{b}	64.21±0.30^{b}
16	**Frizzle feathered**	42.42±0.48^{c}	23.42±0.75^{a}	14.23±0.35^{b}	5.14±0.26^{b}	0.36±0.01	53.89±0.94^{b}	31.28±0.46	66.57±0.92^{a}	60.71±0.46^{c}
	Naked neck	47.96±0.53^{b}	27.19±0.49^{b}	15.11±0.21^{b}	5.46±0.11^{b}	0.36±0.20	56.60±0.53^{a}	30.52±1.14	66.81±0.58^{a}	64.75±0.33^{b}
	Noiler	56.83±1.14^{a}	32.50±0.75^{a}	17.08±0.33^{a}	6.16±0.26^{a}	0.38±0.00	57.14±0.34^{a}	30.05±0.43	69.41±0.43^{a}	67.50±0.68^{a}
	Normal feathered	47.42±0.56^{b}	26.60±0.41^{b}	14.85±0.15^{b}	5.44±0.11^{b}	0.38±0.00	56.22±0.45^{a}	31.32±0.12	61.76±0.47^{b}	60.86±0.82^{c}
20	**Frizzle feathered**	42.83±0.70^{c}	23.33±0.80^{c}	14.66±0.42^{c}	5.16±0.31^{b}	0.36 ±0.12	53.71±1.09^{b}	30.00±0.34^{b}	63.33±1.05^{b}	60.83±0.52^{c}
	Naked neck	49.05±0.48^{b}	28.33±0.51^{b}	15.00±0.16^{b}	5.12±0.15^{b}	0.36±0.91	57.67±0.56^{a}	30.60±0.44^{b}	68.33±0.40^{a}	65.52±0.33^{b}
	Noiler	56.70±1.38^{a}	32.40±0.90^{a}	17.1±0.38^{a}	6.60±0.22^{a}	0.38±0.00	57.09±0.40^{a}	31.15±0.24^{a}	69.30±0.57^{a}	67.75±0.78^{a}
	Normal feathered	47.05±0.67^{b}	26.25±0.50^{b}	14.85±0.18^{b}	5.60±0.11^{b}	0.38±0.00	56.07±0.60^{a}	30.15±0.37^{b}	66.35±0.55^{a}	64.13±0.38^{b}

Egg WT= Egg weight, Alb WT= Albumin weight, Yolk WT= Yolk weigh, Shell WT= Shell weight, Alb%= Albumin percentage, Yolk%= Yolk percentage

IV. DISCUSSION

Short term weekly egg parameters observed in this study were slightly lower than the value reported by Momoh *et al. (*2010). The difference in results might be due to differences in experimental conditions and population. The short-term weekly hen-day production, egg weight, egg number and egg mass was significantly different among the four breeds of Nigerian local chickens in this study which disagreed with conclusion reached by Adedokun and Sonaiya (2001) for Nigerian local chickens. Results of the short-term weekly egg weight range which was higher than the egg weight value reported by Adeyemo *et al.* (2018). The egg weight in this study was significantly heavier among breeds in accordance with the study by Momoh *et al.* (2010) on short term egg production characteristics of Nigerian heavy and light chicken ecotypes. The shape index values obtained in this study which is the ratio of width to length of egg was higher than 0.76 and 0.79 reported by Chineke (2001), Olurede and longer (2002), Ukachukwu and Akpan (2007) respectively for some exotic chickens in Nigeria. The shape index was lower than the shape index value of 0.83 + 0.04 reported by Ikeobi *et al* (1999) and 0.76 - 0.77 by Momoh *et al* (2018) for Nigerian local chicken. Shell thickness mean values in this study were significantly different among the four breeds of local chickens which were in agreement with the report by Momoh *et al.* (2010) and Adeyemo *et al* (2018). The mean Shell thickness values for the chickens in this study were lower than the values reported by Adeyemo *et al.* (2018); Momoh *et al.*(2010) for local chickens but fell within the range of the mean shell thickness values of 0.39 in the study by Niranjan *et al.* (2008) for two backyard poultry varieties in Indian and Yakubu *et al.* (2008) for free range Nigerian local chickens. Eggs with thick shell are desirable to withstand externally applied force thus preventing breakage of eggs which in turn would improve the marketing quality of the eggs however excessive shell thickness decreases hatching ability. The albumin weight in the present study was significantly different among breeds which corresponded with report by Niranjan *et al.* (2008) in rural varieties developed for backyard poultry in India. The numerical mean values of the egg quality traits in this study were comparable with the values reported by Chatterjee *et al.* (2007) for indigenous breeds of chickens of Andaman.

V. CONCLUSION

In this study, the short-term weekly hen-day production, egg weight, egg number and egg mass were significantly different among the four Strains of Nigerian local chickens. Also, the external egg quality traits were significantly different among the strains. It also revealed that the Noiler breeds had higher values for all the short-term egg production characteristics of the four Strains of Nigerian local and improved chickens which could also serve as baseline information for future improvement and selection.

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