

HEATING SYSTEMS FOR PIGLET CREEP BOXES

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INTRODUCTION

There are many different systems for providing localized supplementary heat for sucking piglets and it is important to evaluate their costs and effects on pig performance. In this trial, two different systems for heating enclosed creep boxes were examined and the diurnal pattern of electricity use was monitored in relation to different tariffs available to the farmer.

METHODS

The trial was carried out in a 12-place farrowing room where the environment was regulated by automatically controlled natural ventilation. Each farrowing pen had an insulated forward creep box (0.6 × 1.5 × 0.6 m) with access by a pophole 25 × 30 cm on either side of the farrowing crate. Alternate creep boxes were fitted with one of two types of heating system.

- (1) A dull emitter infra-red strip heater (Kelwood 'Auto' Heater, Kelwood Heating Ltd) attached off centre to the lid of the creep box. Each 250-W heater had its own built-in thermostat control and was initially set for its maximum temperature of 35°C at the sensor position at the top of the creep, to give a temperature of 30 to 32°C at pig level. The unit also incorporated a 15-W attraction light.
- (2) A heated pad (Cuddlypig Pad, Remark (Agricultural) Ltd) covering the whole floor of the creep box. The pad was constructed of PVC with a polyurethane and polycarbonate insulated double-skin base to prevent heat loss to the floor. The pads had a rating of 90 W (i.e. 100 W/m²) and contained an inbuilt thermostat set to give a surface tempera-

ture of approximately 32°C. A 15-W attraction light was attached to the lid of the creep box.

The electricity consumption of six individual creep boxes was monitored for each batch of sows. The meters were set to monitor the diurnal pattern of electricity requirement according to three tariffs differing in standing charge, unit price structure and period of reduced unit cost (Eastern Electricity Council, 1985) as follows:

- (1) farm economy 7 tariff: all electricity used between midnight and 08.00 h GMT at reduced unit charge;
- (2) farm night-and-day tariff: all electricity used between 19.00 h and 07.00 h GMT at reduced unit charge;
- (3) block weekend tariff: all electricity used between 19.00 h and 07.00 h GMT plus electricity used between 07.00 and 19.00 GMT on Saturdays and Sundays at reduced unit charge.

RESULTS

There were no significant differences in pig performance despite the appearance of poorer thermal comfort in piglets with the heated pads.

The higher-rated overhead heaters created more convection currents and contributed disproportionately towards maintaining room temperature, especially in the pre-farrowing period.

Temperatures were monitored every 15 min over a 2-day period of very cold weather.

Mean temperatures recorded at the centre of four

heated pads were 30.7 (s.d. 0.46), 31.0 (s.d. 1.06), 28.6 (s.d. 1.35) and 31.5 (s.d. 0.94) °C.

Temperatures 10 cm above floor level were much lower than at floor level for both types of heating system. With heated pads there appeared to be little warming of the air in the creep box, whereas with the overhead heater convection currents drawing in cold air were set up. Airspeed measurements made at the base of the popholes showed air being drawn from the room at 0.15 m/s with the overhead heaters and 0.07 m/s with the heated pads.

PRACTICAL CONCLUSIONS

- (1) The reliability of the heated pads was poor but there was no visible indication of malfunction.
- (2) The surface temperature of the pads (29 to 31°C) was below piglet skin temperature so a pig lying above the thermostat switched off the whole pad. Additional room heating would be needed in conjunction with the pads in cold weather.
- (3) Fitting of the overhead heater necessitated a hole in the creep lid which increased convection currents of cold air at pig level.

TABLE 1
Pig performance and electricity consumption

	Overhead heater	Heated pad	s.e.d.
Pig performance (23 litters per treatment)			
Initial litter size	10.1	9.9	0.67
No. weaned	9.4	9.2	0.65
Piglet growth (g/day)	224	227	11.3
Electricity consumption (units per litter per day)			
Pre-farrowing	3.6	2.2	0.33
Post-farrowing	1.7	1.5	0.35

TABLE 2
Temperatures in the creep box

Temperature (°C)	Over head heater				Heated pad			
	Mean	s.d.	Maximum	Minimum	Mean	s.d.	Maximum	Minimum
Room	16.6	1.56	19.8	12.2	16.6	1.56	19.8	12.2
Centre of creep, floor level	25.9	0.83	27.8	24.2	31.0	1.06	33.0	29.0
Under heater/light, floor level	29.2	1.42	32.0	25.8	27.0	1.02	28.8	25.0
Opposite side floor level	19.2	1.03	21.2	16.8	24.9	0.99	26.6	22.8
Centre of creep, 10 cm high	20.2	1.41	22.8	16.8	19.8	1.21	22.0	17.2

TABLE 3
The effect of tariff on the cost of post-farrowing creep heating

	% of units on cheap rate		Cost per litter (£)	
	Overhead heater	Heated pad	Overhead heater	Heated pad
Farm rate tariff	0	0	2.06	1.81
Farm economy 7 tariff	35	36	1.71	1.49
Farm day-and-night tariff	37	36	1.92	1.59
Block weekend tariff	64	65	1.70	1.52