The High Altitude Plateaux Areas of Nigeria: Meat or Milk Production? A case study of the Obudu Ranch.

By

Olaloku, E.A.,
Department of Animal Science,
University of Ibadan, Ibadan, Nigeria.

A number of 'expert' reports within the last decade have emphasized the need to exploit the comparatively favourable climatic conditions of the high altitude plateau areas of this country to advantage for animal production, particularly milk.

An intimate knowledge of one such area reveals the complex infra-structural problems that must be surmounted in order to achieve a meaningful animal production programme.

The constraints are considered in the light of the desirability for meat or milk production from these areas.

Relationship of skin thickness and milk production levels in cattle breeds maintained in the tropics

By

Amakiri, S.F.,
Department of Veterinary Anatomy,
University of Ibadan, Ibadan, Nigeria.
The mean thickness of the skin from the mid-thoracic area (10–12th ribs) and milk production levels of pure Holstein/Friesian cattle breeds, their 3/4 and 7/8 crosses with White Fulani Zebu, and pure White Fulanis, maintained in South-Western Nigeria were studied. A positive correlation \( r = 0.9990 \) significant at 1% level was found between skin thickness and milk production in these breeds.

It is concluded that for cows maintained in a hot humid tropical environment, comparative mid-thoracic skin thickness could be used as an index of the milk production potential.

**Litter Size of Sows Bred in Different Months, Seasons and Years**

By

Dettmers Almut and Osinowo, O.,
Department of Animal Science,
University of Ibadan.

Over a period of seven years (1967–73), dams which farrowed in the University of Ibadan piggery were classified according to month of breeding. Influences of seasons and months of mating on litter size farrowed subsequently were studied. A total of 848 litters was involved of which average size was 8.8 pigs born alive.
Litter size varied significantly from year to year, but not when matings were compared between six months of wet and dry seasons. But within the dry season it was significant as to whether sows had been bred during the early or late part. Litter size from dams mated during January through March yielded the largest litters. About 0.8 more pigs were born alive to such dams than from those bred during October through December. There was no such differences in litter size of sows bred in the wet season.

The Development of Artificial Insemination of Pigs in Nigeria:
A Preliminary Report.

By

Dede, T.I.,
Department of Animal Science,
University of Ibadan, Nigeria.

Attempts were made to identify the biological and the physical factors that were detrimental to the porcine spermatozoa stored in vitro.

Ten bacteria genera were isolated from the ejaculates of the boards that were used for this preliminary study. The beneficial effects of the antibiotics (penicillin and streptomycin), singly and in combination with one another was confirmed, and the optimal level of the antibiotic mixture in storage media for the porcine spermatozoa, was established. The beneficial effects of the antibiotics in the storage media were however not significant.
SORBITOL DEHYDROGENASE AS AN INDEX OF SPERMATOGENESIS

By

G. N. Egbunike,
Department of Animal Science,
University of Ibadan, Nigeria.

The possibility of using the activity of an enzyme, sorbitol dehydrogenase (SDH) as an index of spermatogenesis was investigated.

Testicular parenchyma obtained from 39 boars after sacrifice were used to assay for the enzyme activity according to Boehringer Biochemical test combinations instructions (1970).

The specific SDH activity per gram deproteinised testicular parenchyma was negatively and not significantly correlated \( r = -0.02 \) with the daily spermatozoa produced per gram testicular parenchyma. The results failed to support the view (Bishop, 1968) that SDH activity could be used as an index of spermatogenesis.
Eighteen bred Yorkshire gilts were allotted to 3 equal treatment groups and fed fresh cassava diets containing 0 mg, 250 mg and 500 mg cyanide (added as KCN) per kg. of fresh cassava offered, making up treatments 1, 2 and 3 respectively.

Dietary cyanide level had no significant effect on body weight gain, serum thiocyanate or serum protein bound iodine concentration in the gilts. Serum protein bound iodine was however reduced as gestation progressed in the three experimental groups.

Slaughter data also showed that weight and number of foetus was not significantly influenced by dietary cyanide level. Differences in weights of thyroid, spleen, heart, kidney and liver of foetuses did not show any correlation with dietary cyanide level. Weight of organs from the slaughtered gestation gilts were
also similar except for a non-significant increase in thyroid weight with each increasing level of dietary cyanide.

Foetal serum thiocyanate concentration was significantly higher (P 0.05) on the 500 ppm added cyanide group. Rhodanese activity was similar in foetal liver and kidney in all treatments groups. Tissue protein concentrations in the control group was however significantly higher than on cyanide containing diets.

Pathological studies showed proliferation of glomerulus cells of the kidney in gilts in all treatment groups. Diminutive activity of the thyroid gland was also observed in both gilts slaughtered on the 500 ppm added cyanide group. Data provided supports the view that cyanide intake over long term periods (as with the reproductive herd) can cause cummulative repercussions in pigs.

**COMPARATIVE STUDIES OF THE REPRODUCTIVE PHYSIOLOGY OF NIGERIAN AND EXOTIC POULTRY BREEDS**

1. **TESTES AND SEMEN CHARACTERISTICS OF CHICKENS**

By

G. N. Egbunike and J. A. Oluwemi,
Department of Animal Science,
University of Ibadan, Nigeria.

This study involved 48 adult cocks consisting of six birds from each of four breeds namely White Rock (WR), Rhode Island Red (RIR), White Leghorn (WL)
and Nigeria (NIB). Their average age and liveweight were respectively
nine months and 1.93kg.

The WR cocks had the heaviest paired testes weight (25.06g) followed
by RIR (21.36g), WL (18.24g) and NIB (16.54g). These weights accounted
for 1.04%, 1.02%, 0.98% and 1.23% of their liveweights respectively while
specific gravity was 1.048, 1.038, 1.058 and 1.048.

The semen characteristics were as follows:

<table>
<thead>
<tr>
<th>Breeds</th>
<th>WR</th>
<th>RIR</th>
<th>WL</th>
<th>NIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Semen Volume (ml)</td>
<td>0.63</td>
<td>0.60</td>
<td>0.36</td>
<td>0.33</td>
</tr>
<tr>
<td>Sperm Motility (%)</td>
<td>63.34</td>
<td>62.80</td>
<td>59.23</td>
<td>58.12</td>
</tr>
<tr>
<td>Concentration(x 10^9)</td>
<td>3.03</td>
<td>2.59</td>
<td>2.43</td>
<td>2.75</td>
</tr>
</tbody>
</table>

These semen characteristics were significantly influenced by breed and time
of semen collection except with the volume on which the effect of time of collection was not significant.

Results reported herein indicate that WR cocks produced and ejaculated
the largest quantity of sperms and was followed in order by RIR, NIB and WL.

STUDIES ON THE CARCASS QUALITY OF SHEEP:
A PRELIMINARY ANALYSIS OF DATA FROM LOCAL AND CROSS-BRED
RAMS,
BY

I. F. Adu and W. I. Brinkman,
Nat. Animal Production Research Inst.,
Ahmadu Bello University, Zaria.
Apart from a few slaughter figures, there are no carcass data available for local or cross-bred sheep in Northern Nigeria. A preliminary study was, therefore, conducted as an initial contribution to the evaluation of the indigenous sheep as meat animals in Nigeria.

Data are presented on the liveweight gains, efficiency of feed utilization and the carcass characteristics of six Yankasa and six Cross-breds fattened on improved *Digitaria Smutsii* plus a concentrate supplement fed at daily rates of 750g per head.

Liveweight gains and the efficiency of feed utilization were generally low. The crosses had higher dressing-out percentages, and on the whole, better carcass characteristics. It is concluded that the local sheep and their crosses are good meat animals whose potentials merit further investigations.

**EFFECTS OF HOLDING TIME, GLYCEROL TREATMENT AND DEEP FREEZING ON LOSS OF LACTIC DEHYDROGENASE OF BOAR SPERMATOZOA**

By

Osinowo, O. and Salamon, S.,
Department of Animal Husbandry,
University of Sydney, Australia.
Two factorial experiments were conducted to examine the effects of holding time, glycerol treatment and deep freezing on loss of lactic dehydrogenase (LDH) from boar spermatozoa. Holding boar semen for up to 3 hours before dilution and cooling had no significant effect on LDH release.

Addition of glycerol to spermatozoa at 30°C caused greater loss of LDH than addition at 5°C.

Deep freezing of boar spermatozoa resulted in up to two-fold increase in LDH activity in the extracellular fluid, although the increase was considerably less in some semen samples.

OPTIMAL AGE FOR BREEDING THE WEST AFRICAN DWARF SHEEP

By

Akinuli, Adeleye and Ngere,
University of Ibadan, Ibadan.

Data is presented to show that there may be an optimal age for breeding sheep to obtain maximal performance in some reproductive parameters. This age is not necessarily a function of age at physiological maturity alone. Practical implications of this result are discussed.
DIURNAL CHANGES IN THE THERMAL BALANCE
OF CHICKENS UNDER HUMID TROPICAL CONDITIONS

By

G. N. Egbonike,
Animal Science Department,
University of Ibadan, Ibadan.

This investigation involved 80 Yarkon layers and lasted for nine months. The afternoon rectal temperature (40.64°C) and respiratory rate (41.77 breaths per minute) were significantly higher than the morning values of 40.61°C and 39.75 breaths per minute respectively.

When calculated on monthly basis, highly significantly differences in rectal temperatures (P 0.005) and respiratory rates (P 0.025) were observed suggesting that the season has a pronounced effect on the thermal comfort of chickens.

The physiologically effective temperature was significantly correlated with diurnal change in rectal temperature (P 0.05) but not with either the rectal temperature or respiratory rate.

EVALUATION OF SOME CRYOPROTECTIVE COMPOUNDS
FOR DEEP FREEZING BOAR SPERMATOZOA

By

Osinowo, O.¹ and Salamon, S.,
Department of Animal Husbandry,
University of Sydney, Australia.
Three factorial experiments were conducted in which the suitability of ethylene glycol, triethylene glycol, propylene glycol, dimethyl sulphoxide, glycerol and erythritol were examined as cryoprotective compounds for deep freezing boar spermatozoa. The best protection to spermatozoa was given by glycerol and erythritol. Of the other compounds, only dimethyl sulphoxide gave some protection. Erythritol gave substantial protection in the absence of glycerol, when included in the diluent at levels ranging from 0.5 - 1.5M concentrations.

The replacement of glycerol - in the diluent - by erythritol prior to deep freezing resulted in better survival than when either cryoprotective compound was used alone.

HETEROSIS FOR REPRODUCTIVE PERFORMANCE IN TRYPANOTOLERANT BEEF CATTLE BREEDS IN SOUTHERN NIGERIA

By

Olutogun, O. and Almut Dettmers,
Department of Animal Science,
University of Ibadan.

Heterosis for age at first calving (AFC), average calving interval (ACAI) and the average number of calves produced per cow (ANC) were analyzed in
N'Dama, Ketuku and their crossbreds under an extensively damaged beef cattle operation in the Southern Guinea Savannah of Nigeria. The cows were born from 1952 to 1972 at the Upper Ogun cattle Ranch. Age at first calving was defined as the difference between the birthdate of a cow and the date she produced her first live calf while ACAI was the mean interval between her successful parturitions. The average heterosis for AFC was 9.9% (P < .01) while for ACAI it was 4.6% (P < .05). The crossbred dams also showed a 42.3% (P < .01) superiority for ANC. The increased number of calves produced per dam and the lower AFC and ACAI figures supported the general hypothesis that the primary effect of heterosis is more pronounced on the reproductive traits. The largest heterosis effect was for fecundity in these trypanotolerant breeds. Further observation showed that trypanotolerance was not diminished in the crossbreds and even the crossbreds were more resistant to streptothricosis than the Ketuku but less than N'Dama. Since the vast Southern Guinea Savannah of Nigeria is perennially tsetsefly-infested but more pasture productive, it appears that the use of these trypanotolerant breeds for crossbreeding for beef will be prominent in the future strategy for beef cattle production in the zone.
CONGENITAL SYNDROME IN CALVES:

By

Ojo, S.A., D.V.M., M.S.,
Department of Veterinary Anatomy,
Faculty of Veterinary Medicine,
Ahmadu Bello University, Zaria.

Tibial Hemimelia is a part of a congenital syndrome that may include agenesis of patella, tibia, nonclosure of the pelvic symphysis, Craniotabes, Meningocoele, Internal hydrocephalus, Cryptorchidism or nonfusion of Mullerian ducts. This syndrome was found in 7 Galoway Calves. This congenital defect is most likely inherited as a simple autosomal recessive. The herd history, radiological changes, genealogy and the pathological changes will be presented and discussed.

COMPARISON OF THE IFE BREED OF THE INDIGENOUS CHICKEN OF NIGERIA WITH AN IMPORTED EXOTIC STRAIN: 2 BODY WEIGHT AND SEXUAL MATURITY

By

Osu Akinokun, Department of Animal Science, University of Ife, Ile-Ife, Nigeria.

and

A. Dettmers, Dept. of Animal Science, University of Ibadan, Ibadan, Nigeria.
Two breeds of chickens, the indigenous chicken of Nigeria, the Apollo and an Exotic Strain hatched at University of Ife were brooded and reared to sexual maturity under usual modern management. Body weight at 4, 12 and 20 weeks were taken and age at sexual maturity was recorded for each pullet in two generations. Body weight and age at sexual maturity varied widely between breeds, hatches and years. Mean body weight at 4, 12 and 20 weeks, and age at sexual maturity were respectively 180.8g, 643.5g, 1041.3g and 168.7 days for the indigenous chickens, and 189.9, 655.8, 2146.1 and 169.3 for the Apollo in the first generation. The figures for the second generation were 136.7, 638.7, 1125.3, 154.3 for the indigenous chicken, and 158.2, 664.3, 1297.6 and 161.5 for the Apollo. There were significant breed and hatch effect on body weight and sexual maturity, and highly significant effect on 12-week and 20-week weight on age at time of sexual maturity.

PREVENTION AND CONTROL OF SOME ECONOMICALLY IMPORTANT PIG DISEASES IN S. NIGERIA

By

Ayanwale, F.O. and Esuruoso, G.O., Dept. of Veterinary Public Health and Preventive Medicine, University of Ibadan, Ibadan, Nigeria.
We have been involved in the health programmes of various piggeries in Southern Nigeria for a number of years. During this period, we observed that abortions, still births, agalactia, piglet diarrhoea, and unthriftiness were the most important economic conditions in the farrowing houses.

To combat these important conditions we have evolved a fairly comprehensive procedure which includes continuous investigations and appraisals as well as a number of routine treatments, vaccination programmes and the early detection of sub-clinical diseases that may cause great economic losses without being spectacular. Slides will be shown to illustrate our findings and recommendations. Other diseases that occurred sporadically will also be mentioned.

**EFFECT OF INFECTIOUS BURSAL DISEASE (GUMBORO DISEASE) ON POULTRY PRODUCTION IN NORTHERN NIGERIA**

By

Bishu, G., Akerejola, O. O. & Alhaji, I.,
Faculty of Veterinary Medicine,
Ahmadu Bello University, Zaria.

Poultry population in Nigeria is estimated to be 83 million (FAO Animal Health Year Book, 1971). This constitutes the largest animal protein source in the country.
Infectious poultry diseases of economic importance have been recognised for several decades in Nigeria and Vaccines are produced to lower losses arising from them.

Other diseases previously unnoticed have recently started to produce severe losses in poultry industry among which is Infectious Bursal Disease.

This paper discusses the incidence of the disease in northern states of Nigeria, the economic importance it is assuming and approximate losses that are being sustained. Suggestions as regards methods of curbing the spread are also made.

**SALMONELLOSIS IN COMMERCIAL POULTRY**

By

Esuruoso, G. and Ojo, M. O.,
University of Ibadan, Ibadan, Nigeria.

We document a classical outbreak of Salmonellosis in the breeding section of a Commercial Poultry in Oyo State. We describe the diagnostic criteria that enabled us to reach an early diagnosis. We then discuss the epidemiological factors that may have contributed to the outbreak. We conclude that while a general programme of Fowl Typhoid vaccination may be laudable, there are certain situations when routine testing and elimination of reactors should be preferred.
When outbreaks of salmonellosis occur in breeding birds, we usually recommend that all affected birds should be culled to remove the risk of spreading the disease in the hatchery. But even when there is no outbreak, it is rational to test breeding hens for salmonellosis and remove the reactors in order to eliminate silent carriers of the disease. Whenever this procedure is indicated, very often, the reagents are not available.

We have, therefore, started to produce our own diagnostic sera locally and would like to share our experience with others who may find themselves in similar situation where tests could not be carried out with necessary confidence because there is no positive control serum. After using various regimes of immunization and testing the level of agglutinins in our sera, we concluded that the most efficient method of raising positive control sera for blood agglutination test involves the use of Freund's complete adjuvant in our antigen. Four doses of the immunizing antigen on days 0, 3, 7 and 14 produced high titre sera on day 21.
PREGNANCY IN SLAUGHTERED COWS IN ZARIA

Incidence and Relationship to Season, Age and Carcass Weight.

By

Ojo, S.A., D.V.M., M.S.,
Department of Veterinary Anatomy,
Faculty of Veterinary Medicine,
Ahmadu Bello University, Zaria.

A source of wastage well recognized by abattoir personnel but perhaps overlooked by veterinarians and stock-owners is the slaughter of pregnant cows.

Described here is an abattoir study which defined the magnitude of this avenue of wastage in Zaria slaughter houses and which related pregnancy and ovarian status at slaughter to season, age and carcass weight.

A total of 6728 postpuberal beef cows slaughtered in the three slaughter houses in Zaria were examined to define the extent of wastage due to the slaughter of pregnant cows.

On the basis of examination of teeth, most cows (57%) were considered immature (approximately 3.5 to 7 years) at slaughter. 14.5% were young (9 months - 3.5 years) and 28.5% were old (over 7 years).

60% of slaughter cows were pregnant and 40% of these cows were in the second trimester. This high pregnancy rate was considered an important source of herd wastage. Pregnancy rate varied little with season, but the highest
percentages of cows pregnant in the first and third trimesters were recorded in March to June and July to September respectively.

Most cows found non-pregnant had active ovaries at time of slaughter. Anoestrus was observed to be most common in the harmattan season (December to March) and in old cows. Lactation status was not recorded. Mean cold carcass weight of 4,002 cows was $160 \pm 40$ kg. Maximum carcass weight was observed in cows slaughtered at 4 to 5 years of age; old cows had the lowest carcass weight ($140 \pm 30$ kg) of the age groups considered.

Carcass weights in relation to pregnancy or ovarian status were ($170 \pm 40$ kg) in non-pregnant or Ovary-active and ($135 \pm 40$ kg) in non-pregnant/anoestrus cows. Carcass weight of cows in the third ($165 \pm 35$ kg) was greater than those in the second ($160 \pm 35$ kg) or first ($156 \pm 35$ kg) trimesters. The difference between the first and third trimesters was significant ($P < 0.01$). The use of pregnancy diagnosis is suggested in reducing this source of wastage.

**CHANGES IN MINERAL CONTENTS OF FORAGE ON NIGERIAN SAVANNA RANGE**

By

M. Moisa Kapu,
Department of Biological Sciences,
Ahmadu Bello University,
Zaria, Nigeria.
The current report presents a summary of earlier reports on the range forages of northern Nigeria, as well as the possible relationship between forage mineral contents and the grazing Zebu cattle. Most of the forage genera studied were deficient in phosphorus, sodium, calcium and zinc for milking cows, at all stages of sampling. Bone meal and zinc supplementations significantly raised the plasma phosphorus and zinc levels. The concentrations of cobalt, iron, crude protein, phosphorus, potassium, sodium and copper, tended to decrease with increasing maturity. Crude protein was adequate in most browse species, but deficient in the grasses at bloom (in August) and at maturity (in December). The crude protein was more than adequate in the grasses at flush (in April). Analysis of variance showed differences between genera, indicating that these forages could be genetically selected to obtain desired mineral content for livestock feeding. Simple correlations showed a tendency for phosphorus and crude protein to be related to most of the other elements. Crude protein and copper tended to be more concentrated in the browse than in the grasses. The opposite was true for calcium.
PROTEIN LEVELS FOR GROWING CALVES

By

Umura, N.N. and Dankintafo, A.,
Department of Animal Science,
Ahmadu Bello University,
Zaria, Nigeria.

Forty-eight Bunaji and Bunaji X Friesian crossbred steers calves were used in two studies to compare protein levels for growth. In both studies, the calves were randomly assigned to the three dietary crude protein levels 12.1, 16.3 and 20%. The ration which comprised 40% elephant grass silage and 60% balanced supplement (D.M) was fed to the animals individually. The average daily gain (ADG, kg), feed intake (kg) and feed/kg body gain (kg) were respectively 0.53, 4.70, 9.10 for the low protein; 0.57, 5.34, 9.85 for the medium protein and 0.46, 4.41, 9.61 for the high protein rations in the first trial and 0.55, 5.11, 10.01 for the low protein, 0.55, 5.13, 9.52 for the medium and 0.42, 4.31 and 12.25 for the high protein rations in trial 2. There were no significant (P .05) differences in both ADG and feed efficiency in both studies but feed intake of steers fed the 16.3% protein ration in trial 1 was significantly (P .05) greater than for the other treatments. There did not exist any difference between the zebu and their crosses in all the parameters measured. However,
in almost all cases, the crossbreds were slightly more efficient and consumed more feed. These studies are being repeated but it would seem that growing rations with 12-16% crude protein is adequate, for there appeared to be no advantage in going beyond 16% crude protein.

**FEEDING TRIALS WITH SHEEP**

By

Brinckman, W. L.,
National Animal Production Res. Institute,
Shika, Zaria.

Since 1971, a large number of feeding trials with sheep have been carried out at the National Animal Production Research Institute, (formerly Shika Research Station).

Those trials involved different breeds of sheep (Yankasa, Uda, and crosses with Wensleydale and Suffolk rams), different hays (Chloris gayana, Andropogon gayanus, Digitaria smutsii, stylosanthes humilis, stylosanthes guayanensis, and Arachis hypogaea), and different pastures (Chloris gayana, Digitaria smutsii, Pennisetum typhoides, S. humilis and S. guayanensis). Experiments were either supplemented or unsupplemented with about half a kilogram of concentrates.

The results show that high gains are possible if high quality roughages are
used. Highest gain for local animals was 168 g/day whereas crossbred rams gained 251 g/day under optimum conditions.

The advantage of crossbreds over local animal is discussed.

GROWTH RATE OF WEANING KIDS AND LAMBS FED FRESH FORAGE OF THREE CYNODON GENOTYPES

By

Munyabuntu C. M. and Ademosun, A. A.,

Weaning kids and lambs of the West African dwarf goats and sheep respectively were fed fresh Cynodon forage of the genotypes Cynodon nlemfuensis var robustus (IB1), Cynodon nlemfuensis var nlemfuensis and Cynodon dactylon var aridus (IB17) for a period of 36 weeks. The forage was cut daily at a regrowth stage of 6 weeks and fed twice a day at about 8.00 a.m. and 2.00 p.m. A supplementary concentrate ration of 0.23 kg per animal per day was given at 8.00 a.m. with the morning feeding. There were four sheep and four goats on each genotype.

The animals performed well and gained weight all through the period of study. Growth rate reached a peak during the rainy season. Sheep showed greater increases in weight gains over the wet season and greater decline during the dry season (P 0.05). However, there was no general significant difference in weight
gains between the species. This indicates that goats tolerate harsh conditions better while sheep show faster growth when the conditions are optimum. The rainy season promoted significantly (P < 0.05) greater growth than the dry season. The genotypes did not show any significant differences in growth rate promotion over the entire period. It was, however, observed that with the onset of the dry season the quantity of forage produced for feeding declined, the IBI showing the greatest decline. This suggests that IBI could be more nutritive since despite the very much less forage it provided for feeding, animals on it performed as well as the others.

The three genotypes were all found suitable for animal feeding in a fresh form with supplementary feeding.

THE NUTRITIVE VALUE, VOLUNTARY INTAKE AND DIGESTIBILITY BY SHEEP OF PENNISETUM PURPUREUM (SCHUM) AND OF THREE INTERSPECIFIC F1 HYBRID GENOTYPES

By

F. O. Olubajo,
Department of Animal Science,
University of Ibadan, Ibadan.

and

H. R. Chheda, Agronomy Department.
University of Ibadan, Nigeria.
The nutritive value of selected elephant grass (*S.13* *Pennisetum purpureum* Schum) and three interspecific F₁ *Pennisetum* hybrid genotypes, namely Hybrids 1, 12 and 15, was studied in 5 digestion trials with 12 West African dwarf sheep. Results indicated that the dry matter, organic matter, crude protein and the energy were digested to approximately the same extent in the *Pennisetum* and its hybrids. Hybrid 12 had a slight but non-significant (P 0.05) superiority over others in these respects.

With the exception of the energy and digestible energy intakes (g/kg *W⁰·⁷⁵*) where differences between treatments were significant (P 0.001), the differences between treatments in the intakes of dry matter, organic matter, crude protein and their digestible components were not significant (P 0.15). Both the energy and digestible energy intakes (g/kg *W⁰·⁷⁵*) of either *Pennisetum* or Hybrid 12 were significantly higher (P 0.001) than for each of the other two hybrids.

The voluntary dry matter intake was positively correlated with the dry matter digestibility for each of the treatments studied. The correlation coefficient in each case was however low and with the exception of hybrid 12, was not statistically significant (P 0.05).

The mean daily liveweight increases during the experimental period were approximately 16.9, 20.4, 24.7 and 10.5 g per head for the rams fed elephant
grass, hybrids 1, 12 and 15 respectively.

Earlier grazing trials have shown that cattle grazed the hybrids more readily than the elephant grass and hybrids 12 and 15 were consumed in significantly larger quantity compared to the elephant grass. On the basis of the results of the present studies, large scale and longer grazing trials are still needed before any tacit conclusion and recommendations could be made.

PERFORMANCES OF RUMINANTS ON STYLOSANTHES HUMILIS PASTURES IN A NORTHERN GUINEA ZONE CLIMATE

By


Yield components, species composition and dry season liveweight gains were measured for several well-established Townsville stylo pastures in Shika (11° 10' N, 7° 30' E).

Total yields ranged from 3.5 to 6.0 t DM/ha with a legume content varying from 30 to 70 percent, when measured at the beginning of the dry season.

Weight gains for cattle and sheep averaged 250 g/day during the first 8 weeks but dropped thereafter as most legume forage had been consumed. It is concluded that Townsville stylo pasture can provide a maintenance roughage diet when grazed at a stocking rate of 200 kg liveweight per ha (1 steer or 5 mature sheep) for a six months dry season.
PERFORMANCE OF YANKASA RAMS ON INTRODUCED PASTURE 
HAY SUPPLEMENTED WITH GROUNDNUT CAKE

By
Adu, I. F., Agishi, E. C. & Brinckman, W. L., 
National Animal Production Res. Inst., 
Ahmadu Bello University, Zaria.

The performance of local Yankasa sheep was assessed in feeding and metabolism trials with sixteen rams and twelve wethers on hays from four introduced pasture species, viz: Brachiaria decumbens Cv Basilisk (A); Cenchrus ciliaris Cv Gayndah (B); Stylosanthes guayanensis Cv. Endeavour (S); and Stylosanthes guayanensis Cv. Cook (D) supplemented with 220 g Groundnut cake per head per day. The hays came from pastures that were established in July, 1975 from seeds brought two months earlier from Queensland, Australia.

Feed intake, growth rate and N-utilization were measured and the intake figures were used to calculate the digestible energy used to give expected gain.

Daily liveweight gains were significantly (P 0.05) different between the treatments with the Endeavour stylo hay giving the most satisfactory performance.

Forage intake was generally lower than the standard forage intake of 80 g/kg w^{0.75}. N-utilization was higher in the legume hay treatments.
FEEDLOT PERFORMANCE AND CARCASS CHARACTERISTICS OF BULLS FED DIFFERENT PROTEIN-SOURCE RATIONS

11. Comparative influence of protein sources on feedlot performance, carcass characteristics and economics of meat production.

By

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Department of Animal Husbandry,
National Animal Prod. Research Institute,
Ahmadu Bello University, Zaria.

A feedlot trial was conducted to study a comparative animal performance, carcass characteristics and economics of meat production from bulls fed six different protein-source rations containing: brewers dried grains, groundnut cake, delinted cotton-seed cake, beef cubes and whole undelinted cotton-seed.

The study was divided into two phases: growth, and finishing, using 60 bulls which were divided into 6 protein-source groups of 10 bulls each and were individually fed for 133 days. Weekly body weights, daily feed intake, dressing percentage, marbling score and feed efficiency were measured. Digestibility levels of the rations were determined.

Considering all the parameters measured, the cotton-seed ration was the poorest for growth but the cheapest for finishing cattle. The two cotton-seed cake rations produced similar results and had the overall best results, while there was
no significant differences between the performance of animals on groundnut cake and beef cubes. Results from these feedlot series of trials showed that there is no economic justification to transport brewers dried grain from the southern parts of Nigeria to the northern parts as a source of protein for the feedlot animals. Cotton-seed cakes were the most efficient in these studies and should be preferably recommended at least in the northern parts of Nigeria considering all the agro-industrial changes and development.

INTAKE AND DISTRIBUTION OF ENERGY IN FAECES, MILK AND BODY TISSUE OF LACTATING WHITE FULANI (BUNAJI) ZEBU CATTLE

By

Olaloku, E. A.,
Department of Animal Science,
University of Ibadan, Ibadan.

32 White Fulani (Bunaji) Zebu Cattle, were divided into groups of 16 each, grazing with or without supplementation. Each group was sub-divided into four groups of four each according to the stage of lactation.

The daily intake of gross energy, faecal output, milk production and liveweight changes were determined in feeding trials lasting for four 28-day periods with 7-days in-between periods for a change-over to a new ration treatment.

Relating the gross energy intake to the losses in faeces and secretion in milk and body tissue showed that faecal energy losses accounted for 33.09 - 45.74% of
the daily gross energy intake of the cows.

The energy secreted in milk ranged from 7.48 - 10.21%, whilst that deposited as body tissue was only 1 - 2% of the gross energy consumed.

The total energy balance of the cows was rather low, ranging from 8.65 - 11.40% of the gross energy intake.

**THE WATER INTAKE OF TWO BREEDS OF EXOTIC DAIRY CATTLE IN A TROPICAL ENVIRONMENT**

By

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Sixteen exotic dairy cows (8 Friesian and 8 German Brown) weighing between 338 and 152 kg were used for the experiment. They were divided into two groups. While the first group was stall-fed, the other was grazed on *Cynodon nlemfuensis* var. *nlemfuensis*. Each group consists of 4 Friesian (F) and 4 German Brown (GB) cows. Water intake was measured with water troughs - one trough for a cow. One water-trough was placed in the middle of the byre housing the animals or grazing paddocks as a control to measure losses due to evaporation.

Results showed that F and GB cows consumed 480.28 and 356.36g/day/head/\(W^{0.73}\)kg respectively. Respiration counts was 45.03 for the F and 43.97 counts/min. for the GB. Drinking activity was greatest during the day between 9.00 and
19.00 hours. Grazing cows consumed higher volumes of water than stall-fed ones; 33.80 kg for the former and 32.28 kg for the latter. However, stall-fed cows had a slightly higher water intake per kg DM feed than the grazed. Animals on high forage consumed more water than those on high concentrate. These observations and the implication of the high water intake on production especially during the dry season are discussed.

BREWER'S DRIED GRAINS (BDG) AS SUPPLEMENTAL NITROGEN FOR GROWING CATTLE

By

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Two feeding trials were conducted to evaluate the protein of BDG in cattle growing rations. Eighteen group-fed steers were used in trial I which lasted 62 days. In the second trial lasting 81 days, 24 steers and heifers individually fed were used. The calves were randomly assigned to the treatments which corresponded to sources of protein viz: cottonseed cake (CSC) urea, and BDG for trial I and CSC, urea, BDG and BDG-urea for trial 2. In trial I, average daily gain (kg) and feed/kg body gain (kg) were 0.06, 9.17; 0.60; 11.70; 0.80; 9.34 respectively. In trial 2, the same parameters were 0.31, 8.93; 0.18; 20.54; 0.23; 0.20; 14.81 respectively. Calves fed BDG or BDG-urea gained faster and
more efficiently (P 0.05) than those on urea but slightly less than those on CSC. D. M. digestibility was reduced by BDG inclusion. The poor performance of the urea-fed animals could partly be attributed to its rapid hydrolysis to ammonia, while the better performance of the BDG or BDG-urea animals could in part be explained by its slow degradation in the rumen and thus by-passing the rumen for a more efficient utilization in the abomasum.

**UTILIZATION OF COCOA HUSK DIETS BY BROILERS**

By

Adeyanju, S. A., Ogutuga, D. B. A. and Ilori, J. O.

The feeding trials were conducted in which Cocoa Husk (CH) was incorporated into broiler diets at varying levels and the performances of the broilers evaluated.

In the first trial, starter diets containing 0, 5, 10 and 15 percent CH respectively were fed to Cobb broiler chicks up to 6 weeks of age. The results indicated that there were no significant differences in feed intake and average feed costs as the level of CH in the starter diets increased. There were significant decreases in body weight and efficiency of feed utilization as the level of CH increased. Although the 10% CH diet promoted growth satisfactorily, feeding CH beyond 5% in starter diets at isocaloric and isonitrogenous levels proved uneconomical.
In the second trial, finishing diets containing 0, 10, 15 and 20% CH were respectively, fed to 6-week old broilers. The results showed that there were no significant differences in body weight gain, final body weight, feed/gain ratio and estimated gross income as the level of CH increased in the finishing diets. On isocaloric and isonitrogenous basis, broilers would accept more than 20% CH in finishing diets but all the diets containing CH proved significantly less economical than the control diet in terms of average feed cost, feed cost/kg and feed cost/kg body weight gain.

THE EFFECT OF ADDED FAT TO CASSAVA-BASED RATIONS
ON GROWING WHITE LEGHORN BIRDS

By


Growing white leghorn Cockerels were offered 4 rations containing either 0, 15, 30 or 45% cassava meal each supplemented with 2% palm oil from 6 to 12 weeks in an experiment designed to determine the supplementary effect of palm oil on the utilization of cassava in poultry rations. The rations were isocaloric and isonitrogenous.

The average daily gain (g), average daily feed consumption (g) and feed conversion were 16.46, 16.64, 16.68 and 16.13; 60.37, 64.33, 62.69 and 63.41; 3.66, 3.87, 3.76 and 3.96 for 0, 15, 30 and 45% cassava meal rations respectively.
These differences were not significant (P 0.05). There were no significant differences in weights of plucked carcass, liver, heart and gizzard and also in the length of intestine and caecum.

Added palm oil reduced the dustiness of cassava rations thereby promoting more efficient utilization of those diets. It is recommended that oil be added to rations containing high levels of cassava meal.

CUTTING INTERVAL AND LEVEL OF STYLOSANTHES GRACILIS IN DIETS FOR LAYING HENS

By

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A study is reported herein in which 432 White Leghorn laying hens were fed diets containing Stylosanthes gracilis (stylo) harvested at 3 or 4 weekly intervals. Harvests made at 3 or 4 weekly intervals were each formulated into isocaloric and isonitrogenous diets containing 5, 10, 15 or 20% of stylo. The control ration contained no stylo. Sixteen birds were fed each experimental diet and treatments were replicated three times. The experiment lasted 6 months.

The addition of stylo reduced egg production and feed efficiency but had no effect on egg weight and feed intake. In terms of egg production and feed efficiency, the results showed that the control ration was significantly superior to all the other
rations (P 0.01). Stylo additions improved yolk colour and vitamin A status of egg yolk, however, this study showed that stylo additions to a layer’s ration should not exceed the 10% level. The performance of the birds was not affected by the cutting interval.

**CASSAVA PEELS FOR FINISHING PIGS**

By

Sonaiya, E. B. and Omole, T. A.

Cassava peels were sundried, ground into meal (CPM) and incorporated into finishing rations of local pigs at 0, 5, 10, 15% levels. There was no difference in dry matter digestibility through digestibility and metabolizable energy decline with increasing levels of CPM. All CPM diets were more efficient and promoted faster growth rate in pigs than the control diet. The 10% CPM diet induced the fastest rate of gain and highest feed conversion efficiency. Higher levels of CPM tended to improve carcass quality. The 15% CPM diet produced superior carcass measurements than any other treatment. High levels of cassava peel in the finishing rations of pigs produced slower rates of gain but better quality carcass in terms of backfat thickness, % lean cuts, loin-eye area and % fat on loin than lower levels or % cassava peel.
THE EFFECT OF STREPCILLIN ON THE PERFORMANCE OF WEANING LOCAL PIGS

By

Ilori, J. O. and Adeyanju, S. A.

A study involving 60 weaning Local Pigs was undertaken to investigate the effect of strepcillin (a mixture of streptomycin and penicillin) on live weight gains, feed efficiency and the incidence of scouring in pigs. Strepcillin was administered at levels of 0, 25, 50, 75 and 100 g/ton of feed. Results showed that pigs receiving this antibiotic showed a significant increase in rate and efficiency of gain. Although the incidence of scouring was generally low in this study, yet strepcillin additions reduced scouring in weaning local pigs.

THE INFLUENCE OF LEVELS OF DIETARY PROTEIN AND SUPPLEMENTARY COPPER ON THE PERFORMANCE OF GROWING RABBITS

By

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Ninety-six 6-week-old New Zealand White Rabbits were fed a low protein diet (LP) containing 14% protein, a medium protein diet (MP) containing 18% protein or a high protein diet (HP) containing 22% protein. Each dietary protein treatment was further supplemented with either 0, 100, 150 or 200 ppm copper. The MP diet
was superior to the LP or HP diet in promoting daily rate of growth and efficiency of feed utilization. Liver and kidney weights were increased (P 0.05) by the MP diet over the LP diet, but non-significantly over the HP diet. Stomach weight increased (P 0.05) and also caecum and small intestine were thickened as dietary protein levels increased. Added copper improved rate of growth and carcass yield. The main result of copper on abdominal organs was a significant (P 0.05) thinning of the caecum. The overall experiment seems to indicate that as the level of dietary protein increases, the level of supplemental copper required to bring about a relative improvement in body gains becomes reduced.

PRELIMINARY STUDIES ON PROTEIN AND ENERGY REQUIREMENTS OF CHICKENS IN NIGERIA

By

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Replicated dietary levels of 14, 16, 18, 20, 22, 24 and 26% protein in combination with 2800, 2950, 3050 and 3150 kcal/kg metabolisable energy levels were fed to 840 hyline pullet chickens from 2 weeks to 10 weeks. There was a marked increase in growth as the protein levels were increased from 14 to 26%. In sharp contrast increase in energy levels showed a marked decrease in growth. It seems that 22-26% protein and 2800-2900 kcal/kg ME is the range for optimum growth.
OBSERVATIONS ON FERTILITY FACTORS ON FLEMISH
GIANT RABBITS AT NSUKKA

By

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A high degree of fertility in rabbits is dependent upon good inheritance, but
obtaining and raising litters regularly demand proper mating plan. In our four
separate experiments aimed at some improvements towards successful rabbit
breeding in Nigeria by examination of some of the fertility factors, 12 male and
12 female Flemish Giant Rabbits, 24 cages and 12 maternity boxes were used.

In the first experiment, Does remained together with the Bucks in their cages for
2 days and only 33\(\frac{1}{3}\)% pregnancy was achieved. In the second experiment, the mates
were left together for 3 days and 40% pregnancy was got. When the mates were
left together for one week, 50% pregnancy resulted in the third experiment. 50%
gestation was also achieved in the fourth trial with Does that just had their kids
weaned at 8 weeks. It was observed that the difficulty to know Does on heat caused
the poor pregnancies observed. For effective mating, the Does should be put
together with the Bucks 8 weeks after parturition and observations for effective
copulation made. Results indicated average litter size of 6.58 ± 0.75, average
birth weight 42.5gm and average weaning weight at 8 weeks of 636.5gm. The ges-
tation period stretched from 30 to 31 days.
THE EFFECT OF BREEDING RATIO ON EGG PERFORMANCE OF RHODE ISLAND RED BREEDING STOCK AT THE UNIV. OF NIGERIA FARM

By

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Varying number of 2, 3 and 4 cocks were put into three deep litter pens containing each 25 Rhode Island Red hens to establish the optimum mating ratio under Nsukka environmental and management conditions. Nine month old birds were used for the experiment. Before the cocks were introduced into the three groups of birds, the hens were allowed 7 days' adjustment period. Pfizer's breeder ration containing 16.5% protein, 3.5% fat, 6.5% fibre and 3.5% calcium was fed. The total egg production of Group I birds (2 cocks to 25 hens) was 909 eggs with an average daily production of $12.12 \pm 4.41$ and a coefficient of variation of 36.38%. The corresponding figures for Groups II and III were respectively: 635 eggs, $8.46 \pm 4.12$ and 48.69%; 788 eggs, $10.50 \pm 4.48$ and 42.66%. An analysis of variance of the transformed data (logarithmic) showed that birds of Group I (2 cocks to 25 hens) performed significantly better ($P \ 0.05$) than the other groups. The hatchability results of groups I, II and III respectively were 57.49%, 52.32% and 61.00% but no significant differences were detected. There was found a negative correlation ($r = 0.34$) between the number of eggs set and the corresponding hatchability results of the groups. A mating ratio of two cocks to 25 R.I.R. hens is, therefore, recommended.
COMPARATIVE PERFORMANCE OF BROILER CHICKENS
RAISED IN NIGERIA, BRITAIN, USA AND CANADA

By

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Three experiments were conducted with broiler chickens to study the effects of replacing commercial Herring Fish-meal with fishmeals prepared from crayfish, sardine, mudskeeper and mullet. In the first experiment, there were no significant differences in weight gains, feed consumption, feed efficiency, carcass dressing percentages and the composition of the hearts and livers when any of the locally prepared fishmeals replaced the commercial fishmeal in rations fed from 7 to 42 days or 7 to 63 days of age.

However, when groundnut meal constituted the only source of supplementary protein in the ration, there was a significant depression in performance of the chickens and in the carcass-neck dressing percentages of the birds while the compositions of the livers and hearts were not significantly affected. In Experiment 2, the fishmeals were fed at a supplementary level of 7.5% and also were fed at a level of 20% in which case they constituted the only source of supplementary protein. In this experiment, performance of birds fed 7.5% of the different fishmeals were similar to those observed in the first experiment. When the
fishmeals constituted the sole source of supplementary protein, the weight gains, feed consumption and efficiency of feed conversion obtained were similar for all fishmeals and were better than when 7.5% fishmeal was fed in the ration in addition to groundnut meal. Again, the ration containing groundnut meal as the sole supplementary protein source depressed performance of birds. In experiment 3, the total protein efficiency ratios (TPE) of the different fishmeal rations were assessed. The TPE for all the fishmeal rations were not significantly different and were significantly better than that of rations containing groundnut meal as the only supplementary protein source.

**STUDIES ON BLOOD AND URINARY UREA CONCENTRATION IN CATTLE IN RELATION TO PROTEIN METABOLISM**

By

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Balance studies to determine nitrogen requirements and utilization in ruminants rely on measuring nitrogen retention which is the difference between the amount of nitrogen ingested and excreted. Ingested protein is broken down by ruminal microorganism to ammonia and the majority reconverted to microbial protein. The efficiency of utilization of protein consumed by ruminants is dependent upon the quantity of ruminal ammonia produced which in turn is related to its
concentration in blood. Lewis (1957) proposed that the ratio of blood urea concentration to rumen ammonia and urinary urea be used as a supplementary test for the efficiency of protein utilization in ruminants.

A comparative study was conducted to investigate the relationship between blood and urinary urea in the Bunaji, Bunaji/Friesian cross and the Friesian cattle fed on a dietary crude protein level of 12.1%. Hourly blood urea samples for 24 hours period and 4 hourly urinary urea samples were measured. Pre-experimental measurements of blood urea nitrogen (BUN) and urinary urea showed no significant difference in the three breeds.

Peaks of urinary and blood urea concentrations post feeding differed among the breeds. Friesian excreted more urea than the other breed. A time lag in peak BUN concentration was different in the Friesian from the other two breeds. BUN peak in the three breeds corresponded to the lowest level of urinary urea excretion. It was concluded that basic physiological differences exist between Bunaji and the Friesian in protein metabolism, which might relate to different protein requirement hence different feeding standards.
Seasonal variations were also observed in pool turnover rate and daily water turnover. Values were highest during the hot season and lowest during the cold season.

Results obtained from this study suggest seasonal variations in water metabolism in Bunaji cattle in Zaria; these animals apparently adapting by altering their physiologic process to cope with seasonal changes in environmental factors.

SEASONAL VARIATIONS IN THYROID GLAND HISTOLOGY OF CATTLE IN ZARIA, NIGERIA

By

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Histological examinations were carried out on thyroid glands of cattle to determine seasonal variations.

Thyroid glands were collected in January, April and July, representing three distinct seasonal periods. They were weighed and histological examinations carried out on tissues from 3 regions of each lobe: cranial, middle and caudal. The type of secretory epithillum (columnar, cuboidal or low-cuboidal) at four locations on each slide was recorded for each season. Micrometric studies were also made on the height of epithelial cells.
Results indicated marked seasonal variations. The nature of the secretory epithelium and vacuoles seen in January and July are typical of a functional thyroid whereas in April specimens the epithelium was of the flattened, non-functional type. Height of epithelial cells was significantly higher (P < 0.01) for April specimens than for January or July, while July specimens had lower heights than those in January. Significant differences were not observed in the weights of the gland. It is suggested that the seasonal changes in thyroid gland histology observed reflect possible physiologic adjustments by the gland in response to variations in environmental factors.