COMPARATIVE PERFORMANCE OF LANDRACE AND LARGE WHITE YORKSHIRE PIGS UNDER TROPICAL MARITIME MONSOON CLIMATE*

S. Ramesh[1], T. Sivakumar [2], Tensingh Gnanaraj [3] , Ra Murallidharan[4] and M. Murugan[5]

Department of Livestock Production and Management
Madras Veterinary College, Chennai-600 007

Abstract

A study was conducted to assess and compare growth performance of Landrace and Large White Yorkshire weaned pigs under maritime monsoon climate. Body weights and body measurements were recorded at fortnight intervals. The final body weight at 180 days of age was significantly (P<0.01) higher in Landrace compared to Large White Yorkshire. The overall average daily gain was significantly (P<0.01) higher in Landrace. No significant difference in feed conversion efficiency between Landrace (4.09 ± 0.12) and Large White Yorkshire (4.17 ± 0.13) was noticed. The body length was significantly (P<0.01) higher in Landrace but the heart girth and height at withers were significantly (P<0.05) higher in Large White Yorkshire. The post weaning growth performance in terms of body weight and average daily gain was substantially better in Landrace over that of Large White Yorkshire pigs.

Key words: *Body weight, linear body measurements, feed efficiency, Large White Yorkshire, Landrace pigs*

Exotic breeds of pigs have higher feed conversion efficiency and faster growth rate and have higher growth potential than indigenous breeds (Mishra *et al*., 1989). Due to the introduction of pure-bred exotic stock of pigs in recent years, pork industry is expected to play a significant role in the economy of our country. At present Large White Yorkshire (LWY) breed has been utilised widely for commercial pork production in India. Landrace is another exotic pig breed native to Denmark noted for its faster growth rate and mothering ability that has been introduced in Tamil Nadu. Therefore, there is a need to study the performance of Landrace in comparison to LWY pigs.

Materials and Methods

Eight numbers each of weaned Landrace and LWY piglets consisting of four males and four females in each breed were randomly selected based on body weight and were used for this study. The males were castrated .The randomly selected piglets were divided into two groups. Group I (T_1) comprised of Landrace piglets and Group II (T_2) Large White Yorkshire piglets. The piglets were housed in two separate pens in the same building with concrete floor. The piglets in each group were fed *adlibitum* concentrate feed with the following ingredients. Maize -35, Cumbu -10, Ground Nut Cake -15, Wheat bran - 6, Deoiled Ricebran -26.5, Dry fish -5 , Mineral mixture -2 and common salt - 0.5. Feed given was increased by 100 g every 3 to 4 days depending on the intake to minimise feed refusals (Ravi *et al.,* 1999b). The piglets had free access to water. The piglets were maintained under identical management condition and routine health cover was provided to them. The piglets were reared up to 180 days of age. Linear body measurements namely body length, chest girth and height at withers were measured using a standard measuring tape at the time of

**Part of M.V.Sc. thesis submitted by the first author to the Tamil Nadu Veterinary and Animal Sciences University, Chennai-51*

1. M.V.Sc. Scholar
2. Professor & Head
3. Associate Professor
4. Professor (Retd.)
5. Associate Professor, LRS, Kattupakkam

weighment (Singh *et al.,* 2001). Data on fortnightly body weight, body measurements and daily feed intake were recorded and analysed statistically for interpretation (Snedecor and Cochran, 1994).

Results and Discussion

Landrace pigs had significantly (P<0.01) higher body weight (66.31 ± 1.41 kg) compared to L W Y (60.88 ± 1.10 Kg) at the end of the experiment (Table1). This was in accordance with the observation made by Sharma *et al.* (1990), who observed that Landrace pigs were superior to LWY pigs in growth performance at almost all ages. On the contrary, Varadarajulu and Rao (1982) noticed that LWY pigs were superior to Landrace in body weights.

The growth performance of Landrace pigs in the present study was better than those observed by Goswami and Raina (1983) who observed a body weight of 56.73 ± 0.51 kg at 6 months of age, whereas Sharma *et al.* (1990) observed a low body weight of 41.81 ± 0.49 kg at the end of 30th week in Landrace. The performance of LWYwas far better (60.88 ± 1.10 kg) than those reported by Sharma *et al.* (1990) who observed a body weight of 33.72 ± 0.43 kg at the end of 30th week. (Table 2)

The body length was significantly (P<0.01) higher in Landrace (106.75 ± 2.13 cm) compared to LWY pigs (92.49 ± 1.22 cm) (Table 2). It was observed that LWY had significantly (P<0.01) higher heart girth and height (81.94 ± 0.90 cm and 57.89 ± 1.00 cm) compared to Landrace pigs (77.87 ± 1.53 and 53.73 ± 0.89 cm). Similar linear measurements were noticed by Sinha *et al.* (1993) in LWY pigs. In the present study it was noted that heart girth and height at withers was higher in LWY piglets compared to Landrace (Table 3 and 4). This was in tune with

Table 1. Mean ± SE of fortnightly body weight (kg) of Landrace and LWY pigs

Fortnight	Breed		'T' value
	Landrace	Large White Yorkshire	
0	7.48 ± 0.29	7.20 ± 0.43	0.53^{NS}
1	8.98 ± 0.37	8.26 ± 0.48	1.17^{NS}
2	14.18 ± 0.47	12.94 ± 0.63	1.57^{NS}
3	19.76 ± 0.90	18.13 ± 1.05	1.84^{NS}
4	25.53 ± 1.21	22.75 ± 1.08	1.73^{NS}
5	32.43 ± 1.57	28.43 ± 0.96	2.16*
6	38.06 ± 1.28	33.69 ± 0.96	2.77*
7	43.88 ± 1.34	39.94 ± 1.06	2.30*
8	51.06 ± 1.51	46.56 ± 1.16	2.36*
9	58.91 ± 1.36	53.56 ± 1.07	3.13**
10	66.31 ± 1.41	60.88 ± 1.10	3.03**

NS- Non-significant

* -Significant at five per cent level (P<0.05)

**- Significant at one per cent level (P<0.01)

Table 2. Mean ± SE of fortnightly body length (cm) of Landrace and LWY pigs

Fortnight	Breed		'T' value
	Landrace	Large White Yorkshire	
0	50.45 ± 1.14	44.86 ± 0.64	4.25**
1	54.86 ± 0.90	47.76 ± 0.55	6.79 **
2	59.06 ± 0.92	51.60 ± 0.44	7.34 **
3	63.38 ± 0.71	55.34 ± 0.54	8.80 **
4	67.86 ± 0.79	59.06 ± 0.62	8.73 **
5	73.44 ± 0.99	63.13 ± 0.51	9.18**
6	79.75 ± 1.25	68.18 ± 0.64	8.27**
7	86.50 ± 1.33	74.11 ± 0.81	8.35**
8	92.69 ± 1.71	79.64 ± 0.81	6.90**
9	99.81 ± 1.92	87.14 ± 0.82	6.07**
10	106.75 ± 2.13	92.49 ± 1.22	5.81**

**- Significant at one per cent level (P<0.01)

Table 3. Mean ± SE of fortnightly heart girth (cm) of Landrace and LWY pigs

Fortnight	Breed		'T' value
	Landrace	Large White Yorkshire	
0	42.36 ± 0.84	42.16 ± 1.05	0.18 ^{NS}
1	44.50 ± 0.72	44.51 ± 0.98	0.01 ^{NS}
2	47.31 ± 0.79	47.34 ± 0.94	0.04 ^{NS}
3	49.86 ± 0.95	50.26 ± 0.94	0.29 ^{NS}
4	53.36 ± 0.10	54.85 ± 0.86	0.97 ^{NS}
5	57.31 ± 1.08	60.38 ± 0.76	2.32**
6	61.13 ± 1.26	64.66 ± 0.77	2.39*
7	65.31 ± 1.25	68.63 ± 0.67	2.33*
8	69.13 ± 1.31	72.81 ± 0.55	2.59*
9	73.19 ± 1.42	76.99 ± 0.74	2.37*
10	77.87 ± 1.53	81.94 ± 0.90	2.29*

NS- Non-significant
* -Significant at five per cent level (P<0.05)
**- Significant at one per cent level (P<0.01)

Table 4. Mean ± SE of fortnightly height at withers (cm) of Landrace and LWY pigs

Fortnight	Breed		'T' value
	Landrace	Large White Yorkshire	
0	28.86 ± 0.47	29.78 ± 0.60	1.17^{NS}
1	30.25 ± 0.54	31.05 ± 0.70	0.90 ^{NS}
2	31.98 ± 0.61	33.03 ± 0.75	1.09 ^{NS}
3	33.70 ± 0.63	35.06 ± 0.76	1.38 ^{NS}
4	35.76 ± 0.67	36.85 ± 0.97	0.92 ^{NS}
5	37.93 ± 0.71	39.28 ± 0.96	1.13 ^{NS}
6	40.34 ± 0.77	42.79 ± 0.99	1.95 ^{NS}
7	43.33 ± 0.83	45.71 ± 1.02	1.81 ^{NS}
8	46.53 ± 0.86	50.46 ± 1.11	1.96*
9	50.19 ± 0.86	54.11 ± 1.06	1.99*
10	53.73 ± 0.89	57.89 ± 1.00	1.93*

NS- Non-significant
* -Significant at five per cent level (P<0.05)

Table 5. Mean ± SE of fortnightly average daily gain (g) of Landrace and LWY pigs

Fortnight	Breed	
	Landrace	Large White Yorkshire
0	99.99^{a} ± 12.08	69.99^{b} ± 07.86
1	351.66^{a} ± 10.37	313.33^{b} ± 15.17
2	379.99^{a} ± 32.48	345.83^{b} ± 29.50
3	385.83^{a} ± 27.03	308.33^{b} ± 08.96
4	375.82^{a} ± 08.06	378.33^{b} ± 10.05
5	417.50^{a} ± 18.25	350.83^{b} ± 21.00
6	387.50^{a} ± 01.28	383.33^{b} ± 08.34
7	479.16^{a} ± 19.86	441.66^{b} ± 08.34
8	524.99^{a} ± 17.54	462.49^{b} ± 24.75
9	487.49^{a} ± 28.82	491.66^{b} ± 25.78
10	388.99^{a} ± 38.86	354.58^{b} ± 37.16

Means bearing different superscript in a row differ significantly (P<0.01)

Table 6. Mean ± SE of fortnightly feed conversion efficiency

Fortnight	Breed	
	Landrace	Large White Yorkshire
1	3.55 ± 0.46	4.27 ± 0.49
2	2.14 ± 0.08	2.04 ± 0.13
3	3.06 ± 0.25	2.78 ± 0.22
4	3.69 ± 0.25	3.97 ± 0.10
5	4.48 ± 0.10	4.16 ± 0.11
6	4.87 ± 0.19	5.09 ± 0.38
7	4.93 ± 0.15	4.95 ± 0.15
8	4.78 ± 0.19	4.74 ± 0.08
9	4.44 ± 0.16	4.81 ± 0.23
10	5.05 ± 0.28	4.86 ± 0.29
Overall	**4.09 ± 0.12**	**4.17 ± 0.13**

Table 6a. Analysis of variance on feed conversion efficiency

Source of variation	d.f	M.S	'F' value
Between breeds	1	0.02	0.43 ^{NS}
Between periods	9	1.89	35.25**
Error	9	0.053	

NS- Non-significant
**- Significant at one per cent level (P<0.01)

Sukh deo and Raina (1983) who indicated that pigs taller at withers had greater heart girth. The body length was higher in Landrace, as it is known for its higher body length among the breeds.

The post weaning average daily gain was significantly (P<0.01) higher in Landrace (388.99 ± 38.86 g) compared to LWY piglets (354.58 ± 37.16 g) (Table 5).The present finding was in accordance with Rohilla *et al.* (2000), who noticed a growth rate of 335.45 ± 7.45 g /day in LWY pigs. This finding was also in accordance with Goswami and Raina (1983).

The average daily gain obtained in the study was better than those reported by Goswami and Raina (1983) whereas it was lesser compared to the finding of Albar and Marouby (1983) in German Landrace, De Haer and De Vries (1993) in Dutch Landrace, De Haer and De Vries (1993) in Yorkshire and Hyun *et al.* (2001) in LWY. The difference in performance between the breeds might be due to difference in metabolism.

No significant difference in feed conversion efficiency between Landrace (4.09 ± 0.12) and LWY (4.17 ± 0.13) piglets was noticed (Table 6). The feed conversion efficiency in LWY in the present study was in agreement with Singh *et al.* (1990) In contrast, Dash and Mishra (1986) observed feed efficiency of Large White Yorkshire pigs at 24 weeks of age to be 5.39, which was higher than those obtained (Table 3) in present study for LWY pigs. Similarly Varadarajulu and Rao (1982) showed that pure bred Landrace pigs utilised feed (gain/feed) better than purebred Yorkshire pigs. On contrary, De Haer and De Vries (1993) observed that Dutch Landrace pigs had a significantly higher feed to gain ratio compared to Great Yorkshire pigs.

References

Albar, J. and Marouby, H. 1983. Technical and economic performance of pig farms in the German federal Republic. *Anim. Br. Abstr.,* **51** : 821.

Dash, P and Mishra, M.1986. Performance of Large White Yorkshire and its crossbreds with indigenous pigs in Orissa. *Indian. J.Anim. Sci.,* **56**: 144-146.

De Haer, L. C. M and De Vries, A. G.1993. Effects of genotype and sex on the feed intake pattern of group housed growing pigs. *Livestock Prod. Sci.,* **36**: 223-232.

Goswami, R. N. and Raina, B. L.1983. Bodyweight, daily weight gain and growth curve in Landrace pigs. *Indian. J. Anim. Sci.,* **53** : 97-100.

Hyun, Y. and Ellis, M. 2001. Effect of group size and feeder type on growth performance and feeding patterns in growing pigs. *J. Anim. Sci.,* **79**: 803-810.

Mishra, R. R., Shiva Prasad and Krishan Lal. 1989. Studies on carcass traits of Large White Yorkshire pigs. *Indian J. Anim. Prod. Mgmt.*, **5**: 130-133.

Ravi, A., Srinivasa Rao, D and Krishna Reddy, K.1999. Effect of sex on voluntary feed intake and growth performance in crossbred pigs. *Indian J. Anim. Nutr.,* **16**: 56-59.

Rohilla, P.R., Bujarbaruah, K. M., Kumar, M and Singh, G.(2000). Carcass traits of Large White Yorkshire, Hampshire and Naga local pigs. *Indian J. Anim. Sci.,* **70** : 307-308.

Sharma, B.D., Dubey, C. B and Singh, S. K.1990. A comparative study of growth in pure and crossbred pigs. *Indian J. Anim. Sci.,* **60** : 492-495.

Singh, K. I., Singh, R. L., Singh, S. K., Sharma, B. D and Dubey, C. B.1990. Body weight and efficiency of feed utilization in pigs. *Indian J. Anim. Sci.,* **60**: 605-608.

Singh, S.K., Pandey, R.N and Sharma, B.D. (2001). Prediction of body weight from linear body measurement in pigs. *Indian J. Anim. Res.,* **35**: 15-20.

Sinha, S. K., Singh, R. A and Sharma, B. D. 1993. Carcass and economic traits of Swine production on culinary waste. *Indian. J. Anim. Sci.,* **63**: 787 789.

Snedecor, G.W and Cochran, W.G. 1994. *Statistical methods*. IOWA State University Press, Ames, IOWA, USA. 330 p

Sukh Deo and Raina, B. L. 1983. Genetic and phenotypic correlations among body weights and body measurements in Landrace and Landrace X Large White pigs. *Indian. J. Anim. Sci.,* **53**: 451-454.

Varadarajulu, P and Rao, R. S.1982. A comparative study of growth of pure-bred and cross-bred swine. *Indian. Vet. J.,* **59** : 623-627.

❑