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Research Article

Egg genotype and sire strain effect on egg physical traits in crosses between Nigerian indigenous strains of layer chickens.

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Abstract

This research was conducted to reveal the egg genotype and sire strains of layers on physical egg traits in exotic and local strains of layers chicken using 800 eggs sired by four strains which are normal feathered, frizzle feathered, naked neck all of indigenous strains and significant (p > 0.05) on egg shape index where as in has no significant effect (p >0.05) on egg weight, egg length, egg breath.

Key words: Strains, exotic, indigenous traits.

INTRODUCTION

Egg physical traits play a crucial role in the process of embryo development and successful hatchability. The most influential egg external traits are egg breath, egg length, egg shape index, egg shape thickness, egg porosity (Narushin et al 2002)

Narushin et al. (2002) reported that abnormality shaped eggs do not usually have successful hatching while those with normal shape hatch more successfully. This probably results from the fact that embryo changes to axial orientation in the egg at later stages of embryonic development. Rogozina (1961) and Rolnik (1968). This implies that narrow and more markedly oval egg shape are likely to impede the rotation of embryo inside the egg.

Result of Provizen and Lvova (1982) with eggs from white leghorns and Harun *et al.* (2001) with eggs from muscovy ducks reflects the basic tendency shaped egg that are outside the normal egg shape range. In Addition, the authors concluded that well rounded eggs were less successful in hatching than those with pointed ends.

Narushin et al. (2002) reported that an avian egg is highly integrated geological system, the physical characteristics which are interlinked by many relationships such that any abnormality in any physical traits of egg can lead to a simultaneous breakdown in interactions between these egg physical traits.

Consequently leading to a collapse in the egg physiological function to provide the least condition for embryo development and hatchability. Sergeyeva (1986) and Tsarenko (1988) submitted that moderately thick egg shell of chicken reduced chance of microbial penetration into the internal environment of chicken egg. Similarly it also provides appropriate protection against mechanical damage and external insults as well as aggression

MATERIALS AND METHODS

This research was conducted at the poultry breeding unit of the department of Animal Breeding and Genetics, university of Agriculture, Ogun State, Nigeria. The birds were selected from the flock of indigenous naked neck, normal feathered, frizzle feather and exotic yaffa strains. The sire strains were trained for semen collection at the age of 10 months as described by Lake (1967). Both straight and reciprocal crosses were obtained for egg collection, yf x yf, Nk x Nk, F3 x F3, Nm x Nm and Nk x Nk, F3xYf respectively. After artificial insemination, the hens were caged in an open sided pen providing a floor space of 0.4msquare with exposure to daylight of about 12hours daily. 0.1ml of freshly collected semen from the individuals within sire strains was artificially introduced into the dams to generate fertile eggs. The dams were inseminated with fresh semen from four strains twice per day and were pedigree along the sire lines. Records of egg weight, egg length, egg breath were diligently collected.

Physical shaped eggs were collected and egg external traits were measured. Egg weight was measured using sensitive scale graduated in grain. Egg length and egg breath were measured using venier caliper of 0.01cm precision.

Egg shape index was estimated as stated below:

Egg shape index equals egg breath

Egg length.

All data collected were subjected to two way analysis if variance using SAS 1999 and all means were separated using Duncan multiple range test procedure Gomez and Gomez (1984).

RESULTS AND DISCUSSION

Least square means and standard error of egg shape index as affected by egg genotype effect is very significant for egg shape index at P >0.1 (Table 1) This result is in agreement with the findings of Kumari and Shingari (1969), Tsarenko (1988), Sharma and Vohra (1980) and Burtev et al. (1990).

The analysis of variance as presented in table 3 and least squares means as presented in table1 reveals that least squares means and the standard error values of the egg genotype studied where YaffaxYaffa Normal x Normal, Naked Neck x Naked Neck, frizzle x frizzle feather, Normal x Yaffa, Frizzle x Yaffa, Naked Neck x Yaffa has corresponding values of 0.77+-0.07a, 0.80+-0.03a, 079+-0.5a, 0.77+-0.03a, 0.77+-0.01a, 0.77+-0.02a and 0.78+-0.0a

Similarly, least squares means and standard error of external egg traits as affected by sire strains as presented in table 2. The analysis of variance as presented in table 4,5,6,7 shows that the sire strains exerted no significant (P> 0.05) effect on external egg traits considered (egg length, egg breath and egg shape index. This results was in consistent agreement with the findings and report of Stromberg (1975), Pascal (1981), North (1981), Stahl (1986) and peters et al. (2005).

Table 1. Squares means and standard error for effect of genotype on external egg parameters

Genotype	Egg weight	Egg length	Egg breadth	Egg shape Index
NM X NM	50.51+0.35a	5.51+0.28a	6.26+2.10a	0.80+0.03a
YF X YF	51.03+0.48a	5.26+0.04a	4.17+0.04a	0.79+0.07a
FZ X FZ		5.32+0.03a	4.03+0.05a	0.77+0.03a
NK XNK	50.66+0.61a	5.29+0.06a	4.12+0.05a	O.79+0.05a
NM X YF	50.59+0.57a	5.26+0.04a	4.03+0.02a	O.77+0.01a
FZ X YF	50.70+0.60a	5.27+0.03a	4.07+0.03a	O.77+0.01a
NKXYF		5.18+0.04a	3.99+0.06a	0.78+0.00a

Mean in the same column with different superscripts are not significantly different (P>0.05) except egg shape index that is very significant at P<0.01

Table 2 . Least squares means and standard error for effect of sire strain on external egg parameters.

Sire Strain	Egg Weight	Egg Length	Egg Breadth	Egg Shape Index
NM	51.03+0.32a	5.49+0.25a	6.03+1.88a	0.79+0.003b
YF	50.52+0.48a	50.52+0.48a	4.16+0.04a	0.79+0.01ab
FZ	50.51+0.31a	5.30+0.02a	4.16+0.04a	0.77+0.004b
NK	50.05+0.05a	5.26+0.04a	4.12+0.02b	0.79+0.008ab

Means in the same column with different superscript are significantly different {P>0.05)

Table 3. Anova table for effect of genotype on egg shape index

SOURCE	DF	SS	MS	F Value	Pr>F
Genotype	6	0.06	0.01**	2.70	0.014
Error	475	1072	0.001		
Total	481	178			

** = Very Significant at P<0.01.

Table 4. Anova effect of sire and dam on egg weight

SOURCE	DF	SS	MS	F Value	P>F
Dam	3	89.89	29.96^{ns}	1.70	0.165
Sire	3	74.32	24.77^{ns}	1.41	0.239
Error	475	8349.25			
Total	481	8464.87			

NS = Non Significant at P>0.05

Table 5. Anova effect of sire and dam on egg length

SOURCE	DF	SS	MS	F Value	P>F
Dam	3	0.01	0.032^{ns}	0.01	0.910
Sire	3	1.47	0.489^{ns}	0.05	0.970
Error	475	2860.72	6.022		
Total	481	2867.07			

NS = Non Significant at P>0.05

Table 6. Anova effect of sire and dam on egg breadth

SOURCE	DF	SS	MS	F Value	P>F
Dam	3	0.62	0.21^{ns}	0.00	1.00
Sire	3	98.42	32.81^{ns}	0.1	0.964
Error	475	159883.25	3360.60		
Total	481	160426.16			

NS = Non Significant at P>0.05

Table 7. Anova of sire and dam on egg shape index

SOURCE	DF	SS	MS	F Value	P>F
Dam	3	0.01	0.00^{ns}	0.87	0.406
Sire	3	0.02	0.01^{ns}	1.69	0.168
Error	475	1.75	0.00		
Total	481	1.75			

NS = Non Significant at P>0.05

CONCLUSION

It can be concluded from the findings obtained from this study that genetic differences due to sire strains used to produce the chicken egg exerted no significant effect on the external egg traits while egg genotype significantly affect egg shape index.

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