

4.3 Results

4.3.1 Results of Laboratory Experiment 1

Results from the analysis of variance including all 6 experimental groups (Table 17) revealed that there were significant differences between groups of pigs in their daily dry matter intake (DMI, $P < 0.001$), daily energy intake (EI, $P < 0.001$), daily rate of gain (DRG, $P < 0.001$), dressing percentage (Dress%, $P < 0.05$), feed conversion ratio (FCR, $P < 0.05$) but not energy conversion ratio (ECR). The differences were such that the DRG (Figure 21) of pigs on high energy-high protein (HH), high energy-low protein (HL), low energy-high protein (LH) and low energy-low protein (LL) diets in the hotroom (502, 510, 546 and 489 g/d, respectively) were lower ($P < 0.05$) than those groups of pigs on diets HL or LL in the control-room (716 or 690 g/d, respectively). There were no significant differences in DRG between groups of pigs in the hotroom nor between the two groups in the control-room. Similar statistical results were obtained for DMI and subsequently EI.

Pigs on diet HL in the control-room dressed out better (77.2%) than those on diets HH and LL in the hotroom (72.4 or 73.8%, respectively; $P < 0.05$), and the FCR of pigs on diet HL in the control-room (2.79 kg/kg) was lower ($P < 0.05$) than those on diet LL in the hotroom (3.25 kg/kg). All other such between-group differences were non-significant.

When analysed on a 2 diets X 2 environments basis (i.e. HL and LL X hotroom and control-room), it was found (Table 17) that pigs that were on diet HL in both environments converted feed (2.85 kg/kg) better ($P < 0.05$) than those on the LL diet (3.08 kg/kg). Although ECR and dressing out percentage of those which were on diet HL were higher than on diet LL in

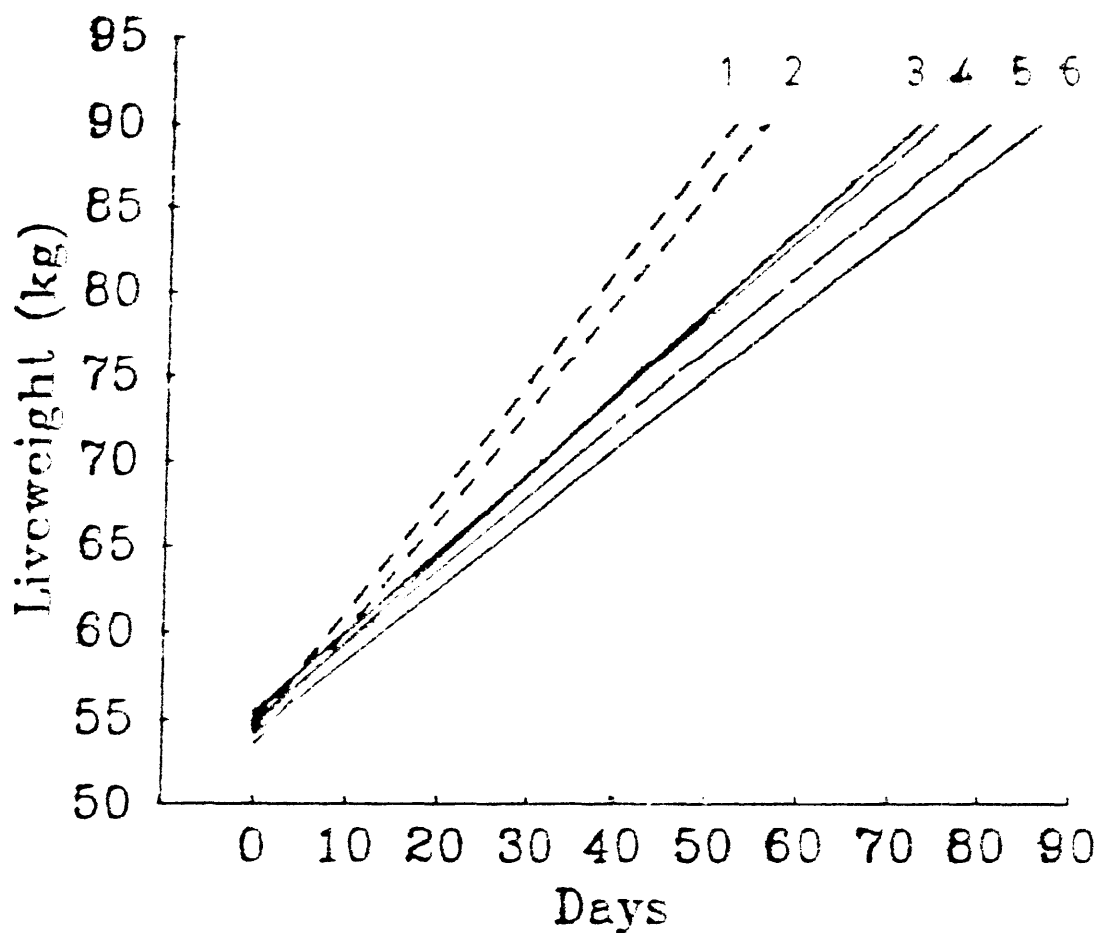


Figure 21. Plots of linear regressions of liveweights of pigs which received different diets and ambient temperature treatments over days of experiment in Laboratory Experiment 1.

- 1 - HL; control-room
- 2 - LI; control-room
- 3 - LH; hotroom
- 4 - HL; hotroom
- 5 - HH; hotroom
- 6 - LL; hotroom

Table 17. Mean Daily Rate of Gain (DRG), Dressing Percentage (Dress%), Daily Dry Matter Intake (DMI), Feed Conversion Ratio (FCR), Daily Energy Intake (EI) and Energy Conversion Ratio (ECR) of pigs on different dietary and environmental temperature treatments in Laboratory Experiment 1.

Treatment	Parameter					
	DRG (g/d)	Dress% (%)	DMI (g/d)	FCR (kg/kg)	EI (MJ/d)	ECR (MJ/kg)
(i) Analysed as 6 Treatments						
HH (hotroom)	502 ^a	72.4 ^b	1436 ^b	2.87 ^{a b}	20.5 ^b	41.0
HL (hotroom)	510 ^a	75.0 ^{a b}	1517 ^b	2.90 ^{a b}	21.9 ^b	42.7
LH (hotroom)	548 ^a	74.6 ^{a b}	1624 ^b	2.99 ^{a b}	21.9 ^b	40.9
LL (hotroom)	489 ^b	73.8 ^b	1577 ^b	3.25 ^a	20.6 ^b	42.3
HL (control-room)	716 ^a	77.2 ^a	2005 ^a	2.79 ^b	29.8 ^a	41.8
LL (control-room)	690 ^a	75.3 ^{a b}	2034 ^a	2.92 ^{a b}	26.0 ^a	37.3
LSD(5%)	109	2.6	264	0.36	3.9	5.0
Sig. Level	***	*	***	*	***	N.S.
(ii) Analysed as 2 Diets X 2 Environmental Temperatures						
HL	613	76.1	1761	2.85 ^b	25.8	42.2
LL	590	74.5	1806	3.08 ^a	23.3	39.8
LSD(5%)	87	1.9	217	0.21	3.2	2.9
Sig. Level	N.S.	-	N.S.	*	N.S.	-
Hotroom	500 ^a	74.4	1547 ^b	3.07 ^a	21.2 ^a	42.5 ^a
Control-room	703 ^a	76.2	2019 ^a	2.85 ^b	27.9 ^a	39.5 ^b
LSD(5%)	87	1.9	217	0.21	3.2	2.9
Sig. Level	***	-	***	*	***	*
Interaction: Diet X Environment						
LSD(5%)	123	2.7	307	0.29	4.5	4.0
Sig. Level	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Means with the same superscript within each column are not significantly different (5% level).

both environments, these differences only approached significance ($0.05 < P < 0.10$).

Furthermore, the results revealed that pigs that were on diets HL or LL in the control-room had higher DMI ($P < 0.001$; 2019 g/d), EI ($P < 0.001$; 27.9 MJ/d) and DRG ($P < 0.001$; 703.3 g/d) values than their counterparts (1547 g/d, 21.2 MJ/d and 499.6 g/d, respectively) in the hotroom. On the other hand the FCR and ECR of pigs in the hotroom (3.07 kg/kg and 42.5 MJ/kg) were higher ($P < 0.05$ and $P < 0.05$) than their counterparts in the control-room (2.85 kg/kg and 39.5 MJ/kg). The difference in dressing out percentage between pigs in the control-room (76.2%) and the hotroom (74.4%) did not reach the level required for significance ($0.05 < P < 0.10$). There were no significant interactions between diets and environments for DMI, EI, DRG, Dress%, FCR or ECR.

From Table 18 it can be seen that there were significant differences in apparent digestibility of dry matter (ADM; $P < 0.001$), energy (ADE; $P < 0.001$), protein (ADP; $P < 0.001$) and in digestible energy (DE; $P < 0.001$) and digestible crude protein (DCP; $P < 0.001$) between the four diets studied. The differences were such that the ADM of diet HL fed to pigs in the control-room (84.8%) was higher ($P < 0.05$) than that of all other diets except HL in the hotroom. The ADM of both diets HH (81.4%) and HL (83.5%) fed to pigs in the hotroom was higher ($P < 0.05$) than that of diet LH (77.7%), which in turn was higher ($P < 0.05$) than that of diet LL in the control-room (74.3%). The ADP of diet LH (78.9%) was higher ($P < 0.05$) than that of diets HH (73.9%), HL (hotroom; 71.8%), HL (control-room; 72.3%) and LL (hotroom; 74.4%) which in turn were higher ($P < 0.05$) than diet LL (68.6%) when fed to pigs in the control-room.

Table 18. Means of Apparent Digestibility of Dry Matter (ADM), Protein (ADP), Energy (ADE), Digestible Energy (DE) and Crude Protein (DCP) of diets given to pigs living in either hot or cold environments in Laboratory Experiment 1.

Treatment	Apparent Digestibility			Diet	
	ADM (%)	ADP (%)	ADE (%)	DE (MJ/kg)	DCP (%)

(i) Analysed as 6 Treatments

HH (hotroom)	81.4 ^a	73.9 ^a	79.3 ^{a c}	14.3 ^b	22.2 ^a
HL (hotroom)	83.5 ^{a b}	71.8 ^a	81.7 ^{a b}	14.7 ^{a b}	17.3 ^b
LH (hotroom)	77.7 ^c	78.9 ^a	76.5 ^{c d}	13.5 ^c	22.0 ^a
LL (hotroom)	76.0 ^{c d}	74.4 ^b	73.8 ^d	13.0 ^{c d}	16.4 ^c
HL (control-room)	84.8 ^a	72.3 ^a	83.1 ^a	15.0 ^a	17.5 ^b
LL (control-room)	74.3 ^d	68.6 ^c	72.2 ^a	12.8 ^d	15.1 ^d
LSD(5%)	2.6	3.0	2.9	0.5	0.7
Sig. Level	***	***	***	***	***

(ii) Analysed as 2 Diets X 2 Environmental Temperatures

HL	84.1 ^a	72.0	82.4 ^a	14.8 ^a	17.4 ^a
LL	75.1 ^b	71.5	73.0 ^c	12.9 ^b	15.7 ^b
LSD(5%)	2.2	2.6	2.5	0.4	0.6
Sig. Level	***	N.S.	***	***	***
Hotroom	79.7	73.1	77.8	13.9	16.9
Control-room	79.5	70.5	77.7	13.9	16.3
LSD(5%)	2.2	2.6	2.5	0.4	0.6
Sig. Level	N.S.	-	N.S.	N.S.	-

Interaction: Diet X Environment

LSD(5%)	3.1	3.7	3.5	0.6	0.8
Sig. Level	N.S.	*	N.S.	N.S.	*

Means with the same superscript within each column are not significantly different (5% level).

The ADE values of diet HL in both the hotroom (81.7%) and the control-room (83.1%) were higher ($P<0.05$) than diet LH (76.5%) and both LL in the hotroom (73.8%) and the control-room (72.2%). Furthermore, the ADE of diet LL fed to pigs in the control-room (72.2%) was lower ($P<0.05$) than when the same diet was fed in the hotroom (73.8%), this in turn lower ($P<0.05$) than that of diet HH. The DE of diet HL fed to pigs in the control-room (15 MJ/kg) was higher ($P<0.05$) than in all other groups with the exception of the same diet fed to pigs in the hotroom (14.7 MJ/kg). The DE of diet HH (14.3 MJ/kg) was higher ($P<0.05$) than that of all others except that of diet HL in both rooms. DE of diet LL fed to pigs in the control-room (12.8 MJ/kg) was lower ($P<0.05$) than that of diet LH (13.5 MJ/kg). The DCP of high protein diets (HH and LH, 22.2 and 22.0% respectively) was higher ($P<0.05$) than that of diet HL when fed to pigs in both the hotroom (17.3%) and the control-room (17.5%), this in turn was higher ($P<0.05$) than that of diet LL when fed to pigs in both the hotroom (16.4%) and the control-room (15.1%). The DCP of diet LL fed to pigs in the hotroom was higher ($P<0.05$) than when the same diet was fed in the control-room. All other such between-group differences were non-significant.

When analysed as 2 diets X 2 environments, the results (Table 18) revealed that ADM, ADE, DE and DCP of diet HL (84.1%, 82.4%, 14.8 MJ/kg and 17.4% respectively) were higher ($P<0.001$, $P<0.001$ and $P<0.001$ respectively) than those of diet LL (75.1%, 73.0%, 12.9 MJ/kg and 15.7% respectively). There were significant interactions between diet and environment in the case of both ADP ($P<0.05$) and DCP ($P<0.05$).

Table 19 shows that there were no significant differences between-groups in any of the anatomical parameters measured when the data was analysed as 6 treatments. However, when analysed as 2 diets X 2

Table 19 Means of Carcase Backfat Depth (P2) measured by ultrasonic (Scanoprobe) and optical (Introscope) methods, Carcase Length (CL), Chest Depth (CD) and Girth of pigs which received different dietary and environmental temperature treatments in Laboratory Experiment 1.

Treatment	Parameter				
	P2(mm)		Car.Length	Chest Depth	Girth
	Scanoprobe	Introscope	(cm)	(cm)	(cm)
(i) Analysed as 6 Treatments					
HH (hotroom)	19.6	20.2	80.5	30.6	101
HL (hotroom)	20.5	21.7	81.3	31.6	102
LH (hotroom)	19.2	20.2	81.8	31.4	101
LL (hotroom)	21.5	18.7	81.9	31.2	99
HL (control-room)	21.0	23.5	79.2	33.1	103
LL (control-room)	19.2	22.0	79.0	33.0	104
LSD(5%)	5.2	4.0	4.5	2.1	4
Sig. Level	N.S.	N.S.	N.S.	N.S.	N.S.
(ii) Analysed as 2 Diets X 2 Environmental Temperatures					
HL	20.7	22.6	80.3	32.4	103
LL	20.3	20.4	80.4	32.1	101
LSD(5%)	3.6	3.1	4.0	1.4	4
Sig. Level	N.S.	N.S.	N.S.	N.S.	N.S.
Hotroom	21.0	20.2	81.6	31.4 ^b	101
Control-room	20.1	22.8	79.1	33.1 ^a	104
LSD(5%)	3.6	3.1	4.0	1.4	3
Sig. Level	N.S.	N.S.	N.S.	*	-
Interaction: Diet X Environment					
LSD(5%)	5.1	4.3	5.7	2.0	4
Sig. Level	N.S.	N.S.	N.S.	N.S.	N.S.

Means with the same superscript within each column are not significantly different (5% level).

Table 20. Means of Respiration Rate (RR), Rectal (RT), and Skin (ST) Temperatures of pigs which received different dietary and environmental temperature treatments in Laboratory Experiment 1.

Treatment	Parameter		
	RR (b/min)	RT (° C)	ST (° C)
(i) Analysed as 6 Treatments			
HH (hotroom)	105 ^a	38.8 ^b	37.1 ^a
HL (hotroom)	117 ^a	38.9 ^{a,b}	37.3 ^a
LH (hotroom)	124 ^a	39.2 ^a	37.4 ^a
LL (hotroom)	119 ^a	39.0 ^a	37.4 ^a
HL (control-room)	37 ^a	38.4 ^c	34.0 ^b
LL (control-room)	49 ^a	38.4 ^c	34.3 ^b
LSD(5%)	20	0.2	0.4
Sig. Level	***	***	***
(ii) Analysed as 2 Diets X 2 Environmental Temperatures			
HL	77	38.7	35.6
LL	84	38.7	35.8
LSD(5%)	13	0.1	0.3
Sig. Level	N.S.	N.S.	N.S.
Hotroom	118 ^a	39.0 ^a	37.3 ^a
Control-room	43 ^a	38.4 ^b	34.1 ^b
LSD(5%)	13	0.1	0.3
Sig. Level	***	***	***
Interaction: Diet X Environment			
LSD(5%)	18	0.2	0.4
Sig. Level	N.S.	N.S.	N.S.

Means with the same superscript within each column are not significantly different (5% level).

environments it was revealed that the chest depth of pigs in the control-room (33.1 cm) was greater ($P<0.05$) than that of their counterparts in the hotroom (31.4 cm). A similar trend was also detected in size of girth, but that difference only approached significance ($0.05<P<0.10$). There were no significant differences in the anatomical parameters of pigs on diets HL and LL nor any interactions between diet and environment.

When analysed on the basis of six treatments, the data revealed significant ($P<0.001$) treatment differences in respiration rate (RR), rectal temperature (RT) and skin temperature (ST). The between-group differences were such that all physiological parameters (RR, RT and ST) of pigs in the control-room were lower ($P<0.05$) than those in the hotroom. Furthermore, the mean RT of pigs on diets LH (39.2°C) and LL in the hotroom (39.0°C) were higher ($P<0.05$) than that of pigs on diet HH (38.8°C).

When analysed as 2 diets X 2 environments the results showed that there were no significant differences in any of the physiological parameters of pigs on diets HL and LL. However, pigs in the control-room exhibited lower values for all the above physiological parameters ($P<0.001$) than their counterparts in the hotroom. There was no significant interaction between diet and environment.

4.3.2 Results of Laboratory Experiment 2

Results of analysis of variance including all six treatments (Table 21) revealed that there were significant differences between-groups in DMI ($P<0.001$), EI ($P<0.001$), DRG ($P<0.001$), FCR ($P<0.05$) and Dress% ($P<0.01$) but not in ECR. The differences were such that the DMI of pigs on diet HL in the control-room (1904 g/d) was higher ($P<0.05$) than that of all other

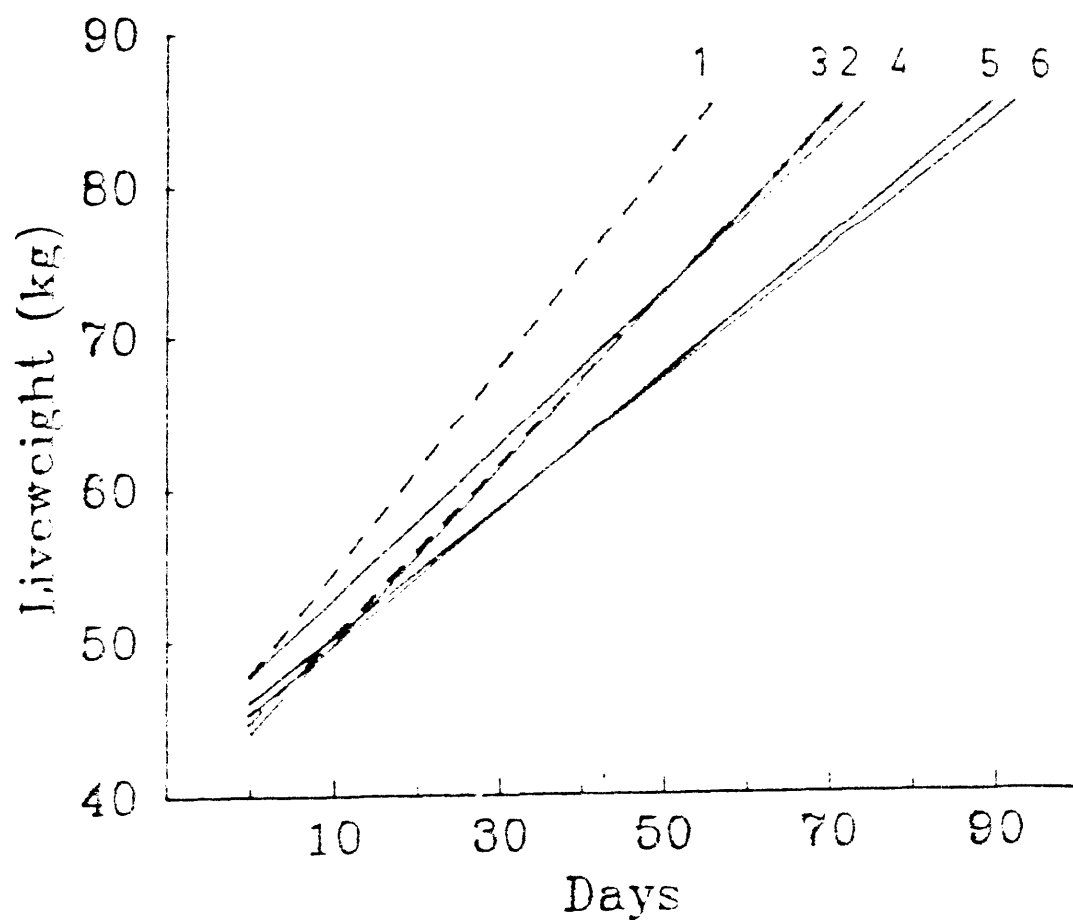


Figure 22. Plots of linear regressions of liveweights of pigs which received different dietary and ambient temperature treatments over days of experiment in Laboratory Experiment 2.

- 1 - HL; control-room
- 2 - LL; control-room
- 3 - HH; hotroom
- 4 - HL; hotroom
- 5 - LL; hotroom
- 6 - LH; hotroom

Table 21. Mean Daily Rate of Gain (DRG), Dressing Percentage (Dress%), Daily Dry Matter Intake (DMI), Feed Conversion Ratio (FCR), Daily Energy Intake (EI), and Energy Conversion Ratio (ECR) of pigs which received different dietary and environmental temperature treatments in Laboratory Experiment 2.

Treatment	Parameter					
	DRG (g/d)	Dress% (%)	DMI (g/d)	FCR (kg/kg)	EI (MJ/d)	ECR (MJ/kg)
(i) Analysed as 6 Treatments						
HH (hotroom)	574 ^b	74.7 ^c	1613 ^{b,c}	2.81 ^b	24.0 ^b	41.8
HL (hotroom)	478 ^c	77.2 ^{a,b}	1452 ^{c,d}	3.04 ^{a,b}	22.4 ^{b,c}	46.9
LH (hotroom)	423 ^c	73.6 ^c	1394 ^d	3.31 ^a	19.3 ^c	45.8
LL (hotroom)	446 ^c	72.4 ^c	1505 ^{c,d}	3.40 ^b	20.3 ^c	45.8
HL (control-room)	671 ^a	79.7 ^a	1904 ^a	2.83 ^b	29.5 ^a	43.9
LL (control-room)	562 ^a	74.7 ^{b,c}	1850 ^{a,b}	3.32 ^a	25.7 ^c	46.0
LSD(5%)	72	3.2	244	0.40	3.5	5.3
Sig. Level	***	**	***	*	***	N.S.
(ii) Analysed as 2 Diets X 2 Environmental Temperatures						
HL	575 ^a	78.4 ^a	1678	2.94 ^b	25.9 ^a	45.4
LL	504 ^a	73.5 ^b	1677	3.36 ^a	23.0 ^b	45.9
LSD(5%)	60	2.7	208	0.32	2.9	4.3
Sig. Level	*	**	N.S.	*	*	N.S.
Hotroom	462 ^b	74.8	1479 ^b	3.22	21.3 ^b	46.3
Control-room	617 ^a	77.2	1877 ^a	3.07	27.6 ^a	44.9
LSD(5%)	60	2.7	208	0.32	2.9	4.3
Sig. Level	***	-	***	N.S.	***	N.S.
Interaction: Diet X Environment						
LSD(5%)	85	3.9	294	0.46	4.1	6.1
Sig. Level	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Means with the same superscript within each column are not significantly different (5% level).

groups except that of pigs on diet LL in the control-room (1850 g/d). The latter group and also pigs on diet HH (1613 g/d) had higher DMI ($P<0.05$) than pigs on diet LH (1394 g/d).

For daily energy intake (EI) the results indicated that pigs on diet HL in the control-room (29.5 MJ/d) had a higher EI ($P<0.05$) than the other groups, while the EI of pigs on diets HH (24.0 MJ/d) and LL in the control-room (25.7 MJ/d) were higher ($P<0.05$) than those on diets LH (19.3 MJ/d) and LL in the hotroom (20.3 MJ/d). In the control-room, the DRG (Figure 22) of pigs on diet HL (671 g/d) was higher ($P<0.05$) than that of pigs on diet LL (562 g/d). DRG values on diet HH in the hotroom (574 g/d) was in turn higher ($P<0.05$) than those on diets HL (478 g/d), LH (423 g/d) and LL (446 g/d).

The FCR of pigs on diet LH (3.31 kg/kg) and LL in both the hotroom (3.40 kg/kg) and the control-room (3.32 kg/kg) were higher ($P<0.05$) than those of pigs on diets HH (2.81 kg/kg) and HL in the control-room (2.83 kg/kg). Dressing percentage of pigs on diet HL in both the hotroom (77.2%) and the control-room (79.7%) was better ($P<0.05$) than that of pigs on diets LH (73.6%) and LL in the hotroom (72.4%). All other between-group differences were non-significant.

When analysed on a 2 diets X 2 environments basis, the results (Table 21) revealed that pigs on diet HL had higher EI ($P<0.05$; 25.9 MJ/d), DRG ($P<0.05$; 575 g/d), Dress% ($P<0.01$; 78.4%) and lower FCR ($P<0.05$, 2.94 kg/kg) values than those on diet LL (23.0 MJ/d, 504 g/d, 73.5% and 3.36 kg/kg, respectively). The results further revealed that pigs in the control-room consumed more ($P<0.001$) feed (1877 g/d) and energy (27.6 MJ/d) per day than their counterparts in the hotroom (1479 g/d, 21.3 MJ/d respectively); the DRG of pigs in the control-room (617 g/d) was

correspondingly higher ($P < 0.001$) than that in the hotroom (462 g/d). Although pigs in the control-room dressed out (77.2%) better than their counterparts in the hotroom (74.8%), the difference only approached significance ($0.05 < P < 0.10$). All other differences between diets and environments were non-significant. There were no interactions between diets and environments for the above parameters.

Table 22 shows that there were significant differences ($P < 0.001$) in ADM, ADE, DE and DCP, but not ADP, between groups when these parameters were analysed on a six treatments basis. The differences were such that the ADM on high energy diets (HH, 83.4%; HL-hotroom, 85.1%; HL-control-room, 85.2%) were higher ($P < 0.05$) than on low energy diets (LH, 77.1%; LL-hotroom, 75.0%; LL-control-room, 77.4%). Similarly, the ADE values on the high energy diets (HH, 82.1%; HL-hotroom, 84.8%; HL-control-room, 85.1%) were higher ($P < 0.05$) than on low energy diets (LH, 76.3%; LL-hotroom, 74.2%; LL-control-room, 76.7%). However, the ADE on diet HH was lower ($P < 0.05$) than that of diet HL when fed to pigs in both environments.

It was intended that the DE of the high energy diets (HH, 14.9 MJ/kg; HL-hotroom, 15.4 MJ/kg; HL-control-room, 15.5 MJ/kg) would be the same but higher ($P < 0.05$) than that of the low energy diets (LH, 13.8 MJ/kg; LL-hotroom, 13.5 MJ/kg; LL-control-room, 13.9 MJ/kg). However, the DE of diet HH was lower ($P < 0.05$) than that of diet HL when fed to pigs in both the hotroom and the control-room. Furthermore, the results indicated that the DCP of diet HH (16.4%) was higher ($P < 0.05$) than that of diets LH (15.7%) and HL when fed to pigs in the control-room (15.4%), which in turn were higher ($P < 0.05$) than that of diet HL fed to pigs in the hotroom.

Table 22. Means of Apparent Digestibilities of Dry Matter (ADM), Protein (ADP), Energy (ADE), Digestible Energy (DE) and Crude Protein (DCP) of diets given to pigs living in either hot or cold environments in Laboratory Experiment 2.

Treatment	Apparent Digestibility			Diet	
	ADM (%)	ADP (%)	ADE (%)	DE (MJ/kg)	DCP (%)
(i) Analysed as 6 Treatment					
HH (hotroom)	83.4 ^a	79.2	82.1 ^b	14.9 ^b	16.4 ^a
HL (hotroom)	85.1 ^a	81.7	84.8 ^a	15.4 ^a	14.2 ^c
LH (hotroom)	77.1 ^b	82.0	76.3 ^c	13.8 ^c	15.7 ^b
LL (hotroom)	75.0 ^b	79.1	74.2 ^c	13.5 ^c	13.6 ^c
HL (control-room)	85.2 ^a	80.7	85.1 ^a	15.5 ^a	15.4 ^b
LL (control-room)	77.4 ^b	80.6	76.7 ^c	13.9 ^c	13.9 ^c
LSD(5%)	2.4	3.1	2.5	0.4	0.6
Sig. Level	***	N.S.	***	***	***
(ii) Analysed as 2 Diets X 2 Environmental Temperatures					
HL	85.2 ^a	81.2	85.0 ^a	15.5 ^a	14.8 ^a
LL	76.2 ^b	79.1	75.4 ^b	13.7 ^b	13.7 ^b
LSD(5%)	1.5	2.3	1.5	0.3	0.4
Sig. Level	***	N.S.	***	***	***
Hotroom	80.0	80.4	79.5	14.4	13.9 ^a
Control-room	81.3	80.6	80.9	14.7	14.6 ^a
LSD(5%)	1.5	2.3	1.5	0.3	0.4
Sig. Level	-	N.S.	-	-	**
Interaction: Diet X Environment					
LSD(5%)	2.1	3.3	2.2	0.4	0.6
Sig. Level	N.S.	N.S.	N.S.	N.S.	*

Means with the same superscript within each column are not significantly different (5% level).

(14.2%) and diet LL fed to pigs in either the hotroom (13.6%) or the control-room (13.9%).

When the above parameters were analysed on the basis of 2 diets X 2 environments, the results (Table 22) revealed that diet HL had higher ($P<0.001$) ADM (85.2%), ADE (85.0%), DE (15.5 MJ/kg) and DCP (14.8%) than did diet LL (76.2%, 75.4%, 13.7 MJ/kg and 13.7% respectively). While there were no significant differences between diets nor environments for ADP, the DCP of diets HL and LL fed to pigs in the control-room (14.6%) was higher ($P<0.01$) than when fed to their counterparts in the hotroom (13.9%). Although ADM, ADE and DE of the diets (HL and LL) fed to control pigs were higher than in the hotroom, the differences only approached significance ($0.05<P<0.10$). Furthermore, the only significant interaction observed between diet and environment was with respect to DCP ($P<0.05$).

From Table 23 it can be seen that when analysed on a 6-treatment basis, backfat depth (both ultrasonic and optical estimates), carcass length and chest depth did not differ between groups. The only significant difference ($P<0.05$) observed between-groups was with respect to girth; values in the control-room on diets HL (101.4 cm) and LL (101.5 cm) were larger ($P<0.05$) than on diets LH (97.4 cm) and LL in the hotroom (96.8 cm). Furthermore, the girth of pigs on diet HH (100.8 cm) was greater ($P<0.05$) than that of pigs on diet LL in the hotroom.

When the above anatomical measurements were analysed on a 2 diets X 2 environments basis, the results (Table 23) indicated that the carcasses of pigs on diet HL (81.0 cm) were longer ($P<0.05$) than those on diet LL (79.0 cm). Furthermore, the backfat depth (measured ultrasonically) and the girth of pigs in the control-room (22.5 mm and 101.4 cm respectively) were greater ($P<0.05$) than those of their counterparts in the hotroom (18.0 mm

Table 23. Means of Carcase Backfat Depth (P2) measured by ultrasonic (Scanoprobe) and optical (Introscope) methods, Carcase Length (CL), Chest Depth (CD) and Girth of pigs which received different dietary and environmental temperature treatments in Laboratory Experiment 2.

Treatment	Parameter				
	P2(mm)		Car.Length	Chest Depth	Girth
	Scanoprobe	Introscope	(cm)	(cm)	(cm)
(i) Analysed as 6 Treatments					
HH (hotroom)	22.2	19.7	80.4	30.2	101 ^{a b}
HL (hotroom)	16.8	20.8	80.4	30.4	100 ^{a b c}
LH (hotroom)	16.5	18.7	80.5	29.4	97 ^{a c}
LL (hotroom)	19.2	21.0	78.5	30.0	97 ^c
HL (control-room)	22.2	23.6	81.5	30.6	101 ^a
LL (control-room)	22.8	20.8	79.4	29.6	101 ^a
LSD(5%)	5.4	4.2	2.2	2.2	3
Sig. Level	-	N.S.	N.S.	N.S.	*
(ii) Analysed as 2 Diets X 2 Environmental Temperatures					
HL	19.5	22.2	81.0 ^a	30.5	101
LL	21.0	20.9	79.0 ^a	29.8	99
LSD(5%)	3.9	3.5	1.8	1.2	3
Sig. Level	N.S.	N.S.	*	N.S.	N.S.
Hotroom	18.0 ^a	20.9	79.5	30.2	98 ^b
Control-room	22.5 ^a	22.2	81.5	30.1	101 ^a
LSD(5%)	3.9	3.5	1.8	1.2	3
Sig. Level	*	N.S.	N.S.	N.S.	*
Interaction: Diet X Environment					
LSD(5%)	5.6	4.9	2.6	1.8	4
Sig. Level	N.S.	N.S.	N.S.	N.S.	N.S.

Means with the same superscript within each column are not significantly different (5% level).

Table 24. Means of Respiration Rate (RR), Rectal (RT) and Skin (ST) Temperatures of pigs which received different dietary and environmental temperature treatments in Laboratory Experiment 2.

Treatment	Parameter		
	RR (b/min)	RT (°C)	ST (°C)
(i) Analysed as 6 Treatments			
HH (hotroom)	126 ^a	39.7 ^a	37.6 ^a
HL (hotroom)	127 ^a	39.7 ^a	37.6 ^a
LH (hotroom)	123 ^a	39.5 ^b	37.4 ^b
LL (hotroom)	113 ^b	39.6 ^b	37.1 ^c
HL (control-room)	45 ^c	39.0 ^c	34.8 ^d
LL (control-room)	47 ^c	39.1 ^c	34.7 ^d
LSD(5%)	7	0.1	0.1
Sig. Level	***	***	***
(ii) Analysed as 2 Diets X 2 Environmental Temperatures			
HL	86 ^a	39.4	36.2 ^a
LL	80 ^b	39.3	35.9 ^b
LSD(5%)	3	0.1	0.1
Sig. Level	**	N.S.	***
Hotroom	120 ^a	39.7 ^a	37.3 ^a
Control-room	46 ^b	39.0 ^b	34.7 ^b
LSD(5%)	3	0.1	0.1
Sig. Level	***	***	***
Interaction: Diet X Environment			
LSD(%)	5	0.1	0.1
Sig. Level	***	*	**

Means with the same superscript within each column are not significantly different (5% level).

and 98.4 cm, respectively). All other differences were non-significant, however, and there were no significant interactions between diet and environment for any of the above anatomical parameters.

Analysis of variance of the physiological parameters indicated that there were significant differences ($P < 0.001$) between groups in respiration rate (RR), rectal (RT) and skin (ST) temperatures (Table 24). The differences were such that pigs in the hotroom on diets HH, HL, LH and LL had higher RR, RT and ST values ($P < 0.05$) than those which were on diets HL and LL in the control-room. Although pigs that were on diet LL in the hotroom breathed (113 b/min) slower ($P < 0.05$) and had lower ($P < 0.05$) skin temperatures (37.1°C) than pigs that were on diet LH (123 b/min and 37.4°C), both RT and ST in these two groups were lower ($P < 0.05$) than those which were on high energy diets (HH and HL) in the hotroom.

When analysed on a 2 diets X 2 environments basis, the results (Table 24) indicated that pigs that were on diet HL had higher RR (86 b/min) and ST (36.2°C) ($P < 0.01$ and $P < 0.001$, respectively) than their counterparts on diet LL (80 b/min and 35.9°C). There were no significant differences in RT between pigs on diets HL and LL. As had been expected, pigs that lived in the hotroom had higher RR (120 b/min), RT (39.7°C) and ST (37.3°C) values ($P < 0.001$) than their counterparts in the control-room (46 b/min, 39.0°C and 34.7°C , respectively).

There were significant interactions between diet and environment for RR ($P < 0.001$), RT ($P < 0.05$) and ST ($P < 0.01$). These appeared to be due to lower values of RR, RT and ST in the hotroom with diet LL, but no difference in RR, RT and ST between diets in the control-room.