

H. R. Thomas & E. T. Kornegay

Double Deck Finishing of Swine

**Research Division Report 141
Virginia Polytechnic Institute
Blacksburg, Va. 24061
May 1970**

DOUBLE-DECK FINISHING OF SWINE

H. R. Thomas and E. T. Kornegay^{a, b}

Facility cost is one of the largest fixed costs in the production of market swine. The fixed cost per animal is directly related to the total carrying capacity of the facility. The square footage of floor space required per animal can be reduced to 4 sq. ft. per hundred pound of body weight without reducing growth and efficiency; however, if animals are crowded more than this, growth and efficiency are reduced (Marshall et al. 1969). The carrying capacity might also be increased by feeding animals on more than one floor level.

The objective of these trials was to study the feasibility of double-decking swine as a method of increasing carrying capacity.

Experimental Procedure

Seven trials using 436 crossbred pigs ranging from 11 to 137 lb. initially were used. Top and bottom decks were compared in trials I-V with a third treatment, single deck, added in trials VI and VII. Pigs were self-fed a standard ration at the NRC (1968) recommended protein level (table 1). Water was allowed at all times.

The pen size was 6 x 14 ft. in all trials except the first in which they were 4 x 14 ft. The floor of the bottom pens was 1 ft. above a concrete slab. The floor of the top pens was constructed 3 ft. above the floor of the bottom pens and 4 ft. below the aluminum roof. Pen floors were completely slotted using flat expanded metal (3/4 inch opening), thereby allowing urine and feces to pass through each floor to the concrete slab.

Body weights and feed consumed were recorded at two-week intervals. Pigs were observed for cleanliness and general appearance. Individual gains and pen feed intake and efficiency data were statistically analyzed using analysis of variance and the multiple range test (Duncan, 1955).

^a Both are Associate Professors in the Department of Animal Science, Virginia Polytechnic Institute, Blacksburg, Virginia 24061

^b Appreciation is expressed to Mr. C. E. Babb for caring for animals and to Dr. C. Y. Kramer for statistical analysis.

TABLE 1. COMPOSITION OF BASAL RATION

Ingredients	Amount per ton ^a	
	Trials I-V	Trials VI&VII
Corn, yellow, lb.	1601.0	1587.0
Soybean meal (50%), lb.	252.0	356.0
Tankage or meat meal, lb.	100.0	--
Limestone, lb.	20.0	8.0
Defluorinated phosphate, lb.	10.0	30.0
Trace mineral salt, lb. ^b	10.0	10.0
Vitamin premix, lb. ^c	5.0	5.0
Zinc sulfate, lb.	2.0	4.0
Copper sulfate, gm./ton	12.0	12.0
Antibiotic (Terramycin - 50)	0.6	--

^a 16% crude protein ration fed from weaning to 75 lb., 14% from 75 to 125 lb., and 12% from 125 lb. to market weight. Crude protein level changed by varying the proportions of corn, soybean meal and tankage.

^b Contained (%): 0.2 Mn, 0.16 Fe, 0.033 Cu, 0.01 Co, 0.007 I, 0.005 Zn, and 96.5 NaCl.

^c Supplied (per lb. of premix): 0.4 gm. riboflavin, 1.0 gm. pantothenic acid, 20.0 gm. choline chloride, 4.0 gm. niacin, 3.2 mg. vitamin B₁₂, 600,000 I.U. vitamin A, and 200,000 I.C.U. vitamin D and 36 mg. ethoxyquin.

Results and Discussion

Average daily gain, feed intake and efficiency data are summarized in table 2 for all trials. Statistical analysis of the performance data for trials I-V individually or combined showed no significant differences in average daily gain, average feed intake and feed per pound of gain between the top and bottom decks. In trial VI, pigs fed on the top deck had gains which were significantly less than those of pigs fed on the bottom and single decks. In trial VII, the average daily gain of the pigs fed on the single deck was significantly greater than that of pigs fed on the bottom and top decks. There were no significant differences in feed intake or feed per pound of gain in these two trials, however, only an analysis of the pen means was possible. When trials VI and VII were combined and the statistical analysis completed, the pigs housed on the top deck had gained significantly less than those housed on the bottom and single decks (1.13 vs. 1.27 and 1.31 lb.).

The poor performance of pigs fed on the top deck in trials VI and VII was probably due to the fact that these trials were conducted during the summer months. It was observed that the pigs on the top deck suffered more from heat than those on the bottom and single decks. Also in trials IV and V, pigs housed on the top deck gained slightly less, although it was not significant, than those housed on the bottom deck. Again these two trials were conducted during the summer months and it was observed that pigs on the top suffered more from the heat than those on the bottom deck.

It is concluded from these studies that pigs can be raised on double-decks without an effect upon average daily gain, feed intake and efficiency, if care is taken to provide proper ventilation and insulation for pigs on the top deck during extreme hot weather.

TABLE 2. AVERAGE DAILY GAIN, FEED INTAKE AND EFFICIENCY OF PIGS FED ON DOUBLE DECKS

Trials and Treatments ^a	Performance data		
	ADG	AFI	F/G
	1b.	1b.	1b./1b.
Trial I (W-Feb.) ^b			
Bottom	1.33	4.70	3.50
Top	1.39	4.84	3.40
Trial II (F-Aug.)			
Bottom	1.37	5.60	3.61
Top	1.34	5.37	3.61
Trial III (W-Jan.)			
Bottom	1.25	5.16	3.68
Top	1.26	5.11	3.76
Trial IV (Su-July)			
Bottom	1.55	5.48	3.53
Top	1.48	5.41	3.46
Trial V (Su-June)			
Bottom	1.34	4.53	3.36
Top	1.27	4.03	3.17
Trial VI (Su-July)			
Bottom	1.27 ^c	5.44	3.84
Top	1.04 ^d	4.63	3.95
Single	1.26 ^c	5.34	3.79
Trial VII (Sp-Apr.)			
Bottom	1.27 ^c	4.55	3.60
Top	1.21 ^c	4.26	3.51
Single	1.35 ^d	4.43	3.28

^a Number of pigs per treatment, average initial weight (lb.), and average length of trial (days), respectively for trials I-VII: 15, 49.5 & 98; 44, 53.8 & 59; 25, 112.7 & 68; 13, 68.5 & 79; 24, 28.0 & 108; 24, 109.5 & 70; 24, 41.9 & 119.

- ^b Season of the year shown in parenthesis when trial was started.
- ^{c,d} Means in the same column with different superscripts are significantly different ($P < 0.01$). When trials VI and VII were combined, the top deck is significantly less than the bottom and the single decks (1.13 vs. 1.27 and 1.31). A combination of trials I-V reveals no significant difference between treatments.

Summary

Seven trials conducted during both summer and winter months were completed using 436 crossbred pigs ranging in weight from 11 to 137 pounds initially. Top and bottom decks were compared in 5 trials with a single deck treatment added in two additional trials. No difference was found in average daily gain, feed intake and feed efficiency of pigs fed either on the top or bottom deck when studies were conducted during the fall and winter months. There was slightly less average daily gain when pigs were fed on the top deck during the summer months and it was observed that these pigs suffered more from heat than the pigs on the lower or single decks. Pigs can be grown on double decks without getting reduced performance if the top deck is properly ventilated and insulated during hot summer months.

Literature Cited

- Duncan, D. B. 1955. Multiple range and multiple F test. Biometrics 11:1.
- Marshall, M., E. S. Bell, J. M. Stanley, H. R. Thomas and R. F. Kelly. 1969. The effects of controlled temperatures, slotted floors, and space allowances on swine production in Southeastern Virginia. V.P.I. Research Report (in press).
- N.R.C. 1968. Nutrient Requirements of Domestic Animals. No. 2. Nutrient Requirements of Swine. National Academy of Sciences, Washington, D.C.