GROWTH AND CARCASS MEASUREMENTS OF INDIGENOUS AND EXOTIC PIGS RAISED IN TWO HOUSING SYSTEMS IN PAPUA NEW GUINEA

ABSTRACT

G. L. MALYNICZ*

Ten indigenous and 10 exotic pigs were housed individually either on dirt lots exposed to the elements or in small concrete floored pens. The dirt lots were unhygienic and infested with nematode parasites. There were significant breed differences for all parameters studied except dressing percentage. Housing system affected weight gain, food conversion ratio, dressing percentage and back fat over the eye muscle. There were no significant breed x housing interactions. Significant differences within breeds between litters were observed for a number of parameters.

INTRODUCTION

THE normal system of pig husbandry in the Highlands of Papua New Guinea is to allow the pigs free grazing during the day and housing at night (Malynicz 1971). This necessitates fencing food gardens to protect against grazing pigs. It is probable that increasing maintenance requirements of garden fences is a contributory factor leading to the abandonment of food gardens. In some areas Local Government Councils have invoked "pig rules" encouraging the enclosure of pigs rather than gardens. Because this usually restricts grazing, pigs under such conditions perform even less adequately than normal.

There is no published information on the growth and development of indigenous pigs compared to imported breeds. This paper describes an experiment designed to provide basic information on growth and carcass quality in the indigenous pig compared to imported breeds and to assess whether unhygienic conditions markedly affected performance.

MATERIALS AND METHODS

Twenty weaner pigs, consisting of five pairs of indigenous and five pairs of exotic pigs were used in the experiment. The exotic pigs were either Berkshire or Tamworth. Each pair was from a different litter. One animal from each pair was allocated at random to one or other of the housing systems which were designated as "dirt" or "concrete". The "dirt" lots consisted of a muddy fenced area 6 x 1.5 m. Water was provided in one drum and food in another. Shelter was provided in an oil drum from which one end had been removed. The area in which the dirt lots were constructed had been heavily stocked with village pigs which were known to be heavily parasitised. In short, conditions were made as unhygienic as possible.

The "concrete" groups were also housed individually in concrete floored pens, 1.5 x 0.9 m. Food and water were supplied *ad libitum* to both groups. The composition of the rations used is shown in *Table* 1.

Pigs commenced the experiment at weaning at 56 days of age. They were dewormed with Tetramisole* after weaning. The experiment was completed after 100 days when the pigs were sent to the abattoir for slaughter.

The procedures for slaughter and appraisal were essentially those used in South Australia, which is a combination of the Smithfield and Downey methods. The following measurements were taken on the chilled half carcass:—

1. Cold carcass weight, including head.
2. Carcass length from the pubic symphysis to the junction of the first rib with the sternum. The side is then cut through the seventh to eighth rib forward from the sacrum exposing the cut surface of the *Longissimus dorsi*, or "eye muscle".

*Tropical Pig Breeding and Research Centre, Department of Agriculture, Stock and Fisheries, Goroka, Papua New Guinea.

* Nilverm granules, Imperial Chemical Industries.

Table 1.—Composition of Rations

	%
Ground Sorghum	80
Protein Concentrate*	20

*The concentrate was produced by Huttmills of Melbourne and gave final allowances in the ration of 0.4% salt, 1,700 I.U. Vit A, 2550 I.U. Vit D3, 12.3 I.U. Vit E and 5.3 I.U. Vit B2 per Kg.

3. The width (A) and depth (B) of the eye muscle was measured.
4. The thickness of back fat over the eye muscle was measured at a point 2.5 cm from the mid-line (C).

The variance between observations was analysed according to Steel and Torrie (1960) and partitioned into breed, housing, breed x housing interaction and within breed litter effects.

RESULTS AND DISCUSSIONS

The results shown in *Table* 2 indicate that the indigenous pig is significantly slower growing, has a lower food consumption, a worse feed conversion ratio, and smaller eye muscle and back fat dimensions at an equivalent slaughter age. The effect on carcass measurements are considered to be largely due to the much smaller carcasses of the indigenous pigs. These results support those of Kemm, Pieterse and Lesch (1967) who, when comparing the primitive Bantu pig of South Africa with the imported Landrace reported similar findings.

The effects of the housing systems were less marked than those due to breed. Weight gain and food conversion ratio were adversely affected, although there was no significant effect on food consumption. The effect was not as large as might have been expected bearing in mind the severity of the "dirt" treatment. Of the carcass measurements dressing percentage was adversely affected although the difference in carcass weight did not quite reach significance ($p<0.1$). The effect on the back fat at (C) was quite marked and may be larger than can be accounted for simply by differences in carcass weight.

Two of the major variables between the housing systems were temperature and spatial density. Temperature was not considered likely to have reduced back fat, since Holmes (1971) found that high temperatures increased back fat. The effect of spatial allocation on back fat has been studied by Heitman *et al.* (1961) and Hughes and Reimer (1967). In neither of these studies did spatial allocation significantly affect back fat.

The effects of different litters was most marked in the exotic pigs where significant differences at the commencement of the experiment were carried through into a number of other parameters including dressing percentage and eye muscle dimensions. A significant litter effect was also observed for indigenous pigs with respect to eye muscle width suggesting the possibility of genetic selection for this trait. As might be expected from the significant litter differences in the exotic breeds the coefficient of variations (x/s) was larger for most of the parameters studied in the exotic breeds.

The results have provided basic data on the growth performance and carcass characteristics of the indigenous pig compared to imported commercial breeds. In addition the effects of unhygienic housing have been studied and shown to account for only a minor part of the variance for each parameter with the exception of back fat. It appears therefore that in the short term, performance will not be adversely affected by poor housing conditions. Long term effects, particularly due to chronic infection with helminth parasites such as *Stephanurus dentatus*, could well affect performance particularly of breeding animals.

ACKNOWLEDGEMENTS

Mr I. R. Watt for partial supervision of the experiment.

REFERENCES

Heitman, H. Jr., Hann, L., Kelly, C. F. and Bond, T. E. (1961). Space Allotment and Performance of Growing Finishing Swine raised in Confinement. *J. Anim. Sci.*, 20, 543-546.

Holmes, C. W. (1971). Growth and Backfat Depth of Pigs kept at a High Temperature. *Anim. Prod.*, 13, 521-527.

Hugh, W. I. and Reimer, D. (1967). Floor Space Allotment for Growing Finishing Pigs. *Proc. Amer. Soc. Anim. Science* (Western Section), 18, 69-72.

Kemm, E. H., Pieterse, P. J. S. and Lesch, S. F. (1967). A Study of Feed Utilization in two Extreme types of Pig. *S. Afr. Tydskr. Landbouwet.* (1967) 10, 997-1003.

Malynicz, G. L. (1971). Pig Keeping by the Subsistence Agriculturalist of the New Guinea Highlands. *Search*, 1, 201-204.

Steel, R. G. D. and Torrie, J. H. (1960). Principles and Procedures of Statistics. McGraw Hill, New York.

(Accepted for publication April, 1973.)

Table 2.—The effect of housing on growth and carcass measurements in indigenous and exotic pigs*

BREED	BRITISH		NEW GUINEA		SIGNIFICANCE OF EFECTS				
Housing	Dirt	Concrete	Dirt	Concrete	Breed	Housing	Breed X Housing	Litter (N)	Litter (B)
N.	5	5	4	5					
Initial weight (kg)	13.91 4.27	13.18 2.50	8.64 2.20	7.73 0.72	0.001	N.S.	N.S.	N.S.	0.01
Daily gain (g)	404 78	495 89	185 30	236 71	0.001	0.05	N.S.	N.S.	N.S.
Daily food consumption (kg)	1.60 0.15	1.63 0.20	1.06 0.08	0.95 0.33	0.01	N.S.	N.S.	N.S.	N.S.
Food conversion ratio	4.23 1.10	3.34 0.41	6.04 0.83	4.05 0.85	0.01	0.05	N.S.	N.S.	N.S.
Dressing percentage	73.60 5.41	74.2 5.22	72.8 2.86	75.00 1.58	N.S.	0.05	N.S.	N.S.	0.001
Carcass length (cm)	67.81 5.09	68.81 6.41	49.78 2.52	50.68 2.98	—	—	—	—	—
Eye muscle (A) (cm)	6.17 1.80	6.53 1.53	4.99 1.02	5.01 0.64	0.001	N.S.	N.S.	0.01	0.001
Eye muscle (B) (cm)	3.580 0.978	3.780 0.691	2.960 0.321	3.240 0.416	0.01	N.S.	N.S.	N.S.	0.01
Back Fat at (C) (cm)	1.566 0.355	2.028 0.310	1.248 0.346	1.676 0.077	0.05	0.01	N.S.	N.S.	N.S.
Carcass weight (kg)	40.73 10.96	45.55 11.18	19.91 4.30	23.65 3.57	0.001	N.S.	N.S.	N.S.	0.01

*Mean ± Standard Deviation