Performance of the Indigenous Pigs of Nigeria Under Intensive Management Conditions

By

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SUMMARY

OBSERVATIONS on some reproductive traits were made on 63 litters of indigenous pigs obtained from pigs selected from an initial group of 60 pigs purchased from local farmers around Ibadan between April 1972 and February 1976. Studies on the growth rate, feed intake and feed efficiency, as well as the proportion of separable tissue in carcass at different terminal weights, rate and efficiency of tissue growth were also carried out with a total of 394 pigs obtained from these litters. For the observations on performance, tissue proportions, tissue growth rate and efficiency of tissue deposition, Large White x Landrace pigs of the same age group were used for comparison at each stage. Litter size averaged 6.7 piglets per sow, with a range value of between 4 and 13 piglets. Mean litter birth weight was 6.10 kg, while mean litter weaning weight was 29.4 kg. A preweaning mortality of 15.8% and 4.79% still births were recorded for these indigenous pigs.

Daily gain, feed intake and feed conversion efficiency were lower for the indigenous compared to Large White x Landrace pigs. Maximum growth rate for these pigs occurred in the growth phase between 45.5 and 56.8 kg liveweights. Tissue growth rates were lower and the efficiency of tissue deposition poorer in the indigenous compared to the Large White x Landrace pigs. The basic factor underlying the differences in performance of these two breeds would appear to be the inherently different patterns of growth of the respective tissue. The rate and efficiency of tissue growth as well as growth and efficiency of feed utilisation, together indicate that the indigenous pigs should not be reared beyond liveweights between 45.5 and 56.8 kg.

INTRODUCTION

TRADITIONALLY, the indigenous pigs found in many Nigerian villages are reared on an extensive system where they are allowed to roam and scavenge and graze at will. More recently however, a survey (Ogunfowora *et al.*, 1975) has indicated that about a third to half of the compound

feeds produced for pigs in the period 1973/74 and 1974/75 have found their way into the feeding of these breeds of pigs in the rural areas, indicating an increasing awareness of the role of proper feeding and a tendency towards confinement rearing of the local pigs. Evidence from some earlier studies (Vohradsky, 1968; Cameron and Gordon, 1969) in Ghana had indicated some improvement in performance of these animals resulting from improved housing and management. Such improvements however, were well below the observed performances of imported European pigs in a tropical environment. Perhaps of greater significance are the recent observations in Latin America (Bressani, 1974) and Nigeria (Ilori, 1974), that the native pigs outproduced their imported European counterparts when reared on diets of low protein concentration. This indicated lower requirements for nutrients, coupled with their lesser susceptibility to careless management, raises considerable hopes for additional meat production from the fairly large number of indigenous pigs kept by peasant farmers whose present level of management know-how cannot cope with the very exacting demands of the imported European pigs for nutrients, careful management and disease control. This paper reports on more recent observations on the growth performance and tissue growth rates of the indigenous pigs under intensive management conditions, over a four year period. It is hoped that this might provide a rational basis for further studies on the nutrient requirements and optimal slaughter weights of these animals for profitable meat supply.

MATERIALS AND METHODS

Sixty indigenous weaner pigs comprising 45 gilts and 15 boars were purchased in March 1971 from three local farmers with a sizeable herd in Ibadan area. These groups of animals showed phenotypic characteristics usually ascribed to the pigs described as 'locals'. A typical indigenous Nigerian pig is shown in Plate I. The genetic make up of these animals were, however, not ascertainable as various degrees of introduction of exotic traits may have occurred in the field over a long period of time. The weaners obtained were isolated, dewormed with piperazine hydrochloride and then transferred to the nutrition piggery where they were placed on a 20% protein diet of the standard ingredient composition used for weaner pigs on the University of Ibadan, Teaching and Research Farm. Records were kept on a weekly basis for this first batch of pigs, gilts and boars being housed

separately. Based on the recorded performance of this initial group over a 140 day period 15 gilts and 5 boars were selected to be used for multiplication. During the entire period between April 1972 and February 1976, 63 litters were produced from sows bred to produce on average 2 litters per year. Farrowing was in specialized pens fitted with rails and facilities for creep feeding. Records were kept of litter size, litter birth weight, still births, pre-weaning mortality and litter weaning weights. All piglets were weaned at eight weeks and on weaning transferred to the Rockefeller nutrition piggery where they were used for observations on growth performance. In all, a total of 394 indigenous piglets were fattened during the period 1972 to February 1976. Piglets of Imported European Large White x Landrace pigs of similar ages to the indigenous were obtained from the University of Ibadan commercial piggery for growth comparison at all stages when growth

PLATE I

records were being kept for the indigenous pigs. In the piglet crop obtained between May 1973 and December 1974, a group of 40 boars were castrated at weaning and growth and feed intake records kept for these group to allow for comparison of the performance of gilts, intact males and barrows. For the several groups of piglets both indigenous and European pigs observations were to different predetermined terminal weights, at which the animals were slaughtered and dressed and the carcass completely dissected into lean, fat, bone and skin and the separate tissues weighed fresh. Estimates of content of separable tissue at the start were obtained by slaughtering a group of weaners of the same mean initial weight as the general group and dissecting them to obtain the fresh weight of the different tissues. This enabled the calculation of the rate of tissue growth as described by Cooke, Lodge and Lewis, (1972).

Fattening of pigs was in concrete floored pens fitted with individual feeding units to facilitate recording of individual feed

consumption. All piglets were reared from weaning on a 24% crude protein weaner's ration of the following percentage composition: Yellow maize, 64.0; groundnut cake, 20.0; fishmeal, 3.0; blood meal, 3.0; rice bran, 2.0; skim-milk powder, 2.0; palm oil, 2.5; dicalcium phosphate, 3.0; salt, 0.5 and Vitamin-trace mineral mixture at the rate of 5 kg/ton of feed, calculated to supply the following per kg of ration: Vitamin A, 8,000 IU; Vitamin D₃, 550 IU; Zinc, 200 mg; Oxytetracycline hydrochloride, 4 mg; and all other members of the B-complex vitamins at levels slightly higher than recommended levels. All pigs reared beyond 34 kg terminal weight were switched on to a growing-fattening diet containing 18% crude protein. The reduction in protein level was effected by a total removal of fishmeal and a reduction in the level of groundnut meal. Water was provided *ad libitum*, while feed was offered four times daily in the individual feeding stalls. Records of feed consumption and body weight changes were kept on a weekly basis.

FIG. 1. A COMPARISON OF THE PERFORMANCE OF THE FIRST CROP OF INDIGENOUS PIGS INTRODUCED INTO THE NUTRITION PIGGERY WITH LARGE WHITE PIGS REARED ON A STANDARD 20% PROTEIN DIET (1971)

TABLE 1

Observation on Some Reproductive traits in the Indigenous Nigerian Pigs

Number of litters	..	..	..	..	63
Mean litter size	..	..	..	..	6.7 (4-13)*
Mean litter birth weight (kg)	..	..	..	..	6.10 (2.7-11.8)*
Mean litter weaning weight (kg)	..	..	..	..	29.4 (15.0-60)*
Pre-weaning Mortality (%)	..	..	..	..	15.80
Still births (%)	..	..	..	..	4.79

*Figures in brackets represent the range values.

Statistical analyses of growth, feed intake and feed efficiency data as well as rate and efficiency of tissue gain involved multiway analysis of variance and multiple comparison of means (Steel and Torrie, 1960).

RESULTS

The results of observations on the performance of the first crop of indigenous pigs introduced into the University of Ibadan farm compared to those of large White pigs, over a 140 day period in 1971 appear in Figure 1. Seen at a glance, the Large White pigs were superior for all traits measured, the average daily gain of the indigenous pigs representing about 68% of that recorded for Large White pigs. The indigenous pigs consumed about 20% less feed compared to the Large Whites and utilised their feed far less efficiently.

Table 1 summarises some observations on some reproductive traits in the indigenous pig between 1972 and early 1976. The mean litter size was 6.7 piglets per sow, with individual litters varying in size from 4 to 13 piglets. The mean litter birth weight was 6.10 kg while the mean litter weaning weight was 29.4 kg. A pre-weaning mortality of 15.80% was recorded for the indigenous pig with 4.79% still births in 63 litters.

The growth rate and mean number of days from weaning to several predetermined terminal weights of indigenous Nigerian pigs farrowed in the University of Ibadan are presented in table 2. Similar

values obtained for Large White x Landrace pigs are presented for comparison in the same table. As expected, the imported Europeans pigs were superior to the indigenous Nigerian pigs for all stages of the observations and attained the predetermined slaughter weight much earlier. Rearing the indigenous pigs from weaning to successive terminal weight resulted in increasing average daily liveweight gains up to 68.2 kg liveweight. Rearing the pigs beyond this weight resulted in decreasing average daily liveweight gains. On the other hand, the Large White x Landrace pigs displayed increasing average daily liveweight gains as the terminal weights were increased. A comparison of the growth pattern for the two breeds appear in Figure 2.

Feed intake (Table 3) for both breeds reared from weaning to different terminal weights, showed an increasing trend with increasing final weight. The Large White x Landrace pigs consumed more feed than the indigenous pigs, although this difference was not very marked up to 45.5 kg liveweight. For the groups reared from weaning to 56.8, 68.2, 79.6 and 91.0 kg, respectively, the Large White x Landrace pigs consumed 32, 40.3, 68.7 and 51.9% more feed than the indigenous pigs for the respective terminal weights. For both breeds, considerable variability existed among individuals as evidenced by the range values presented. Between weaning and the several predetermined terminal weights, the Large White x Landrace pigs were consistently better converters of feed into body weight gain (Table 3).

TABLE 2
Comparative Growth rate of Indigenous and Large White x Landrace Pigs reared from weaning to different terminal weights

Terminal weights (kg)	MEAN DAILY LIVEWEIGHT GAIN (kg)			MEAN NUMBER OF DAYS TO ATTAIN WEIGHT				
	IND _L		LW X LD _L		IND		LW x LD	
	Range	Mean... ± SD	Range	Mean... ±SD	Range	Mean...-SD	Range	Mean...-SD
22.7	0.16 - 0.35	0.25 ± 0.02	0.32-0.54	0.42 ± 0.04	47 - 118	78.0 ± 11.86	21 - 49	39.0 ± 6.41
34.1	0.19 - 0.41	0.29 ± 0.03	0.36-0.59	0.48 ± 0.03	63 - 168	111.0 ± 19.20	42 - 77	58.0 ± 6.73
45.5	0.21-0.41	0.30 ± 0.02	0.46-0.61	0.55 ± 0.05	84 - 209	139.0 ± 22.66	56 - 77	69.0 ± 9.52
56.8	0.22-0.44	0.32 ± 0.05	0.46-0.75	0.61 ± 0.03	126 - 263	179.0 ± 22.14	63 - 103	83.0 ± 12.37
68.2	0.25-0.48	0.34 ± 0.03	0.51-0.79	0.66 ± 0.06	140 - 283	197.0 ± 24.87	77 - 122	109.0 ± 14.36
79.6	0.27-0.43	0.31 ± 0.02	0.53-0.89	0.74 ± 0.05	172 - 319	243.0 ± 21.60	98 - 134	123.0 ± 12.87
91.0	0.23-0.41	0.30 ± 0.03	0.63-0.88	0.78 ± 0.06	189 - 349	289.0 ± 26.42	119 - 162	148.0 ± 15.44

L In this and subsequent tables, IND = Indigenous pigs; LW x LD = Large White x Landrace pigs.

Fig. 2 Comparative growth pattern of the indigenous pig and large white & landrace pigs

The changes in growth rate, feed intake and feed conversion efficiency between successive weight class intervals from weaning to 91 kg liveweight appear in table 4. The average daily gain between successive weight class intervals for the indigenous pigs increased gradually, reaching a maximum between 45.5 and 56.8 kg, and declined thereafter. While rate of gain declined after 56.8 kg., the feed intake level increased progressively through all the weight class intervals covered by the present study giving rise to a

rapidly worsening efficiency of feed utilisation beyond 56.8 kg liveweight. The Large White x Landrace pigs on the other hand, displayed increasing rate of body weight gain between successive growth intervals up to 79.6 kg. The slowest rate of gain obtained for the Large White x Landrace pigs, which was between weaning and 11.4 kg, was comparable to the point of optimum gain in the indigenous pig. Feed efficiency for this pigs did not worsen appreciably up to 79.6 kg.

TABLE 3

Comparative Feed Intake and efficiency of feed utilisation of Indigenous and Large White x Landrace pigs reared from weaning to different terminal weights

Terminal weights (kg)	Mean daily feed intake(kg.)			Efficiency of feed utilisation (kg feed/kg gain)					
	IND.			LW x LD		IND		LW x LD	
	Range	Mean	SD	Range	Mean	SD	Range	Mean	SD
22.7	0.47-1.04	0.73±0.12	0.60-0.92	0.77-0.14	2.07-4.72	2.90±0.28	1.37-2.40	1.83±0.19	
34.1	0.61-1.23	0.87±0.14	0.66-1.41	1.00-0.13	2.21-3.99	3.06±0.31	1.19-2.71	2.11±0.13	
45.5	0.69-1.39	1.02±0.11	0.95-1.66	1.22-0.14	2.58-4.18	3.38±0.29	1.77-2.84	2.26±0.18	
56.8	0.84-1.49	1.14±0.16	1.26-1.90	1.51±0.12	2.82-4.72	3.60±0.34	2.10-2.86	2.49±0.22	
68.2	0.98-1.72	1.29±0.22	1.47-2.01	1.81-0.21	3.41-5.39	3.85±0.42	2.54-3.37	2.74±0.31	
79.6	0.99-1.88	1.31±0.19	1.76-2.89	2.21±0.18	3.67-5.82	4.21±0.33	2.73-3.89	3.36±0.28	
91.0	0.97-1.96	1.40±0.22	1.81-3.29	2.72±0.33	3.98-5.86	4.68±0.41	2.84-4.08	3.52±0.30	

TABLE 4

Changes in Growth rate, feed intake and feed efficiency of Indigenous and Large White x Landrace pigs between successive weight class intervals from weaning of 91 kg.

Weight Class intervals	Indigenous Pigs			Large White x Landrace Pigs			
	Av. daily gain (kg)	Feed intake (kg)	Feed Efficiency (kg feed/kg gain)	Av. daily gain (kg)	Av. daily feed (kg)	Feed Efficiency (kg feed/kg gain)	
Weaning to 11.4 kg.	0.21±0.01	0.45±0.11	2.14±0.21	0.43±0.02	0.53±0.03	1.55±0.14	
11.4 to 22.7 kg.	0.29±0.03	0.90±0.08	3.07±0.33	0.45±0.03	0.88±0.08	1.96±0.18	
22.7 to 34.1 kg.	0.32±0.02	1.26±0.15	3.94±0.27	0.57±0.04	1.37±0.12	2.42±0.24	
34.1 to 45.5 kg.	0.33±0.03	1.37±0.12	4.15±0.21	0.66±0.11	1.82±0.16	2.76±0.22	
45.5 to 56.8 kg.	0.35±0.06	1.44±0.16	4.12±0.42	0.66±0.09	1.98±0.14	3.00±0.26	
56.8 to 68.2 kg.	0.34±0.03	1.52±0.14	4.47±0.36	0.76±0.08	2.17±0.18	2.86±0.24	
68.2 to 79.6 kg.	0.32±0.02	1.59±0.21	4.96±0.32	0.87±0.14	2.36±0.15	2.71±0.32	
79.6 to 91.0 kg.	0.26±0.03	1.62±0.23	6.23±0.43	0.77±0.09	2.50±0.21	3.24±0.36	

TABLE 5
Sex differences in the Performances of Indigenous Nigerian Pigs reared to different terminal weights

Terminal weight (kg)	Av. Daily Gain (kg)			Av. Daily Feed Intake (kg)			Feed Efficiency (kg/feeding unit)			Mean days to attain		weight
	Gilts	Barrows	SEm	Gilts	Barrows	SEm	Gilts	Barrows	SEm	Gilts	Barrows	
22.7	0.25	0.28	0.23	0.74	0.78	0.66	2.95	2.87	2.88	79.0	70.0	84.0
34.1	0.28	0.31	0.27	0.84	0.95	0.82	3.00	3.20	2.98	108.0	97.0	126.0
45.5	0.30	0.33	0.29	1.02	1.08	0.95	3.44	3.43	3.27	141.0	129.0	147.0
56.8	0.31	0.35	0.31	1.15	1.29	1.05	3.69	3.72	3.40	185.0	164.0	187.0
68.2	0.33	0.37	0.31	1.31	1.41	1.18	3.85	4.03	3.69	198.0	185.0	204.0
79.6	0.32	0.35	0.28	1.36	1.51	1.19	4.26	4.31	3.98	234.0	213.0	266.0
91.0	0.31	0.33	0.26	1.46	1.56	1.22	4.72	4.85	4.68	277.0	260.0	330.0
												16.1

Observations on sex differences in the performance of the indigenous pigs reared to different terminal weights are presented in table 5. For all the terminal weights investigated, barrows grew at a faster rate, consumed more feed, but utilised feed less efficiently than boars and gilts. The differences in performance were more marked when pigs were reared to higher weights. Between gilts and boars, growth rates were fairly similar when reared up to 22.7, 34.1 and 45.5 kg. respectively. However, when reared to higher weights, gilts grew significantly faster than boars. Between weaning and the respective terminal weights, boars consumed less feed compared to gilts resulting in better efficiency of feed utilisation by boars compared to the gilts. The comparative growth pattern of gilts, boars and barrows over a 224 days growth period is presented in Figure 3.

Separable lean, fat, bone and skin in the carcass of indigenous pigs and Large White x Landrace pigs at the different terminal weights investigated are presented in table 6. The Large White x Landrace pigs produced more lean, less fat, deposited more bone, and less skin compared to the indigenous pigs at any given terminal weight. For both breeds, the proportion of lean, bone and skin decreased as slaughter weight increased, while the proportion of fat increased with increasing slaughter weight. Calculated rate and efficiency of tissue deposition (Table 7) indicated very highly significant ($P < 0.01$) differences between the indigenous pigs and Large White x Landrace pigs in the rate of deposition of the different tissues. The Large White x Landrace pigs deposited 72.8, 77.3 and 96.3% more lean per day than the indigenous pig for the groups reared up to 22.7, 34.1 and 45.5 kg liveweights respectively, while beyond this weight, the rate of lean tissue deposition was more than double for the imported European pigs compared to the indigenous pigs. Differences in the daily rate of fat deposition was much lower, ranging between 19.3 and 42% for the Large White x Landrace pigs compared to the indigenous at the different terminal weights, giving a

FIG. 3. Comparative growth pattern of different sexes of the indigenous Nigerian pigs.

TABLE 6

Comparative Content of Separable tissues in the Carcass of the Indigenous Nigerian pig and Large White x Landrace slaughtered at different terminal weights

Slaughter weights	Dressing Percentage $\pm$ SD		Separable Lean (%) $\pm$ SD		Separable fat (%) $\pm$ SD		Separable bone (%) $\pm$ SD		Separable skin (%) $\pm$ SD	
	IND	LW x LD	IND	LW x LD	IND	LW x LD	IND	LW x LD	IND	LW x LD
22.7	68.20 $\pm$ 1.89	66.80 $\pm$ 2.13	56.84 $\pm$ 2.86	59.30 $\pm$ 2.43	14.51 $\pm$ 1.82	12.79 $\pm$ 1.63	10.22 $\pm$ 2.14	12.21 $\pm$ 1.62	14.07 $\pm$ 1.34	12.32 $\pm$ 1.28
34.1	70.30 $\pm$ 2.44	69.74 $\pm$ 1.89	54.21 $\pm$ 3.14	58.40 $\pm$ 2.96	21.30 $\pm$ 1.93	16.87 $\pm$ 1.52	10.40 $\pm$ 1.82	12.05 $\pm$ 1.82	14.01 $\pm$ 1.58	11.48 $\pm$ 1.61
45.5	74.90 $\pm$ 3.21	73.14 $\pm$ 2.44	53.10 $\pm$ 2.96	58.11 $\pm$ 2.62	29.30 $\pm$ 2.14	19.87 $\pm$ 1.84	10.35 $\pm$ 1.68	11.84 $\pm$ 1.34	10.21 $\pm$ 1.92	9.84 $\pm$ 1.74
56.8	77.90 $\pm$ 1.78	73.83 $\pm$ 2.14	49.80 $\pm$ 3.22	57.89 $\pm$ 2.43	31.23 $\pm$ 3.26	22.28 $\pm$ 2.14	8.70 $\pm$ 1.72	10.84 $\pm$ 2.11	10.53 $\pm$ 1.84	9.32 $\pm$ 1.51
68.2	78.60 $\pm$ 2.14	74.60 $\pm$ 2.64	47.70 $\pm$ 2.41	57.38 $\pm$ 1.96	34.56 $\pm$ 2.19	25.38 $\pm$ 1.97	8.34 $\pm$ 1.62	10.48 $\pm$ 1.41	9.27 $\pm$ 2.11	8.69 $\pm$ 1.83
79.6	80.42 $\pm$ 2.33	76.80 $\pm$ 1.97	45.61 $\pm$ 2.36	56.84 $\pm$ 2.14	37.14 $\pm$ 2.84	27.24 $\pm$ 2.28	8.26 $\pm$ 1.54	10.11 $\pm$ 1.87	8.93 $\pm$ 1.93	8.48 $\pm$ 1.7
91.0	81.34 $\pm$ 1.98	77.90 $\pm$ 2.11	44.24 $\pm$ 2.41	55.94 $\pm$ 3.21	38.94 $\pm$ 2.63	28.20 $\pm$ 1.96	8.32 $\pm$ 1.83	9.19 $\pm$ 1.56	8.47 $\pm$ 1.84	8.45 $\pm$ 1.82

TABLE 7

Calculated rate and efficiency of tissue deposition in Large White x Landrace pigs and the Indigenous Nigerian Pig reared from weaning to different terminal weights

	22.7 kg		34.1 kg		45.5 kg		56.8 kg		68.2 kg		79.6 kg		91.0 kg	
	IND	LW x LD	IND	LW x LD	IND	LW x LD	IND	LW x LD	IND	LW x LD	IND	LW x LD	IND	LW x LD
Lean deposition (g/day)	189.7	241.4	160.5	284.6	174.2	342.0	180.7	381.0	183.5	413.0	164.4	470.8	155.5	491.3
Feed consumed per g lean (g)	3.74	3.18	5.53	3.56	5.82	3.63	6.38	3.99	7.13	4.38	7.94	5.28	9.03	5.59
Fat deposition (g/day)	37.30	53.1	66.80	85.8	103.10	123.0	122.3	155.0	145.7	196.5	146.4	241.3	150.5	269.7
Feed consumed per g fat (g)	13.98	14.49	13.29	11.81	9.84	10.11	9.42	9.77	8.99	9.20	8.91	10.31	9.33	10.18
Bone deposition (g/day)	22.55	42.50	27.81	47.40	30.91	53.60	27.91	57.91	28.42	60.2	26.35	61.71	26.11	61.05
Feed consumed per g bone	22.87	18.08	31.92	21.36	32.80	23.93	34.94	27.29	44.15	32.86	49.52	40.29	53.77	42.86
Ratio of lean to fat deposited	3.75	4.70	2.40	3.31	1.69	2.78	1.48	2.46	1.26	2.10	1.12	1.95	1.03	1.82

significantly lower ratio of lean to fat deposition for the indigenous compared to the imported European pigs. Highly significantly greater rate of bone deposition was observed for the Large White x Landrace pigs. Feed utilisation for lean and bone deposition was highly significantly ($P < 0.01$), better for Large White x

Landrace than for the indigenous pigs. There were however, no clear cut differences in the efficiency of feed utilisation for fat deposition for both breeds.

The changing pattern of rate and efficiency of tissue deposition between successive growth intervals, from weaning to 91 kg liveweight for both breeds are

Fig. 4. Changes in the calculated rate and efficiency of tissue deposition between successive growth intervals for large white & landrace and the indigenous Nigerian pig reared from weaning to 91 kg liveweight.

presented in Figure 4. Lean tissue deposition dropped rapidly after 34 kg, while fat deposition continued at an increasing rate for the indigenous pig. Beyond 68.2 kg, lean, fat and bone depositions declined. Even though rate of lean deposition also declined progressively beyond 34 kg for the Large White x Landrace pigs, at no point did rate of fat deposition equal or surpass rate of lean deposition as observed for the indigenous pigs. The figure also clearly demonstrate higher rate of fat, bone and lean deposition, as well as superior efficiency of feed utilisation for the formation of the different tissues in the imported European pigs relative to the indigenous pigs throughout the growth phases from weaning to the 91 kg terminal weight.

DISCUSSION

Observations on some reproductive traits of the indigenous pigs presented in this study, though limited to about 63 litters clearly showed that this breed of pigs does better than is generally described in many unpublished literature. The average litter size per sow was only slightly lower than that reported by Steinbach (1971) for Large White x Landrace pigs. The mean litter birth weight and weaning weights recorded were however lower than reported by the above author for these two breeds of European pigs, probably related to a low supply of milk from the sows, although Steinbach (1971), had also observed that weaning weights for Large White and Landrace pigs at Ibadan, were about 50% lower than those of their counterparts in a temperate environment. This fact may be explainable on the basis of the depressive effect of environmental temperatures on sow's milk yield and a possible inadequate nutrition of the sow in gestation. The preweaning mortality of 15.8% obtained for the indigenous pigs was superior to that of 22.0% reported by Steinbach (1971) for Large White and Landrace pigs, indicating a possible superior mothering ability by the indigenous pigs compared to the imported breeds.

Observations on growth, feed intake and efficiency of feed utilisation, clearly

confirm the superiority of imported breeds as reported by earlier workers in Nigeria and Ghana (Hill, 1956; Vohdradsky, 1968; Cameron and Gordon, 1969). Observed rates of gain for the indigenous pigs in the present study were however better than reported by these authors. Cameron and Gordon (1969), had reported an average daily gain of 0.25 kg per day for local Black pigs reared from weaning to about 52.7 kg liveweight in Ghana. Pigs raised to about the same weight in this study gained 0.32 kg daily. The figures for performance between successive growth intervals, clearly indicate that maximum growth in the indigenous pig occurs between 45.5 and 56.8 kg, beyond which weight, growth declines almost ceasing at higher weights. The indigenous pigs consumed less feed, but used the feed less efficiently than the Large White x Landrace crosses tested in the present study. The feed conversion efficiency ratios at the several terminal weights, however, represent considerable improvement over that reported by Hill in 1956. He had obtained a mean ratio of 6.5 for pigs reared from weaning to less than 34 kg. The corresponding values for pigs reared to 34 kg in the present study was 3.06. Differences in feed utilization in the two breeds at all stages of growth represent differences in the ratio of fat and lean tissue deposited. As shown in table 7, at all stages the ratio of fat to lean deposited by the indigenous pigs was greater than for the Large White x Landrace crosses. The tendency to deposit greater proportion of fat would result in poor feed efficiency. Fat deposition in terms of the resultant nutrient conversion ratio is a relatively inefficient process compared with the process of greater lean deposition.

Taking together the performance and tissue growth data for both breeds, it is obvious that the indigenous pig and the imported European pigs have inherently different capacities for tissues growth. The indigenous pigs produce fatter carcasses than the imported European pigs even at lower levels of feed intake because of a lower potential for muscle growth rather than as a result of a greater ability for fat deposition, because at all stages

of growth, (Fig. 4) the imported pig is depositing more fat than the indigenous pig. The slower rate of growth in the indigenous pig is, therefore, a direct result of a slower rate of lean, fat and bone tissue formation in these animals, relative to the imported pigs. Moreover, the changing pattern of growth, both in terms of liveweight and tissue growth, indicate that the indigenous breeds of pigs are earlier maturing, because a decline was obtained in the daily rate of lean deposition beyond 34 kg, while growth rate declined after 56.8 kg. In the imported strains of pigs lean tissue deposition continued at an increased rate up to 91 kg liveweight. This clearly indicates that even under intensive rearing management, it would be undesirable to attempt to rear indigenous pigs to comparable weights to which imported European pigs are reared. The logical slaughter weight for these pigs would appear to lie between 46 and 57 kg.

The observation that the indigenous pigs in Latin America (Bressani, 1974) and Nigeria (Ilori, 1974; Fetuga, Unpublished data) outproduce the imported European breeds, when both are fed diets of low protein concentration is likely to be essentially related to their much lower potential for the growth of the different tissues. Lower daily rate of fat deposition is equivalent to a reduced energy retention and therefore may indicate lower energy requirements. Similarly a slower daily rate of bone accretion may be expected to result in much lowered requirements for the important nutrients for bone formation. More importantly, the formation of proteinaceous tissue is dependent on the availability of a balanced supply of specific essential and non-essential amino acids. Animals with greater genetic potentials for rapid muscle development are likely to require these amino acids in greater concentrations than those with a much lower potential for the deposition of proteinaceous tissue, assuming close similarities in the efficiency with which these amino acids are released from the intact protein, absorbed and incorporated into tissues by both types of animals. Such differences as postulated may, therefore, account for the observed differences in

the requirements for protein by the indigenous and Large White x Landrace pigs.

It is concluded, that the present study raises similar doubts as some earlier studies, that Large scale commercial pig production based on the indigenous pig may not be a profitable venture even though they may be better able to utilise poorer quality feeds and have less exacting nutrient requirements. On the other hand, successful pig raising based on imported breeds and strains of pigs are only possible where pig production ideas are favourable and their management principles well understood. The indigenous breeds of pigs will therefore continue to contribute to the rural meat supply. Their fattening period could be considerably shortened under conditions of improved housing and feeding. The non-profitability or otherwise of meat production from this source can only be conclusively determined by an economic appraisal which would consider various rearing systems, feeds of varying nutrient densities and cost as well as optimum slaughter weights.

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