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Performance of feeder pigs of various grades

James Tracy

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To the Graduate Council:

I am submitting herewith a thesis written by James Tracy entitled "Performance of feeder pigs of various grades." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Husbandry.

J. B. McLaren, Major Professor

We have read this thesis and recommend its acceptance:

Robert S. Dotson, James G. O'Neal

Accepted for the Council:

Carolyn R. Hodges

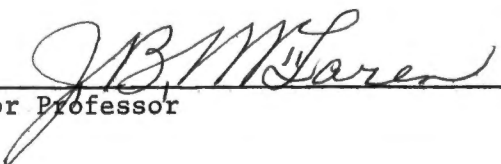
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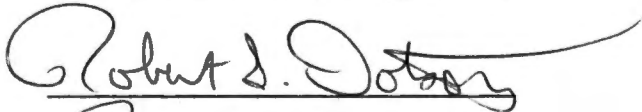
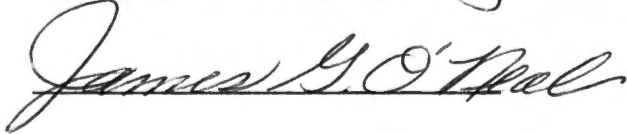
July 10, 1972

To the Graduate Council:


I am submitting herewith a thesis written by James Tracy, Jr., entitled "Performance of Feeder Pigs of Various Grades." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Husbandry.


Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:


Vice Chancellor for
Graduate Studies and Research

PERFORMANCE OF FEEDER PIGS OF VARIOUS GRADES

A Thesis

Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by

James Tracy, Jr.

August 1972

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ABSTRACT

Production of feeder pigs has become a major swine enterprise in Tennessee. An increasing number of these pigs are being marketed through organized feeder pig sales where they are sorted according to weight and grade. The grade of a feeder pig is determined by evaluating its logical slaughter potential and its thriftiness. The logical slaughter potential of a thrifty feeder pig is its expected slaughter grade at a market weight of about 220 pounds after a normal feeding period. Therefore, the objective of this experiment was to measure the performance, feed efficiency and carcass characteristics of pigs of various feeder grades.

Twenty pigs, weighing 40 to 50 pounds, were randomly selected from each of three graded pens; mixed U.S. No. 1 and U.S. No. 2, U.S. No. 3 and U.S. No. 4; at the Lawrence County Feeder Pig Sale, Lawrenceburg, Tennessee. They were wormed, sprayed for external parasites and fed a 16% protein wheat-supplement ration for 105 days.

Average daily gain, during the 105-day finishing period, of pigs graded U.S. No. 1-2, U.S. No. 3, and U.S. No. 4 at weaning (40 to 50 pounds) was 1.67, 1.68 and 1.74 pounds per head per day, respectively. The pigs which were graded U.S. No. 4 as feeders were fatter, slightly shorter, less muscular and graded lower at slaughter than the pigs graded higher, U.S. No. 1 through 3.

Average back probe for the three feeder grade groups, U.S. No. 1-2, U.S. No. 3, and U.S. No. 4 was 1.30, 1.33 and 1.53 inches, respectively. The leaner, U.S. No. 1 through No. 3 pigs were more efficient feed converters than the fatter U.S. No. 4 pigs.

Pigs graded U.S. No. 4 as feeders tended to grade higher at slaughter. Ten percent of the pigs in this feeder grade were graded U.S. No. 1 at slaughter, 35% were graded U.S. No. 2, 50% graded U.S. No. 3 and only 5% were graded U.S. No. 4. These results indicate that many Tennessee feeder pigs are being placed in feeder grades below their potential slaughter grade and genetic potential at feeder pig sales due to poor pre-sale management and nutrition. The response of the No. 4 pigs, especially during the 12-day adjustment period, shows the Tennessee producers have an opportunity, through improved management and nutritional practices, to have a greater percentage of their pigs graded higher as feeders.

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CHAPTER I

INTRODUCTION

Tremendous strides have been made during the past two decades in changing the swine of the United States from the "fat" type to those of the "lean" type. However, one has to visit a terminal livestock market or feeder pig auction but once to see that large numbers of the fat-type swine are still being marketed. Because of the difference in carcass composition, the United States Department of Agriculture has adapted a slaughter grading system ranging from U.S. No. 1 to U.S. No. 4, plus the U.S. utility grade, which contains pigs of unacceptable quality. Market hogs having the least amount of backfat and the highest degree of muscling produce the greatest amount of carcass lean and are graded U.S. No. 1 and the very fattest, lightest muscled hogs are graded U.S. No. 4.

Tennessee swine producers raise about 1.75 to 2 million pigs each year. The number of pigs marketed in graded feeder pig sales increased from 21,822 (1.1%) in 1960 to 641,085 (35.7%) in 1971.

The grade of a feeder pig is determined by evaluating its logical slaughter potential and its thriftiness. The logical slaughter potential of a thrifty feeder pig is its expected slaughter grade at a market weight of 220 pounds after a normal feeding period. ^{P-4} Therefore, grading standards for feeder pigs provide six grades--U.S. No. 1 through U.S. No. 4, U.S. utility and U.S. cull. Except for the U.S. cull grade, these grades correspond to the five grades for slaughter swine and for pork carcasses (U.S.D.A., 1970).

In 1971, buyers of pigs in the Tennessee feeder pig sales paid an average of \$1.18 more per head for pigs in the top grade (mixed U.S. No. 1 and U.S. No. 2) than for U.S. No. 3 pigs of equal weight. The price differential per head between U.S. No. 1-2 pigs and U.S. No. 4 pigs was \$3.19.

Both feeder pig buyers and graders can have more confidence in their judgments if they have an opportunity to observe and study the performance of graded pigs from the feedlot through the packing house. Under normal conditions, buyers and graders seldom are able to obtain reliable information on rate of gain, feed conversion and carcass cutability of pigs which were graded as feeders.

The objective of this experiment was to measure the performance, feed efficiency and carcass characteristics of pigs of various feeder grades when fed a ration of wheat and protein supplement.

CHAPTER II

REVIEW OF LITERATURE

I. GRADES OF SWINE

Development of Grades

A system of classifying and grading market hogs was formulated by the United States Department of Agriculture in 1918 for use in the live-stock market reporting service. According to Agnew (1969), the system was developed to represent the most generally accepted market groupings of the time. After meeting with producers, animal husbandmen, market representatives and processors in 1928 and 1929, revisions were made consistent with changes in production and marketing conditions (U.S.D.A., 1940) and tentative new standards were issued in 1930. Further revisions were incorporated into the tentative standards in 1940 when they were published by the U.S.D.A.

In July 1955, grading standards were amended (U.S.D.A., 1970) by changing the designations of Choice No. 1, Choice No. 2 and Choice No. 3 to U.S. No. 1, U.S. No. 2 and U.S. No. 3, respectively. At this time, the degree of finish or fatness was reduced for each grade and the descriptive specifications were re-worded to reflect the reduced degrees of finish and to facilitate more uniform interpretation of the standards. Additional changes in the market hog grading standards, made in 1968, more adequately reflect the effect of variation from normal fat distribution and muscling on yields of cuts. More recent changes have resulted in the present standards and specifications.

The grade of a feeder pig is determined by evaluating two general value-determining characteristics--its logical slaughter potential and its thriftiness (U.S.D.A., 1970). The logical slaughter potential of a thrifty feeder pig is its expected slaughter grade at a market weight of about 220 pounds after a normal feeding period. In these feeder pig standards, logical slaughter potential is determined by a composite appraisal of the development of the muscular and the skeletal system. Both of these factors have an important effect on the development of lean and fat as the animal grows and therefore, on the expected slaughter grade.

Most feeder pigs are marketed when relatively young and before reaching a weight of 125 pounds. Agnew (1969) suggested that at this age, sex condition exerts little influence on the basic factors determining the feeder grade. Therefore, the standards are equally applicable for grading barrow, gilt and boar pigs, although it is recognized that sex condition may influence the market price in some instances.

Grade Standards

The following specifications for official United States standards for grades of feeder pigs were described by U.S.D.A. (1970).

U.S. No. 1. Thickness of muscling is particularly evident in thick and full ham and shoulders. They usually present a well balanced appearance. In no case may a feeder pig be graded U.S. No. 1 with less than moderately thick muscling. Feeder pigs in this grade are expected to produce U.S. No. 1 grade carcasses when slaughtered at 220 pounds.

U.S. No. 2. Feeder pigs of the U.S. No. 2 grade are moderately long and have moderately thick muscling throughout. The back usually

appears slightly full and well rounded. This grade also includes feeder pigs which otherwise qualify for the U.S. No. 1 grade but have less than moderately thick muscling. These pigs are expected to produce U.S. No. 2 grade carcasses at slaughter.

U.S. No. 3. Pigs in this grade are slightly short and have slightly thin muscling throughout. The ham and shoulders are slightly thin and flat and the back usually appears moderately full and thick. These pigs in this grade are expected to produce U.S. No. 3 grade carcasses.

U.S. No. 4. Typical U.S. No. 4 feeder pigs are short and have thin muscling throughout. The hams are thin and rather flat. The back usually appears rather flat and the width at the topline usually is greater than at the underline.

U.S. Utility. Feeder pigs typical to this grade are small for their age and appear unthrifty. They often have a rough, unkempt appearance indicating the effect of disease and poor care. The hams and shoulders usually are thin and flat and taper toward the flank. U.S. Utility grade feeder pigs will produce U.S. No. 1, U.S. No. 2, U.S. No. 3, or U.S. No. 4 grade carcasses at slaughter provided their inthrifty condition is corrected.

II. TENNESSEE FEEDER PIG SALES

According to O'Neal (1972b), the first organized feeder pig sales in Tennessee were held in the mid 1950's. O'Neal (1972a) summarized the results of all Tennessee feeder pig sales held since 1960. In 1971, 432 individual sales were held at 21 locations. Of the 1,797,000 pigs produced in Tennessee that year, 641,085, or 35.7%, were sold in these

sales conducted by local sponsoring organizations. The pigs in these sales were graded by Tennessee Department of Agriculture graders and sorted into uniform groups according to weight and grade. All pigs were sold at auction to the highest bidder.

The number and the percent of the total pigs produced in Tennessee which were sold in these sales has steadily increased from 21,822 (1.1%) in 1960 to 641,085 head (35.7%) in 1971 (O'Neal, 1972b). During this period the total number of pigs produced in Tennessee has remained relatively constant at about 1.75 to 2 million head.

III. PERFORMANCE OF VARIOUS GRADES

Feeder pig buyers and graders have associated improved overall performance with pigs which qualify for the higher U.S. feeder grades. A limited number of studies have been conducted to evaluate rate of growth, feed efficiency and carcass characteristics of the various grades.

In 1965, Thrasher, Fitzgerald and Mullins selected pigs from graded feeder pig sales in Louisiana in order to study the performance and carcass traits of pigs falling into four grades. These grades were similar to the U.S.D.A. grading standards as described at that time. Pigs grading AA (the highest grade) and A as feeders produced carcasses and wholesale cuts which were acceptable in meatiness and quality. On the other hand most of the pigs graded BA and UC as feeders produced carcasses and wholesale cuts which were unacceptable to most retailers and consumers due to the low amount of lean and excessive fat content. Rate of gains by the four grades, AA, A, BA and AC were 1.77, 1.64,

1.49 and 1.47 pounds per head per day, respectively.

Results of a study conducted by Thrasher et al. (1968) indicated there was no difference in the rate of gain of pigs graded AA (U.S. No. 1 and Top U.S. No. 2), A (U.S. No. 2), BA1 (U.S. No. 3) and BA2 (low U.S. No. 3 and U.S. No. 4) as feeders. Average daily gains reported for the four grades were 1.60, 1.65, 1.64 and 1.67 pounds per head per day, respectively. They reported that 324, 317, 333 and 322 pounds of feed per 100 pounds of gain was required by the four grades, respectively.

Two groups of pigs, designated as fat and lean type were compared by Barth, McConnell and Griffin (1970). When fed a ration with ample protein (20% protein from 60 to 125 pounds and 16% from 125 pounds until slaughter) the lean pigs gained slightly faster (1.59 vs 1.65 pounds per day) than the fat type pigs. However, this difference was not statistically significant. Lean type pigs required less feed per pound of gain and were more efficient in converting feed protein into edible-carcass protein. In contrast, when fed a ration of 18-16% and 14-12% protein the gain of fat-type and lean-type pigs was similar.

Thrasher, Fitzgerald and Mullins (1965) reported that 83, 59, 17 and 8 percent of the pigs traded AA, A, BA and US, respectively, as feeder pigs produced U.S. No. 1 carcasses at slaughter. The percent of U.S. No. 1 carcasses produced by the AA, A, BA1 and BA2 feeder pigs compared by Thrasher et al. (1968) was 52, 48, 35 and 17 percent, respectively. Fat-type pigs fed a high protein ration produced carcasses which yielded 48.1 percent ham, loin and shoulder compared to 53.5 percent for the lean-type pigs (McConnell, Barth and Griffin, 1971).

The fat- and lean-type pigs on the low protein ration yielded 47.5 and 50.8 percent ham, loin and shoulder, respectively.

IV. NITROGEN RETENTION AND DIGESTIBILITY

Digestion and N-metabolism trials were conducted by McConnell (1970) using six lean- and six fat-type barrows at three stages of growth (41, 70 and 95 kg). No significant differences were found in digestibilities of dry matter, gross energy or protein within trials regardless of leanness of the pig. Digestibility of the nutrients generally improved with increasing age, and protein digestibility was somewhat higher when the pigs were fed at the higher protein level. Daily N-retention was similar in both fat- and lean-type pigs when the low-protein ration was fed. No increase in carcass leanness was observed when the fat-type pigs were fed the high-protein diet. However, higher protein levels improved carcass leanness in the lean-type pigs.

CHAPTER III

EXPERIMENTAL PROCEDURE

I. EXPERIMENTAL ANIMALS

Sixty feeder pigs, weighing between 40 and 50 lbs., were purchased at the Lawrenceburg feeder pig sales, at Lawrenceburg, Tennessee, on June 10, 1971. Twenty-five pigs of each grade grouping, mixed U.S. No. 1 and U.S. No. 2, U.S. No. 3 and U.S. No. 4 were selected at random (gate cut). Twenty pigs most representative to each grade were retained for use in the experiment. This procedure provided a random sample of the pigs in each weight-grade group and also provided assurance the pigs used were representative of the various grades. The pigs were individually weighed at the sale and were transported to the feedlot where they were reweighed and ear-notched for identification.

II. FEED AND MANAGEMENT

All pigs were self-fed a 16% commercial ration containing 250 gram per ton of antibiotic (Aureo SP-250) during a 12-day conditioning period from June 11 to June 22. They were wormed with piperzine and sprayed for external parasites. This 12-day period was designed to reduce the stress the pigs were subjected to during the sale and transporting. It also allowed the pigs to adjust to the feedlot conditions since they had been subjected to different environments prior to the sale.

Following the 12-day pre-experimental period, the 20 pigs of

each grade were randomly allotted to 2 groups of 10 pigs each and fed in one-half acre lots until the group averaged about 220 pounds. Each group was provided a 12-hole self-feeder and an automatic washerer. The pigs were re-wormed using five pounds per head of a commercial feed containing piperzine.

All groups were self-fed a 16% commercial ration containing Aureo SP-250, from the beginning of the experiment until the pigs weighed about 100 pounds. At this time they were changed to a ration calculated to contain 16% protein which was composed of 75% ground wheat and 25% commercial supplement (36% protein). Chemical analysis of the wheat-supplement ration is presented in Table 1.

III. DATA COLLECTED

The pigs were weighed individually when purchased, at the beginning and at the end of the experiment. When the various groups averaged about 230 pounds, the experiment was terminated. The hogs were trucked about 18 miles to the packing plant. Individual weights and back probes at three locations (first rib, last rib and last lumbar vertebra) were taken on the live pigs. In addition, each pig was subjectively scored for muscling, estimates of backfat thickness and percent lean cuts were made. Each pig was graded with respect to slaughter grade according to U.S.D.A. standard grading schedule.

Ten pigs from each of the groups were selected at random to be slaughtered for carcass evaluation. These pigs were individually tattooed for identification and slaughtered at a local packing plant. After a 24 hour chill, fat thickness, carcass length and loin eye area

Table 1. Chemical Analysis of Feed^a

	Dry Matter	Crude Protein	Ash	Ether Extract	Crude Fiber	NFE
	%					
Sample 1	91.85	18.43	6.01	2.20	3.02	62.19
Sample 2	91.09	18.17	6.41	2.70	3.32	60.49

^aMixture of 3 parts wheat and 1 part commercial supplement fed from 100 lb. to market weight.

was measured. In addition, each carcass was scored on the basis of carcass quality.

IV. STATISTICAL ANALYSES

Analysis of variance, as described by Sokol and Rohlf (1969) were performed to determine the effect of pen and initial feeder pig grade on the following dependent variables: average daily gain, fat thickness, muscling score, slaughter grade, quality score, carcass length, loin eye area and percent lean cuts. Since there were approximately equal numbers of barrows and gilts in each of the grades and since groups of pigs on feed in commercial finishing lots are generally mixed barrows and gilts, no effort was made to summarize or analyze these data with respect to sex differences.

Difference between lots treated alike was considered the appropriate error term. When significant differences were observed between various grades, mean separation was made by Duncan (1955) multiple range test.

CHAPTER IV

RESULTS AND DISCUSSION

I. ANIMAL PERFORMANCE AND FEED EFFICIENCY

Body weight gains and ration intake-to-growth relationships are presented in Table 2. Average daily gain (ADG) of pigs graded U.S. No. 1-2, U.S. No. 3 and U.S. No. 4 at weaning (40 to 50 lbs.) was 1.67, 1.68 and 1.74 lb. per head per day, respectively. Although the difference between the ADG of the U.S. No. 4 and the ADG of the other grades was statistically significant only at the 0.25 level of probability (Table 3), the trends were similar to those reported by Thrasher et al. (1968), McConnell (1970) and Barth, McConnell and Griffin (1970).

Examination of body weight changes during the 12-day pre-experimental adjustment period presented in Table 4 indicates that as feeder grade decreased, ADG increased significantly during the early part of the post-sale feeding period. This fact and the trend toward faster gain by the U.S. No. 4 pigs during the subsequent experimental period suggests that the U.S. No. 4 pigs are as described by the Department of Agriculture (U.S.D.A., 1970), less thrifty than the other grades. It further suggests that these pigs, U.S. No. 4, respond favorably to nutritionally adequate rations and improved management practices. These compensatory gains resulted in the U.S. No. 4 pigs being 7 pounds heavier at the beginning of the test.

The results in Table 2 show that the leaner, U.S. No. 1 through 3,

Table 2. Feedlot Performance of Feeder Pigs by Grades

	Feeder Grade		
	1-2	3	4
No. of pigs	20	20	20
Days on feed	105	105	105
Avg. wt. and gain, lb.			
Initial wt.	49	49	56
Final wt.	223	224	237
Total gain	174	175	181
Daily gain	1.67 ^a	1.68 ^a	1.74 ^b
Feed requirements, lb.			
Total per head	621	624	669
Feed per cwt. gain	358	357	370

^{a,b} Mean on the same line superscripted with different letters are significantly different ($P < 0.25$).

Table 3. Analysis of Variance of Performance Traits

Source	df	Gain	ADG	Mean Squares				Avg. Backfat Probe
				Backfat Probe		Last Lumbar		
				1st Rib	Last Rib	Last Rib	Last Lumbar	
Grade	2	315.0 ^a	0.029 ^a	0.514 ^d	0.146 ^b	0.243 ^b	0.301 ^c	
Pen/grade	3	18.3	0.002	0.007	0.096	0.086	0.032	
Within pens	54	244.1	0.023	0.105	0.056	0.082	0.067	

^aP<.25; ^bP<.10; ^cP<.025; ^dP<.01.

Table 4. Performance of Pigs During the 12-Day Pre-Experimental Adjustment Period

	Feeder Pig Grade		
	1-2	3	4
No. of pigs	20	20	20
Initial wt., 6-11, lb.	45	43	47
Final wt., 6-22, lb.	49	48	56
Total gain, lb.	4	5	9
Average daily gain, lb.	0.37 ^a	0.48 ^a	0.75 ^b

^{a,b} Mean superscripted with different letters are significantly different ($P < 0.01$).

pigs were more efficient feed converters (about 357 lb. of feed per cwt. of gain) than the fatter U.S. No. 4 pigs (370 lb. of feed per cwt. of gain). This agrees with results reported by McConnell (1970), Thrasher, Fitzgerald and Mullins (1965) and Thrasher et al. (1968). These results are, theoretically, reasonable since it takes more energy to deposit fat than lean.

II. MEASURES OF QUALITY AT SLAUGHTER

Estimates of carcass characteristics made prior to slaughter (backfat probes, slaughter grades, muscle scores and estimates of length) are shown in Table 5. The pigs which were graded U.S. No. 4 as feeders appeared to be fatter ($P < 0.025$), shorter ($P < 0.01$) and less muscular ($P < 0.001$) and graded lower on a live basis than the pigs graded higher, U.S. No. 1 through 3 (Table 6).

Individual backfat probes, taken at the first rib, last rib and last lumbar, indicated that the difference in fat thickness was greater over the shoulder (first rib) than at the other probe sites. Estimates of backfat thickness made prior to probing were similar to the average probe values. Average backfat probe for the three feeder groups, U.S. No. 1-2, U.S. No. 3 and U.S. No. 4 was 1.30, 1.33 and 1.53 inches, respectively. These results were similar to those reported by Thrasher et al. (1968).

Analysis of slaughter grades within each feeder grade group shows that the pigs that were initially graded U.S. No. 1 and U.S. No. 2 generally graded No. 1 and No. 2 at slaughter. Pigs graded U.S. No. 3 as feeders tended to grade higher at slaughter. Fifty percent of the

Table 5. Effect of Feeder Grade on Quality Estimates^a of Carcass at Slaughter

	Feeder Grade		
	1-2	3	4
No. of pigs	20	20	20
Avg. length, in.	31.46	30.72	30.09
Avg. est. backfat, in.	1.33	1.42	1.68
Avg. backfat probe, in.			
1st rib	1.65	1.76	1.97
Last rib	1.14	1.13	1.28
Last lumbar	1.11	1.13	1.31
Average	1.30	1.33	1.53
Avg. est. lean cut, %	53.67	53.11	50.89
Avg. muscle score	1.22	1.10	0.81
Avg. slaughter grade	1.56	1.67	2.42
U.S. No. 1, %	55	50	10
U.S. No. 2, %	40	40	35
U.S. No. 3, %	5	10	50
U.S. No. 4, %			5

^aVisual estimates and actual probes taken on the live hogs prior to slaughter.

Table 6. Analysis of Variance of Various Traits Measuring Quality in the Live Hog

Source	df	Mean Squares			
		Live Slaughter Grade	Est. of Lean Cuts	Est. Back-Fat	Muscle Score
Grade	2	4.381 ^a	43.600 ^a	0.666 ^b	0.889 ^c
Pens/grade	3	1.111	7.153	0.074	0.067
Within pens	54	0.439	6.162	0.039	0.060

^aP<.01; ^bP<.025; ^cP<.001.

No. 3 pigs graded No. 1 as slaughter hogs and 40% graded No. 2. This increase in grade (feeder grade vs slaughter grade) was also observed in the No. 4 pigs. Ten percent of the No. 4 feeder pigs were graded No. 1 at slaughter, 35% were graded No. 2, 50% No. 3 and only 5% were graded No. 4.

This tendency for improvement in grade indicates that at least part of the U.S. No. 4 pigs were graded on the basis of unthriftiness rather than simply on the basis of potential slaughter grade. These results suggest that many feeder pigs may be placed in feeder grade groups below their potential slaughter grade and genetic potential at graded feeder pig sales due to poor pre-sale management and nutrition.

III. CARCASS CHARACTERISTICS

Carcass information presented in Table 7 was obtained on 10 slaughter hogs selected at random from the 20 head in each feeder-grade group. Average loin eye area of the U.S. No. 1-2, U.S. No. 3 and U.S. No. 4 groups was 4.93, 4.11 and 4.23 square inches, respectively. Backfat thickness, as measured on the carcass, was similar to that measured on the live hogs by probe and that estimated at slaughter.

The U.S. No. 1-2 feeder pigs produced carcasses that were leaner ($P < 0.05$), more muscular ($P < 0.01$) and graded higher than the other feeder grade groups (Table 8). Carcass grades were similar to the slaughter grades and substantiated the hypothesis that the slaughter potential of the U.S. No. 4 feeder pigs was greater than indicated by that feeder pig grade.

Table 7. Effect of Feeder Grade on Carcass Characteristics

	Feeder Pig Grades		
	1-2	3	4
No. head	10	10	10
Avg. backfat, in.			
1st rib	1.67 ^b	1.78 ^b	1.92 ^c
Last rib	1.25	1.23	1.28
Last lumbar	1.16	1.23	1.31
Average	1.36	1.41	1.50
Avg. loin eye area	4.93 ^b	4.11 ^c	4.23 ^c
Avg. quality score	2.3	2.2	2.4
% lean cuts	53.21 ^{ab}	52.32 ^{bc}	51.59 ^c
Avg. carcass grade	1.64 ^b	1.76 ^b	2.46 ^c
U.S. No. 1, %	50	40	10
U.S. No. 2, %	40	50	40
U.S. No. 3, %	10	10	40
U.S. No. 4, %			10
Avg. length	31.46 ^b	30.72 ^b	30.09 ^c
Avg. muscle score	1.25 ^b	1.03 ^b	0.77 ^c

^aActual measurements made on the carcasses following slaughter.

^{b,c}Mean superscripted with different letters is significantly different ($P < 0.05$).

Table 8. Analysis of Variance for Carcass Characteristics

Source	df	Carcass Fat Thickness					Mean Squares						
		1st Rib		Last Rib		Avg.	Lean Cuts	Muscle Score	Carcass Length	Loin Area	Eye Area	Quality Score	Carcass Grade
		Rib	Rib	Lumbar	Last								
Grade	2	0.157 ^a	0.006	0.056	0.053	17.75 ^b	0.577 ^c	1.002	1.979 ^b	0.100	1.961 ^b		
Anim./grade	27	0.083	0.039	0.061	0.045	5.19	0.068	1.469	0.503	0.226	0.544		

^aP<0.25; ^bP<0.05; ^cP<0.01.

IV. COSTS AND RETURNS

In order to compare the potential value of the three feeder grades with respect to market value as feeder pigs, performance in the feedlot and carcass and/or slaughter value, comparative economic analyses were made. Average prices paid for the various grades of feeder pigs in Tennessee feeder pig sales during 1971 were used as initial values. Average values for slaughter hogs of various weights and grades during 1971 were considered to be the appropriate final value.

Feed costs were slightly higher per unit of gain for the U.S. No. 4 feeder pigs than for the other groups. Return above initial and feed cost tended to be higher from the U.S. No. 3 and U.S. No. 4 feeder pigs. These differences in returns were due to the lower initial cost and increase in grade of the graded U.S. No. 4 as feeders (Table 9).

Table 9. Effect of Feeder Grade on Return Above Initial and Feed Cost

	Feeder Pig Grades		
	1-2	3	4
Initial cost/head	\$15.43	\$14.33	\$12.06
Initial cost/cwt. ^a	31.49	29.24	24.62
Selling price per head ^b	46.21	46.11	44.84
Selling price per cwt.	20.63	20.58	20.02
Feed cost/head	19.73	20.89	21.41
Feed cost/cwt. gain	11.21	11.94	12.35
Return above initial and feed cost	11.05	10.89	11.37

^aAverage price paid for feeder pigs in Tennessee feeder pig sales in 1971.

^bInitial and final weight held constant.

CHAPTER V

SUMMARY

Production of feeder pigs has become a major swine enterprise in Tennessee. An increasing number of these pigs are being marketed through organized feeder pig sales where they are sorted according to weight and grade. The grade of a feeder pig is determined by evaluating its logical slaughter potential and its thriftiness. The logical slaughter potential of a thrifty feeder pig is its expected slaughter grade at a market weight of about 220 pounds after a normal feeding period. Therefore, the objective of this experiment was to measure the performance, feed efficiency and carcass characteristics of pigs of various feeder grades.

Twenty pigs, weighing 40 to 50 pounds, were randomly selected from each of three graded pens; mixed U.S. No. 1 and U.S. No. 2, U.S. No. 3 and U.S. No. 4; at the Lawrence County Feeder Pig Sale, Lawrenceburg, Tennessee. They were wormed, sprayed for external parasites and fed a 16% protein wheat-supplement ration for 105 days.

Average daily gain, during the 105-day finishing period, of pigs graded U.S. No. 1-2, U.S. No. 3 and U.S. No. 4 at weaning (40 to 50 pounds) was 1.67, 1.68 and 1.74 pounds per head per day, respectively. The pigs which were graded U.S. No. 4 as feeders were fatter, slightly shorter, less muscular and graded lower at slaughter than the pigs graded higher, U.S. No. 1 through 3.

Average back probe for the three feeder grade groups, U.S. No. 1-2, U.S. No. 3 and U.S. No. 4 was 1.30, 1.33 and 1.53 inches,

respectively. The leaner, U.S. No. 1 through No. 3 pigs were more efficient feed converters than the fatter U.S. No. 4 pigs.

Pigs graded U.S. No. 4 as feeders tended to grade higher at slaughter. Ten percent of the pigs in this feeder grade were graded U.S. No. 1 at slaughter, 35% were graded U.S. No. 2, 50% were graded U.S. No. 3 and only 5% were graded U.S. No. 4. These results indicate that many Tennessee feeder pigs are being placed in feeder grades below their potential slaughter grade and genetic potential at feeder pig sales due to poor pre-sale management and nutrition. The response of the U.S. No. 4 pigs, especially during the 12-day adjustment period, shows the Tennessee producers have an opportunity, through improved management and nutritional practices, to have a greater percentage of their pigs graded higher as feeders.

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VITA

James Tracy, Jr., was born March 10, 1930 in Crockett County, Tennessee. He attended public schools at Coxville, Tennessee, and graduated from Alamo High School, Alamo, Tennessee, in 1947. He attended the University of Tennessee at Martin for two years and graduated from the University of Tennessee at Knoxville in 1951 with a major in Agricultural Education and a minor in Animal Husbandry.

After graduation, he was employed as a science teacher at Crockett Mills High School for four years. During this time he met and married Miss Betty Smith.

In 1955, he was employed by the Agricultural Extension Service as Assistant County Agent in Hardin County where he remained for one year. He was employed by a firm as a feed salesman working out of Jackson, Tennessee, for a period of five years (1956-61).

In 1961, he was re-employed by the U.T. Extension Service in Hardin County as Assistant County Agent. He served as 4-H Club Agent from 1961 until 1967 when he became County Agent of Hardin County. His present position is Extension Leader of Hardin County.