

Summary

Fat and lean pigs were observed at temperatures of 0(32F), 5(41F), 10(50F), 15(59F), and 20C(68F). In comparing fat and lean pigs no significant differences were observed in feed-to-gain ratio or average daily gain.

Pigs housed at 32 and 41F gained significantly slower and less efficiently than those housed at 50, 59, or 68F. No differences in performance were observed among the last three groups. Increased huddling, longer hair coats and increased shivering were observed at the lower temperatures.

Introduction

Genetic selection and improvement have led to leaner swine. Since fat insulates against conductive heat loss, producers may have lowered the pigs' tolerance to temperature by reducing backfat thickness. Examining effects of various degrees of cold may help determine the relationship between backfat thickness and optimum temperature for growth and efficiency as well as the most economically feasible temperature for modern swine production.

Procedure

Eighty crossbred barrows of similar genetic background were obtained for the study. They averaged approximately 150 lbs. at the start of each trial.

The experiment was divided into five 28-day trials. Temperatures of 32, 41, 50, 59 and 68F were studied. All temperatures were controlled in two psychrometric chambers at the KSU Sheep Research Unit. Each chamber was divided into four equal-sized pens. Two pigs of the same fat thickness were placed in each pen. All pigs were fed a milo-soybean meal fortified diet (16% crude protein). Average daily gain, feed intake, and feed-to-gain ratio were observed.

Results and Discussion

Influences of temperature and backfat on performance are shown in table 10. No significant differences were observed between fat and lean groups in either average daily gain or feed-to-gain ratio, but the lean pigs tended to gain faster and use feed more efficiently than fat pigs under temperature of 50, 59 and 68F.

When data from fat and lean groups were combined (table 11) performance at 32 and 41F were

significantly ($P < .05$) poorer than at the three higher temperatures. No significant improvement was observed by increasing environmental temperature above 50F. Responses to cold temperature varied widely among pigs housed at 32 and 41F.

Behavioral observations were also recorded. Pigs at 32 and 41F showed a marked increase in shivering, grew longer hair coats, and developed a crouching position in an apparent effort to reduce surface area exposed.

Table 10. Effect of temperature on average daily gain and feed/gain ratio of fat and lean pigs

| Temperature | | Average daily gain(lb) | | Feed/gain | |
|-------------|-----|------------------------|------|-----------|------|
| (C) | (F) | Fat | Lean | Fat | Lean |
| 0 | 32 | 1.19 | 1.19 | 9.12 | 9.67 |
| 5 | 41 | 1.19 | 1.12 | 6.52 | 7.69 |
| 10 | 50 | 1.55 | 1.96 | 4.66 | 4.07 |
| 15 | 59 | 1.61 | 1.90 | 4.36 | 3.62 |
| 20 | 68 | 1.80 | 1.95 | 3.72 | 3.85 |

Table 11. Overall effect of temperature on average daily gain and feed/gain ratio.

| Temperature | | Average daily gain | Feed/gain |
|-------------|-----|--------------------|-------------------|
| (C) | (F) | (Lb.) | |
| 0 | 32 | 1.19 ^a | 9.40 ^a |
| 5 | 41 | 1.16 ^a | 7.10 ^a |
| 10 | 50 | 1.76 ^b | 4.37 ^b |
| 15 | 59 | 1.75 ^b | 3.99 ^b |
| 20 | 68 | 1.87 ^b | 3.79 ^b |

^{a, b} Means with different superscripts differ significantly ($P < .05$).