Kansas Agricultural Experiment Station Research Reports

Volume 0
Issue 10 *Swine Day (1968-2014)*

Article 275

1980

Effect of temperature on performance of finishing swine

David A. Nichols

D R. Ames

Robert H. Hines

Effect of temperature on performance of finishing swine

Abstract

We used 128 barrows averaging approximately 160 lbs. and temperatures of 32, 41, 50, 59, 68, 77, 86 and 95 F to study the effects of temperature on growth and efficiency. No significant differences in performance were observed for pigs housed at temperatures from 50 to 77 F. Those housed at 32 and 41 F were significantly less efficient than those housed at any other temperature. Pigs exposed to 95 F ate significantly less and had lower daily gains than any other group. With increased energy costs, temperature for maximum performance may no longer be the temperature for most economical performance. Results from these studies indicate that environmental modifications for heating or cooling may not be justified when temperatures range from 50 to 77 F.; Swine Day, Manhattan, KS, November 13, 1980

Keywords

Swine day, 1980; Kansas Agricultural Experiment Station contribution; no. 81-142-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 388; Swine; Temperature; Performane; Finishing pigs

Effect of Temperature on Performance of Finishing Swine

D. A. Nichols, D. R. Ames, and R. H. Hines

Summary

We used 128 barrows averaging approximately 160 lbs. and temperatures of 32, 41, 50, 59, 68, 77, 86 and 95 F to study the effects of temperature on growth and efficiency. No significant differences in performance were observed for pigs housed at temperatures from 50 to 77 F. Those housed at 32 and 41 F were significantly less efficient than those housed at any other temperature. Pigs exposed to 95 F ate significantly less and had lower daily gains than any other group.

With increased energy costs, temperature for maximum performance may no longer be the temperature for most economical performance. Results from these studies indicate that environmental modifications for heating or cooling may not be justified when temperatures range from 50 to 77 F.

Introduction

Basically decisions on how much to modify depends on costs of the improved environment compared with the value of improved performance. In essence, this is a trade off between cost of energy in feedstuffs versus cost of energy for heating or cooling the environment.

The major climatic variable influencing swine performance is temperature. Extreme cold stress drastically increases feed intake to offset major increases in energy to maintain the pig. The pig will be actually eating for heat instead of meat. Heat stress, on the other hand, depresses feed intake, which lowers energy available for growth.

Procedure

In this study, we used 128 barrows averaging 160 lb. at the start of each trial, housed in two environmentally controlled rooms at 32, 41, 50, 59, 68, 77, 86 and 95 F. All pigs were fed 28 days and were housed at 59 F five days prior to the start of each trial. Temperature and lighting were constant and water and feed were supplied ad libitum. Temperatures were controlled in two 10 ft x 12 ft environmental rooms divided into four equal sized pens with two pigs per pen housed on concrete slatted floors. All pigs were fed the same sorghum-soy diet.

Results and Discussion

The pigs' first response to temperature stress is behavioral and includes shivering and huddling at the low temperature and panting and reduced activity during heat stress.

The next response in either case is reduced performance. Temperature effects on daily feed intake, daily gain and feed-to-gain ratio are shown in Table 15.

Table 15. Effect of Temperature on Performance

Temp. (^{o}F)	Daily feed intake	ADG (lb.)	F/G
32	11.16	1.18	9.45
41	8.27	1.17	7.10
50	7.70	1.76	4.37
59	6.93	1.74	3.99
68	7.09	1.87	3.79
77	5.78	1.58	3.65
86	4.87	.98	4.91
95	3.33	.68	4.87

Pigs housed at 32 F ate significantly ($P<.05$) more than pigs at any other temperature tested. Within temperatures of 41, 50, 59, and 68 F, no real differences in feed intake were observed. Pigs housed at 95 F ate significantly less ($P<.05$) than any other group. Figure 1 shows the response of intake to temperature. The S-shaped curve illustrates feed intake increases during cold stress and severe appetite depression during heat stress.

Average daily gains show a similar trend except that performances at 32 and 41 F were very similar. As temperatures increased to approximately 50 F, we see marked improvements in gain. No significant differences in gain ($P<.05$) were observed within the temperature range of 50 to 77 F. **Daily gain declines during heat stress primarily due to lowered feed intake.** Figure 2 shows the effect of temperature on daily gain. Based on these data, we predict maximum daily gain at approximately 65-68 F.

Feed to gain ratios were extremely poor when pigs were housed at 32 and 41 F. (Figure 3) No significant difference ($P<.05$) in F/G ratio was observed at 50, 59, 68 or 77 F. During heat stress, feed to gain ratio begins to increase while daily gain is increasing.

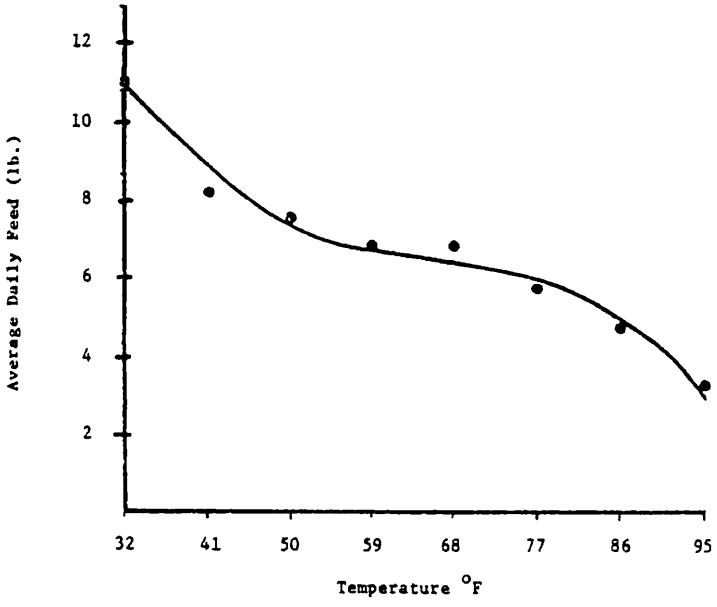

Figure 1. Effect of temperature on daily feed intake

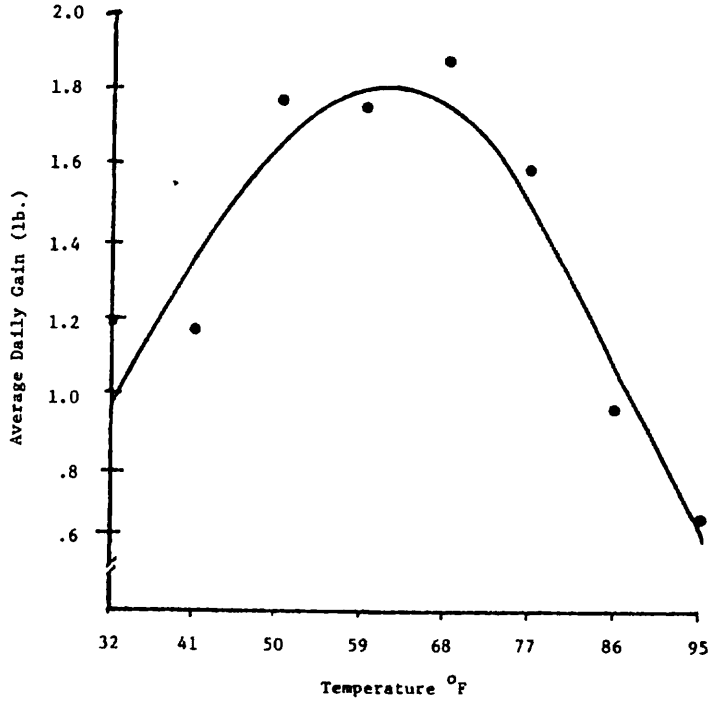

Figure 2. Effect of temperature on average daily gain

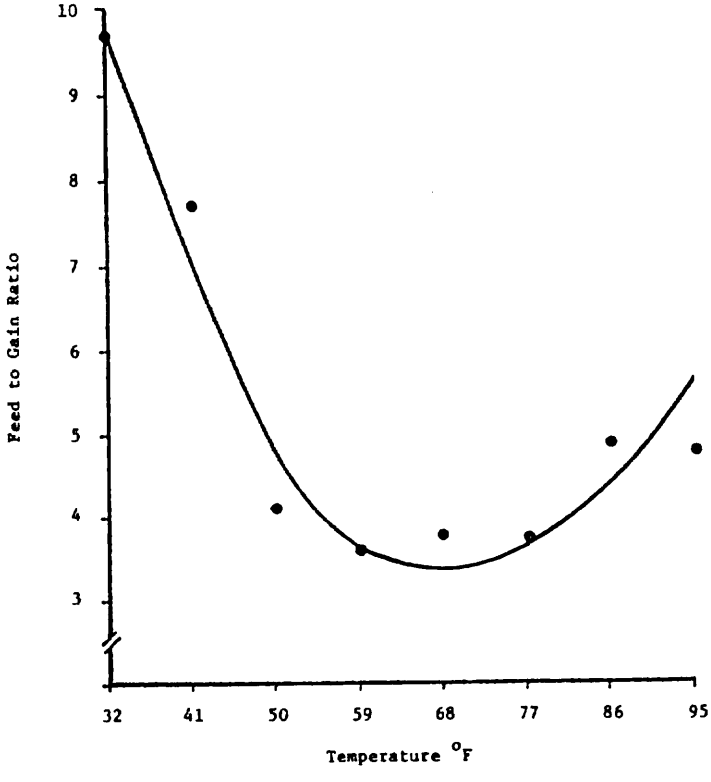

Figure 3. Effect of temperature on feed to gain ratio