THE EFFECTS OF LIMIT FEEDING ON TESTICULAR VOLUME IN GROWING BOARS

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Story in Brief

Boars were allowed either ad libitum or restricted feed intake levels to initiate a project comparing selection for postweaning growth under two nutritional environments. All boars used were from a line of pigs previously selected for postweaning growth. Ad libitum fed boars were pen fed, while restricted boars were fed individually. Separate spring and fall farrowing replicates were utilized, with 36 boars tested from each line within each of the two replicates. Measurements of testicular width and length were taken at 150 days of age and again after reaching 230 lb. Total volume was estimated using the measurements of testicle length and width. Testicular volume was higher in the ad libitum fed boars at 150 days of age, while the difference at 230 lb varied between farrowing replicates. Limit fed boars were leaner and gained more slowly. These data suggest that testing boars under limited intakes may decrease testicle volume.

(Key Words: Boars, Testicle, Restricted Intake, Selection, Gain.)

Introduction

Alternative methods of selection for lean growth rate and efficiency in swine are of interest. One suggested method is selection for rapid growth on a fixed level of intake. This would eliminate variation in intake, meaning those individuals selected would be the most efficient in depositing lean tissue. A possible concern of limit feeding of boars is their rate of sexual development. A relatively easily attained indicator of sexual development is testicular volume. The purpose of this study was to determine if restricting feed intake of boars decreased testicular volume at a common age and/or weight.

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Materials and Methods

Boars used in this study were housed at the Southwest Forage and Livestock Research Station near El Reno. All boars were from a composite line of pigs that had been closed to outside genetics and selected for rapid postweaning gain. Boars from spring and fall farrowing replicates were tested for rapid daily gain under two levels of intake. Within each replicate 36 males were tested on ad libitum intake and 36 on limited intake, for a total of 144. The limited level of intake was 83% of predicted ad libitum based on each boar's metabolic body weight. The diet which the limit fed boars received was higher in protein to meet their requirements. Ad libitum fed pigs were penned with 12 males per pen, while limit fed pigs were individually penned.

All males were tested from 80 lb until the first weekly weighing over 230 lb. Limit fed boars were weighed weekly and intake was adjusted based on this weight. In situ measurements of testicular length and width were taken at 150 days of age and upon removal from test at 230 lb by use of a caliper. In addition, ultrasonic backfat probes were taken at the shoulder, last rib and last lumbar vertebrae upon completion of test. Testicular volume was estimated by $(\text{width}/2)^2 \times \text{length}$.

Results and Discussion

Daily gain and adjusted backfat are presented in Table 1. Ad libitum fed boars gained faster and deposited more backfat. However, a farrowing replicate by level of intake interaction was observed for average daily gain (Table 2). In the spring replicate, there was a much larger difference in gain between the full and limit fed boars. This is due to full fed males gaining faster in the spring

Table 1. Performance traits across farrowing replicates.

Trait	Level of intake	
	Ad libitum	Limited
Age, days	155.8	156.1
Off-test weight, lb	237.0	237.1
Average daily gain[a], lb/day	2.16	1.86[b]
Adjusted backfat, inches	1.14	1.05[b]

[a] Significant replicate x level of intake interaction ($P < .05$) (see Table 2).
[b] Level of intake significant at $P < .05$.

Table 2. Farrowing replicate by level of intake interaction[a] for average daily gain and testicular volume at 230 days.

Replicate-level of intake combination	Trait	
	Average daily gain, lb/day	Testicular volume at 230 days, cubic inches
Fall-ad libitum	2.06	35.0
Fall-limited	1.87	31.5
Spring-ad libitum	2.27	22.5
Spring-limited	1.85	24.5

[a] Interaction significant at $P < .05$.

than in the fall. However, there was no replicate difference in gain when intake was limited. Due to the range of dates on which ad libitum fed males were placed on test within a pen, accurate comparisons of feed efficiency could not be made.

Measurements of testicular volume are presented in Table 3. At 150 days of age testicular volume was higher in boars on full feed, while at 230 lb there was no difference. However, a replicate by level of intake interaction was significant for testicular volume at 230 lb and is presented in Table 2. This interaction suggests possible replicate or seasonal differences in the effect of feed intake on volume at a common weight.

The boars that were used in this study represent the base generation of a selection project comparing the efficiency of lean gain in progeny of boars

Table 3. Testicular volume across farrowing replicates.

Trait	Level of intake	
	Ad libitum	Limited
Volume at 150 days, cubic inches[a]	23.7	18.5[b]
Volume at 230 lb, cubic inches[b]	28.7	28.0

[a] Level of intake significant at $P < .05$.
[b] Significant replicate x level of intake interaction ($P < .05$) (see Table 2).

selected for rapid gain under the two nutritional environments. The fourth generation of selection is currently being evaluated. These data suggest that testicular volume at a common age is decreased by this level of limited feeding, but that the effect at a constant weight may be dependent upon seasonal factors. Correlated response in testicular volume to selection under reduced intake has not been evaluated.