From PEARL project to ACGG in Nigeria

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First ACGG Nigeria Innovation Platform meeting
Ibadan, Nigeria
20-22 July 2015
Summary

- As far back as 1963 the indigenous chicken had been proposed as the basis of breed development in Nigeria (Modebe, et. al. 1963).

- Other scientists similarly were in agreement. For example, David West (1979), Oluyemi (1979) Akinokun and Detmers (1977), Omeje and Nwosu (1983), Ibe (1990, 1993) etc. all worked with the indigenous poultry.

INTRODUCTION

- Large global breeding companies tend to promote the strains that are used in developed countries.
- Although from temperate regions, the belief is that these breeds are suitable for all environments.
- Most of these strains have been selected and produced for higher productivity, and general robustness under relatively good management and nutrition condition and without much temperature and climatic stress.
- However, the tolerance and productivity of imported exotic animals under sub-optimal conditions are never as optimal as expected in their zone of origin.
- The breeder companies recommend improved management standards and practices that are most unachievable in the target countries.
- There is lack of consideration for the heat stress that often have major impact on performance, especially, growth of broilers because of their metabolic heat output in the tropical environment.

Maintaining reasonable house temperatures is either too expensive or simply not possible owing to limitation in power supply.
Developing Indigenous stocks.

- Poultry genetic resources have suffered significant losses due to:
  - global consolidation of commercial poultry breeding companies.
  - few companies now operate with narrow genetic base.
  - loss of experimental lines, most of which are generated in research institutions due to lack of fund for continuity and retention of lines.

- In Nigeria, indigenous poultry breeds development started in 1994 with initial characterization of genetic resources sourced all over South-Western Nigeria.
Nigeria’s poultry population was put at 140 million in 2007, 80% of which are indigenous non-descript breeds found roaming around homesteads without any special care. Because these birds come relatively handy for economic empowerment of women and children, they should be left in the hand of these small-scale producers where they generate 40-60 eggs per annum.

Nigeria currently has less than 2 million Parent and Grand Parent stock of poultry birds for commercial production, whereas, in the present livestock transformation agenda, the expectation is for the establishment of 40 million Parent stock of poultry birds to fill the gap for poultry meat, eggs and inadvertently to increase the current animal protein consumption of Nigerians from 34 gm per head per day to 80 gm and possibly poultry egg consumption from 60 per head per annum to about 200 per capita per annum.
JUSTIFICATION.

The project is being proposed for:

- Multiplying and effective utilization of our improved indigenous poultry lines.
- Rapid development of GPS and PS for commercial poultry production.
- Rapid generation of animal protein supply to our people at a cheaper rate and
- Most importantly for the economic empowerment of our graduates, YOUTHS, WOMEN AND RURAL HOUSEHOLDS.
In the project we are presently multiplying pure indigenous and the improved indigenous birds in the Gene pool so as to enhance genetic diversity of the GPS lines.

The Gene pool is to be enlarged with the purchase of 3 additional Exotic broiler lines to enlarge our genetic base to 6 lines. From these, 2 GPS lines and 2 PS lines are being generated while the commercial birds will be generated from the middle of the year 2014.

Bearing in mind the essence of minimum operation systems in a Poultry Breeder Farm, Biosecurity issues and adequate data collection, collation and analyses, will involve comprehensive research.
In the South, 4 ecotype or strains were 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 (Table 1).

These generally, are genes found to be affecting the body metabolic processes as reported by Hutt (1949),

- 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 than in fully covered ones.

The Na gene was reported to increase breast meat yield, while the advantages of the F and Na genes over normal feathering conditions was found to be exhibited during egg production.
## Genetic Parameters

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

<table>
<thead>
<tr>
<th>Genetic group</th>
<th>N</th>
<th>% Incidence</th>
<th>Gene frequency</th>
<th>Carriers in the population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>1594</td>
<td>78.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frizzled</td>
<td>223</td>
<td>10.97</td>
<td>F = 0.06</td>
<td>11.64%</td>
</tr>
<tr>
<td>Naked neck</td>
<td>175</td>
<td>8.61</td>
<td>Na = 0.05</td>
<td>9.75%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Na = 0.95</td>
<td></td>
</tr>
<tr>
<td>Frizzled / naked neck</td>
<td>29</td>
<td>1.43</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Dwarf birds</td>
<td>11</td>
<td>0.54</td>
<td>Dw = 0.07</td>
<td>13.51%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dw = 0.93</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GENOTYPES</th>
<th>MEAN AGE AT 1\text{st} EGG(g)</th>
<th>Mean of 14 Day egg production</th>
<th>Mean monthly egg weight(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NORMAL</td>
<td>1268.67±44.61</td>
<td>8.45±0.65 to 11.25±0.15</td>
<td>36.50±0.90 to 53.15±0.35</td>
</tr>
<tr>
<td>NAKED</td>
<td>1105.73±21.99</td>
<td>7.45±0.15 to 10.80±0.10</td>
<td>38.25±1.65 to 52.75±0.65</td>
</tr>
<tr>
<td>FRIZZLE</td>
<td>1381.67±14.12</td>
<td>8.10±0.20 to 10.35±0.25</td>
<td>37.90±0.10 to 54.65±0.05</td>
</tr>
<tr>
<td>DI-HYBRID NAKED</td>
<td>1268.67±18.69</td>
<td>7.60±0.02 to 10.55±0.35</td>
<td>36.70±1.10 to 49.05±0.65</td>
</tr>
<tr>
<td>DI-HYBRID NORMAL</td>
<td>1449.07±37.82</td>
<td>7.40±0.20 to 10.50±0.80</td>
<td>39.90±1.00 to 54.55±1.45</td>
</tr>
<tr>
<td>MARSHALL</td>
<td>2203.87±14.73</td>
<td>7.45±0.15 to 10.20±0.10</td>
<td>49.45±0.95 to 71.65±0.55</td>
</tr>
<tr>
<td>GENOTYPES</td>
<td>Feed/doz egg</td>
<td>Monthly Henhoused egg prodn</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------</td>
<td>-----------------------------</td>
<td></td>
</tr>
<tr>
<td>NORMAL</td>
<td>1.85±0.05 to 2.15±0.15</td>
<td>64.30±0.50 to 80.60±1.00</td>
<td></td>
</tr>
<tr>
<td>NAKED</td>
<td>1.65±0.05 to 2.15±0.05</td>
<td>57.10±1.10 to 74.75±0.25</td>
<td></td>
</tr>
<tr>
<td>FRIZZLE</td>
<td>1.50±0.01 to 2.65±0.05</td>
<td>58.15±1.55 to 69.35±2.05</td>
<td></td>
</tr>
<tr>
<td>DI-HYBRID NAKED</td>
<td>1.55±0.15 to 2.15±0.15</td>
<td>60.25±1.65 to 72.70±5.40</td>
<td></td>
</tr>
<tr>
<td>DI-HYBRID NORMAL</td>
<td>1.65±0.05 to 2.10±0.10</td>
<td>60.50±2.40 to 75.30±0.90</td>
<td></td>
</tr>
<tr>
<td>MARSHALL</td>
<td>2.10±0.05 to 2.80±0.20</td>
<td>53.05±1.05 to 72.75±0.75</td>
<td></td>
</tr>
</tbody>
</table>
Performance of multiplied elite indigenous stock: egg production
Seasonal performance

earlywet  | hdp  | hhp  | Imort
latewet   |      |      |
earlydry  |      |      |
latedry   |      |      |
Alpha Black females
Alpha - Brown females
Alpha Gold cock
Alpha - Blue females
Alpha - Blue cock
Alpha Naked neck cock
Alpha-Naked cocks
Alpha - Naked neck females
Alpha-white cocks
Alpha-White females
Alpha Barred Cock
Alpha barred female
Alpha frizzle
Alpha - Commercial meat lines on
Shika Brown
LIMITATIONS ADDRESSED BY PEARL

- The training of University students on this project will encompass elements of Breeding, Hatchery operation, genetic data analyses and more importantly accelerating breed selection using biotechnology methods.

- It is expected that the following inputs will gradually be in place as we move on in the project:
  - Adequate number of houses for the different lines
  - Adequate number of staff to oversee each unit
  - Establishment of dedicated hatchery
  - Establishment of a poultry processing line with the cold room and storage system
  - Establishment of a feed mill line to ensure quality control of feed utilized.
  - Effective Veterinary care, drug and disinfectant section.
The ACGG programme is coming up on the PEARL project starting from 2015.

On-Station testing of presently available lines will commence in June 2015 on both the Federal University of Agriculture, Abeokuta and the Obafemi Awolowo University.

Birds to be tested will comprise the FUNAAB- alphas, the Fulani, Shika Brown and the Kuroiler.

On-Farm testing will involve 2,700 Rural households spread over 10 States, in 5 agro-ecological zones of the country.

Farmer preferred, adapted, productive chickens for economic empowerment of the women for value addition, improved nutrition and health will be selected for commercialization.

There will be in place public-private partnership for the continuous multiplication to ensure availability, distribution and supply of 3 weeks old pre-vaccinated birds to rural farmers.
RESEARCH TEAM

- Prof Funmi Adebambo---------Team Leader
- Prof. I.A. Adeyinka------------Breeder
- Dr A.O. Adebambo----Breeder/ Biotechnologist
- Dr M.A. Adeleke--------Breeder/ AI specialist
- Dr M. Wheto------Breeder/ AI/ Biotechnologist
- Dr. O.O. Kehinde----Veterinarian
- 4 M. Agric Students.