ABG -23

Indigenous Chicken Breeding in Nigeria

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Abstract

As far back as 1963 the indigenous chicken had been proposed as the basis of chicken breed development in Nigeria (Hill and Modebe, 1961). We are convinced that indigenous poultry breed development is a feasible proposition and should be encouraged for commercialization in Nigeria. Between 1994 and 2016 we have used 4 local chicken ecotypes, identified according to their genetic variants, based on the expression of adaptive major genes for frizzling (F); naked neck (Na) and the dwarf (dw) genes in a crossbred formation, to develop improved chicken genotypes for our rural households in Nigeria.

Keywords: Nigeria's chickens, rural households

Improved Indigenous Chicken Development

The poultry ecotypes in Nigeria: In the Southern zone of Nigeria, 4 poultry ecotypes were collected from rural households for genetic evaluation and diversity studies. These comprised the Normal feathered, Naked Neck, Frizzle feathered and dwarf ecotypes. These diverse genotypes are found to possess genes that could be affecting the body metabolic processes as reported by Horst (1988). The naked neck condition is caused by a single dominant gene, frizzling is caused by an incompletely dominant autosomal gene leading to higher rates of metabolism and heat loss, the Na gene was reported to increase breast meat yield, while the advantages of the F and Na genes, over normal feathering, was found to be exhibited during egg production. The performance characteristics of the birds were determined and defined, using conventional and genomic evaluation to determine inherent variation and diversity (Ikeobi *et al.*, 1996; Adebambo *et al.,* 1999; Ozoje *et al.,* 1999; Peters *et al.,* 2002a&b; Adebambo *et.al.,* 2007; Adeleke *et al.,* 2015; Osinbowale, 2017) in several undergraduate and postgraduate students (Table 1).

Blood samples from 50 birds per genotype were used to assess genetic diversity of the Nigerian local chickens (Adeleke *et.al*. 2011). Using SDS gel electrophoresis (SDS–PAGE). Dendrogram developed from the different bands observed, revealed that the strains were clearly separated from one another with 55 percent mean genetic similarity among the four strains, the naked neck strain being the most divergent (Figure I). Because of high mortality and poor hatchability encountered among the Frizzled and Naked Necks, in our indigenous broiler production, Microsatelite analyses was used to distinguish between the homozygous and heterozygous genotypes among the Naked neck chickens (Osinbowale, 2017). The heterozygous naked neck birds often produce higher egg numbers with improved hatchability while the homozygous mating, often result in higher mortality, lower fertility and hatchability with higher number of dead-in-shells (Table 2).

Table 1: Frequency of some genes in the local chicken of Nigeria

Genetic group	*N*	*% Incidence*	*Gene frequency*	*Carriers in the population*
Normal	1594	78.44		
Frizzled	223	10.97	F = 0.06 F = 0.94	11.64%
Naked neck	175	8.61	Na = 0.05 Na = 0.95	9.75%
Dwarf birds	11	0.54	Dw = 0.07 Dw = 0.93	13.51%

Source: Ikeobi *et al.* (1996).

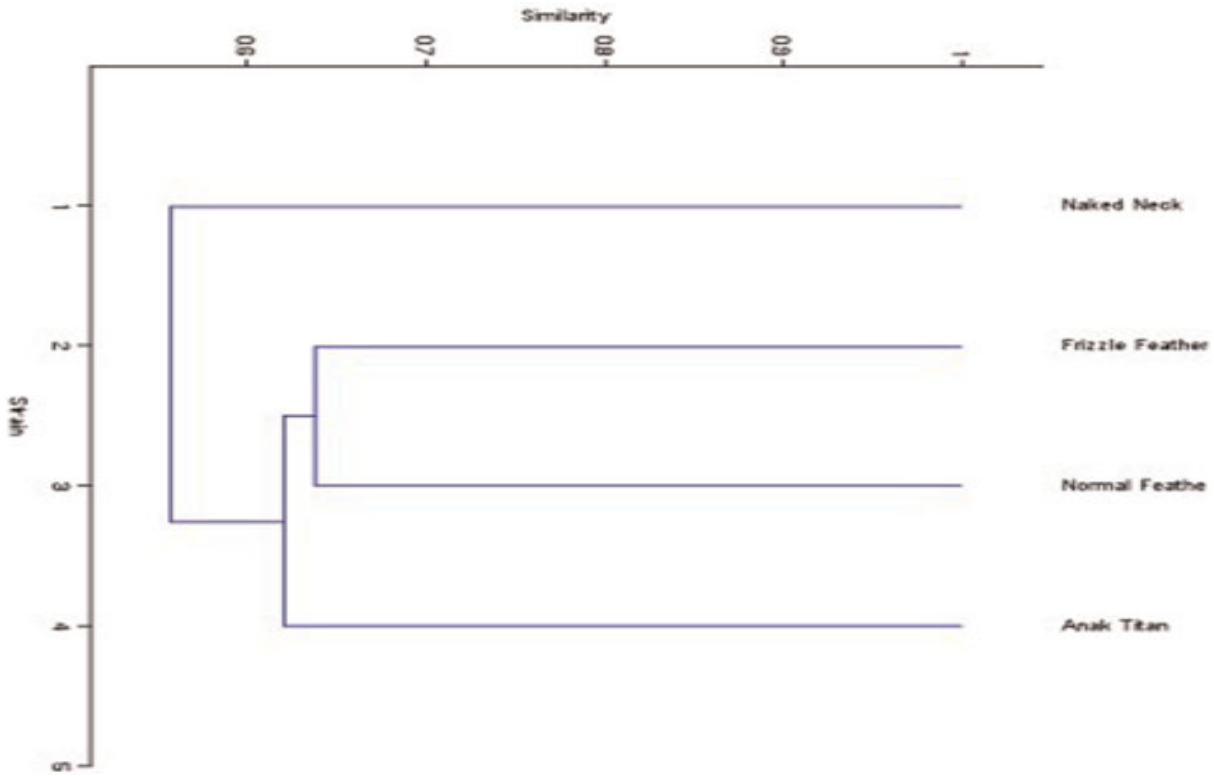

Fig. I: Dendrogram developed by UPGMA cluster analysis showing the coefficient of genetic similarities among the chicken populations studied (Adeleke *et al.* 2011).

Table 2. Reproductive potential of the improved indigenous FUNAAB-Alpha breeds

Parameters	*Naked*	*Normal*	*Frizzle*	*Broiler*
% Fertility	76.67	84.76	90.53	80.12
% hatchability	83.50	89.69	91.36	85.55
% dead in shell	9.46	8.90	7.53	8.23
%Weak in shell	0.53	1.32	0.42	0.35

Source: *Osinbowale, 2017.*

Consequently, a link between the genomic and phenotypic assessment is currently being used in the breed selection for broiler production (Ogunpayimo, 2017). Cocks of 62.5% indigenous lines were persistently been used as the Male line on selected females to generate birds with higher 2.1 to 2.6kg body weight at maturity.

The females' weight varied from 1.6 -1.8 kg and were laying coloured and bigger sized eggs of 49gm at first lay and 55g at peak and later lay. With consistent selection for bigger body weight and more eggs, selection for birds that lay 4 to 6 eggs per week has improved the egg production to 200-250 per annum within the last 3 generations (Adeleke *et al.*, 2006).

A comparative analyses of 6 Indigenous and tropically adapted chicken (iTABS) comprising 2 Indigenous and 4 tropically adapted breeds was carried out within the 5 agro-ecological zones of Nigeria under rural households. Data collection were on growth and reproductive performance, feed conversion ratio and carcass characteristics at 20weeks of age for the males, and reproductive performance for the females up to 52 weeks in lay. Results of the On-Station and On-Farm Testing funded under the African Chicken Genetic Gain Programme are as shown below (Figures II and III). Commendable genetic improvements in both growth and reproduction had been achieved with the Improved Indigenous compared to the pure lines.

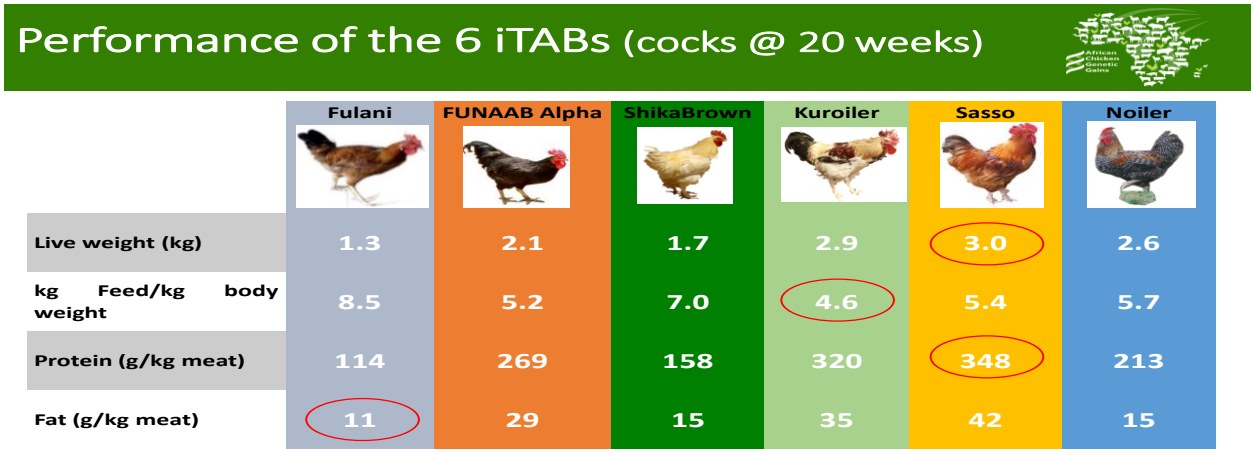

Fig. I: Growth performance of the iTABs on-farm testing (ACGG, Nigeria 2017)

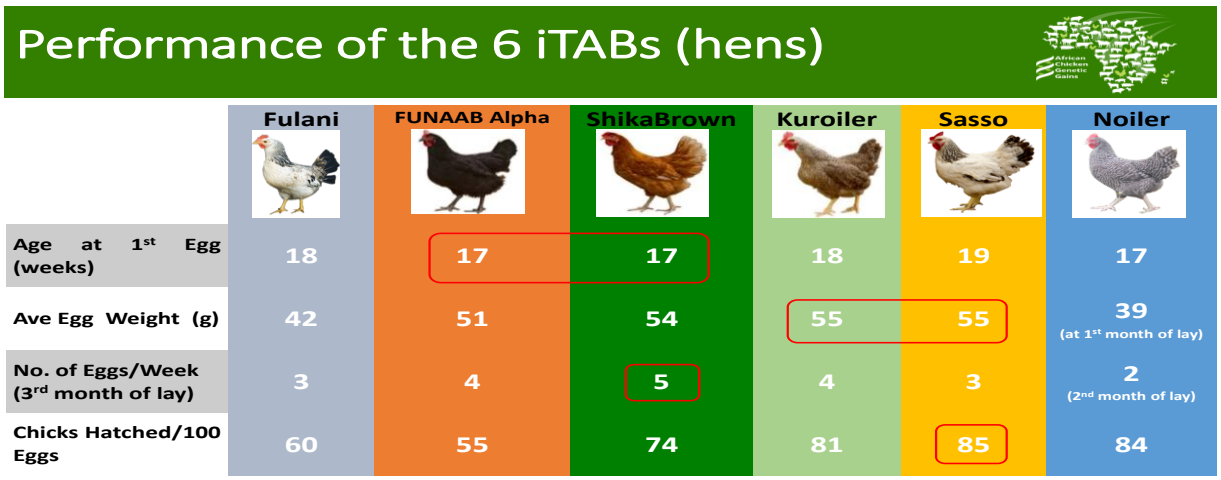

Fig. III: Reproductive performance of birds on on-farm testing (Source: ACGG Nigeria, 2017)

Conclusion and Recommendation

We have succeeded in developing Nigeria's local chicken to comparable standard with the imported tropically adapted breeds. We are currently generating flocks of GPS, PS and commercial lines of the improved indigenous birds with 37.5 to 62.5 % indigenous blood as broiler and dual purpose layers for the economic empowerment of rural households in Nigeria. With the reported performance of the improved indigenous chicken genotypes, it is hereby recommended that Nigeria recognizes the feasibility of genetic improvement of her indigenous birds for commercialization, economic empowerment and improved nutrition of Nigerians aside foreign exchange conservation and enhanced job creation.

Acknowledgement.

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