

MAGR
GOVS
MN 2000 EP-no.3

LETIN ROOM
Y, UNIVERSITY FARM

Summary of the
***SWINE FEEDING EXPERIMENTS**

Conducted by the

DIVISION OF ANIMAL HUSBANDRY

of the

UNIVERSITY OF MINNESOTA

UNIVERSITY OF MINNESOTA
DOCUMENTS

SEP 13 1976

ST. PAUL CAMPUS LIBRARIES

January 1921 to January 1928

E. F. FERRIN

EXTENSION PAMPHLET NO. 3

3

January 1928

UNIVERSITY OF MINNESOTA

AGRICULTURAL EXTENSION DIVISION

1

2

Published by the University of Minnesota, College of Agriculture, Extension Division, F. W. Peck, Director, and distributed in furtherance of the purposes of the cooperative agricultural extension work provided for in the Act of Congress of May 8, 1914.

This archival publication may not reflect current scientific knowledge or recommendations.
Current information available from University of Minnesota Extension: <http://www.extension.umn.edu>

INDEX

- Alfalfa
 - hay, 4, 6
 - meal, 5, 11
 - pasture, 4, 8, 10
- Barley
 - compared with rye as a substitute for corn, 6
 - compared with shelled corn, 7
 - ground, 6, 7, 12
- Buttermilk, 6, 12
 - comparing semi-solid and dried, 5
 - compared with tankage, 5, 9
- Corn
 - compared with rye, 6
 - ground, 6
 - new corn, 10
 - proportions with oats for growing pigs, 11
 - shelled, 4, 5, 7-12
- Dry-lot feeding, 4-11
- Dried buttermilk, compared with semi-solid, creamery, 5
- Duroc Jersey breed compared with Yorkshire and Poland China, 12
- Fall pigs, comparing feeds to make gains, rate and cost of gains with spring pigs, 4
- Farrowing, early farrowing necessary for full feeding, 10
- Feed costs, 4
 - comparing tankage, dried, creamery, and semi-solid buttermilk, 5
- Feeder pigs, 7
- Flour middlings, 5
 - feeding on alfalfa pasture, 4
 - feeding on rape pasture, 8
- Full feeding compared with limited feeding, 10
- Gains, comparing costs in winter and summer, 4
- Limited feeding of grain, 8, 10, 11
- Limited feeding compared with full feeding of grain, 10
- Linseed meal
 - as supplement for dry-lot feeding, 4, 9, 11
 - as supplement for pasture feeding, 4, 12
- Middlings
 - flour, 4, 5, 8
 - standard, 4, 8, 9, 10, 12
- Oats
 - dehulled oats, 9
 - ground oats, 6, 9
 - proportions with corn for growing pigs, 11
 - whole oats, 9, 11
- Pastures
 - alfalfa, 4, 8
 - bluegrass, 12
 - rape, 5, 6, 8, 10, 11
 - sweet clover, alfalfa, and rape compared, 8
- Poland China breed compared with Yorkshire and Duroc Jersey, 12
- Prices, comparing fall and spring, 4
- Protein mixtures, 9, 11
- Protein supplements
 - for growing pigs, 11
 - for growing fattening pigs, 9
 - for suckling pigs, 5, 7
 - for weaned pigs, 5, 8

Rape pasture, 5, 9, 11
 compared with alfalfa and sweet clover, 8

Red-dog flour, 5, 7,
 feeding on alfalfa pasture, 4

Rye
 ground, 6
 compared with corn, 6
 and buttermilk compared with corn, 6
 and oats, 6

Semi-solid buttermilk
 dry lot, 4
 pasture, 4, 5

Shelled corn as grain
 for fattening pigs, 7
 for growing fattening pigs, 4, 8, 10, 11, 12
 for growing pigs, 4, 5, 8, 9, 11
 for suckling pigs, 7
 for weaned pigs, 5, 8

Spring pigs, comparing feeds to make gains, rate and cost of gains with fall pigs, 4

Standard middlings
 compared with flour middlings and red-dog flour, 4
 feeding on alfalfa pasture, 4, 8, 10
 feeding on bluegrass pasture, 12
 feeding on sweet clover pasture, 8
 feeding on rape pasture, 8
 feeding in dry lot, 9, 10

Substituting wheat by-products for corn and tankage, 4

Skimmilk, compared with tankage, 5, 7, 8

Sweet clover pasture, compared with alfalfa and rape, 8

Tankage
 as supplement for dry-lot feeding, 4-11
 as supplement for pasture feeding, 4-12
 compared with buttermilk, 5
 compared with skimmilk, 5, 7

Watering pigs, methods of, 8

Wheat by-products, comparing standard middlings, flour middlings, and red-dog flour, 4

Yorkshire breed compared with Duroc Jersey and Poland China, 12

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
Feed Requirements and Cost of Gains of Spring and Fall Pigs Bulletin 213	To compare the feeds necessary to make gains, the rate of gains, and the cost of gains during winter and summer	60 pigs on each ration Shelled corn Red-dog flour Tankage Semi-solid butter-milk	lb. 1.49	lb. 395	<ol style="list-style-type: none"> 1. Fall pigs are more difficult to raise than spring pigs, but when handled carefully they are at least equally profitable. 2. Fall pigs make as rapid gains when well housed and handled as do spring pigs. 3. The amount of feed required to produce gains was practically the same for pigs farrowed at the two different seasons. 4. Cheaper gains are made by fall pigs because feed costs are lower in winter than in summer. 5. Fall pigs sell at higher prices than do spring pigs.
		Shelled corn Red-dog flour Linseed meal Semi-solid butter-milk	1.27	425	
		Shelled corn Red-dog flour Tankage Linseed meal	1.40	375	
		Fall pigs, dry lot	1.39	403	
		Spring pigs, dry lot	1.40	402	
		Spring pigs, alfalfa pasture	1.37	389	
		A Comparison of Wheat By-Products for Growing Pigs Bulletin 219	To determine the comparative feeding values of three wheat by-products. To investigate the substitution of part of the corn and the tankage with a wheat by-product	20 pigs on each ration Shelled corn Tankage	
Shelled corn Tankage Standard middlings	1.11			397	
Shelled corn Tankage Flour middlings	1.16			382	
Shelled corn Tankage Red-dog flour	1.12			388	
Alfalfa pasture					

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
Tankage and Buttermilk as Protein Supplements, Bulletin 221	To compare relative economy of tankage, semi-solid buttermilk, and creamery buttermilk as protein supplements for growing pigs	20 pigs on each ration	lb.	lb.	<ol style="list-style-type: none"> The feeding of dried buttermilk, semi-solid buttermilk, or creamery buttermilk as a protein supplement in rations for growing pigs increased slightly the daily gains, as contrasted with tankage. The saving in time necessary to increase the weight of a growing pig by 100 pounds was six days when either kind of buttermilk was fed instead of tankage. Creamery buttermilk or tankage produces the most economical gains, with dried buttermilk third and semi-solid buttermilk fourth. For growing pigs on good pasture the commercial buttermilk feeds are not as cheap sources of protein as either tankage or creamery buttermilk.
		Shelled corn Red-dog flour Tankage Rape pasture	1.12	370	
		Shelled corn Red-dog flour Dried buttermilk Rape pasture	1.21	349	
		Shelled corn Red-dog flour Semi-solid buttermilk Rape pasture	1.21	415	
		Shelled corn Red-dog flour Creamery buttermilk Rape pasture	1.21	697	
Protein Supplements for Weaned Pigs	To compare protein supplements in rations for pigs after weaning	Shelled corn Flour middlings Skimmilk	0.94	687	<ol style="list-style-type: none"> For weaned pigs skimmilk is the cheapest and most valuable protein supplement. Skimmilk produced 30 per cent faster gains than tankage. In this trial 100 pounds of skimmilk had a replacement value of 25 pounds of corn and 11 pounds of tankage, valued at 80 cents. Pasture saved practically 25 per cent of the feed required for pigs similarly fed in dry lot.
		Shelled corn Flour middlings Tankage	0.72	412	
		Shelled corn Flour middlings Tankage Rape pasture	0.90	304	

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
Methods of Feeding Rye	To determine the most satisfactory methods of utilizing rye as a grain for feeding hogs	Ground corn Tankage	lb. 1.24	lb. 452	<ol style="list-style-type: none"> 1. Ground rye, tankage, and minerals fed under dry-lot conditions do not make a satisfactory ration. 2. Equal parts of rye and creamery buttermilk have given the greatest and the most economical gains for dry-lot feeding. 3. Two-thirds ground rye and one-third ground oats plus tankage and minerals, or equal parts of ground rye and ground barley plus tankage and minerals make fairly cheap rations. These rations are approximately 77 per cent as efficient as corn, tankage, and minerals in dry lot. 4. Rape pasture helped to offset the disadvantages of rye as the only grain. 5. If rye is cheap in price as compared with other grains, it can be substituted economically for part of the concentrates but is not a satisfactory substitute for all of the grain in a ration for growing pigs.
		Ground rye Tankage	0.70	656	
		Ground rye ½ Creamery buttermilk ½	0.99	885	
		Ground corn Tankage	1.39	386	
		Ground rye 2/3 Ground oats 1/3 Tankage	0.90	521	
		Ground rye Tankage Alfalfa hay	0.78	558	
		Ground rye Tankage	0.57	597	
		Ground rye Tankage	0.45	745	
		Ground rye ½ Ground corn ½ Tankage	0.72	575	
		Ground rye ½ Ground barley ½ Tankage	0.94	522	
		Ground rye Tankage	0.65	629	
		Ground rye ½ Ground corn ½ Tankage	1.10	463	
		Ground rye ½ Ground barley ½ Tankage	0.93	543	

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
Protein Supplements for Suckling Pigs	To determine the effect of adding protein to the rations of small pigs before weaning To compare the relative values of skim milk and tankage as supplements to corn in the ration of the little pigs	Shelled corn Red-dog flour Skim milk	lb.	lb.	1. Skim milk or tankage when added to the ration for suckling pigs increases the rate of gains and lowers the cost of gains.
		Shelled corn Red-dog flour Tankage	0.76	250	
		Shelled corn Red-dog flour	0.56	84	2. Suckling pigs fed shelled corn and red-dog flour made fairly satisfactory gains. Much of the credit for these gains must be given to the milk supplied by the sows.
Fattening Feeder Pigs	To obtain data on the problem of fattening feeder pigs	Shelled corn Tankage	1.83	394	1. Gains averaging 1.80 pounds daily were made by pigs fed corn and tankage while similar pigs given barley and tankage gained 1.87 pounds.
		Ground barley Tankage	1.84	426	
		Shelled corn Tankage	1.76	400	2. The total feed necessary to make 100 pounds gain when corn and tankage were fed averaged 399 pounds, while with barley and tankage the average was 464 pounds.
		Ground barley Tankage	2.00	460	
		Shelled corn Tankage	1.83	402	3. Even with high-priced feeds, a \$1.00 margin between the values of feeder pigs and the price of finished hogs is sufficient, if gains in excess of 1.75 pounds daily are made.
		Ground barley Tankage	1.77	507	

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
Protein Supplements for Weaned Pigs	To compare protein feeds for the period while pigs are gaining from an initial live weight of 50 pounds to a final weight of 100 pounds	Shelled corn Flour middlings	lb. 1.01	lb. 361	<ol style="list-style-type: none"> 1. Protein supplements are necessary for economical gains. 2. Skimmilk is usually the most satisfactory supplement. Pigs fed skimmilk made 17 per cent faster gains than those fed tankage. 3. While rape pasture approximates skimmilk in composition, pigs fed milk made faster and cheaper gains.
		Shelled corn Flour middlings Tankage	Rape pasture 1.15	322	
		Shelled corn Flour middlings Skimmilk	1.35	672	
Methods of Watering Pigs	To determine the effect upon gains and feed consumption when water is given pigs either three times daily or kept before them at all times	Shelled corn Standard mid- dlings Tankage Water, free will	1.52	397	<ol style="list-style-type: none"> 1. There was no significance in the difference in rate of gains or in feeds for gains between the two methods of watering. 2. Pigs having water before them all the time drank 27 per cent more than the hand-watered lots without making greater gains or cheaper gains. 3. Watering three times daily seems to be as satisfactory a method as providing a constant supply.
		Shelled corn Standard mid- dlings Tankage Water in troughs three times daily	1.55	382	
A Comparison of Sweet Clover, Alfalfa, and Rape Pastures	To obtain a ranking of the three crops as pasture for growing pigs	Shelled corn Standard mid- dlings Sweet clover pasture	1.05	401	<ol style="list-style-type: none"> 1. Satisfactory gains were made on a 3 per cent grain ration with each of the pasture crops. 2. The grain to produce 100 pounds gain with rape was 8 per cent less than with alfalfa and 18 per cent less than with sweet clover pasture. 3. Considering only the rates and costs of gains of the pigs, rape, alfalfa, and sweet clover pastures ranked in the order named.
		Shelled corn Standard mid- dlings Alfalfa pasture	1.14	369	
		Shelled corn Standard mid- dlings Rape pasture	1.22	340	

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
Protein Supplements for Growing Fattening Pigs	To demonstrate the advisability of adding protein supplements to common rations. To compare the efficiency and economy of protein supplemental feeds	5 pigs per lot	lb.	lb.	<ol style="list-style-type: none"> Free choice self-feeding in dry lots without a high protein feed is unsatisfactory. More rapid gains resulting from the feeding of protein supplements get pigs to market earlier, with an advantage in selling price. Cheaper gains usually are made when high protein feeds are given.
		Shelled corn Ground oats	0.54	620	
		Shelled corn Standard middings	0.82	470	
		Shelled corn Ground oats Tankage	1.07	479	
		Shelled corn Ground oats Buttermilk	1.51	804	
		Shelled corn Ground oats Rape pasture	0.98	399	
The Influence of Oat Hulls in Rations for Growing Pigs	To determine the effect of oat hulls by feeding either whole oats, ground oats, or dehulled oats as the only grain in a ration	Whole oats Protein mixture 2 tankage 1 linseed 1 alfalfa meal	0.86	456	<ol style="list-style-type: none"> Oat hulls are so bulky that growing pigs can not consume sufficient oats to make normal gains. This bulk limits the pigs to a low intake of dry matter and digestible nutrients. Pigs obtain little, if any, nutrients from the hulls of oats. Dehulled oats are considerably more concentrated than whole oats or ground oats and produce more rapid gains at a higher cost.
		Ground oats Same protein mixture	0.89	444	
		Dehulled oats Same protein mixture	0.99	330	

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
Full vs. Limited Feeding for the Market Hog	To compare the full feeding method with the plan of growing pigs on a partial grain ration and fattening them in the fall To determine the difference in cost of gains in relation to selling price of pigs handled by the two different methods	2 lots of 10 pigs on each of the four rations	lb.	lb.	1. Full-fed pigs in 1925 and 1926 gave a greater margin over feed costs than similar pigs limited to a ½ grain ration during the summer.
		Shelled corn Standard mid-dlings Tankage Full feed, dry lot	1.33	404	
		Shelled corn Standard mid-dlings Tankage Half feed, dry lot	0.91	480	3. Old corn only was fed to the pigs on full feed. The limited grain lots ate 40 per cent old corn and 60 per cent new corn.
		New corn full fed as soon as ripe Tankage	1.49	351	
		Shelled corn Standard mid-dlings Tankage Full feed, alfalfa pasture	1.04	399	
		Shelled corn Standard mid-dlings Tankage Half feed, alfalfa pasture			
		New corn full fed as soon as ripe Tankage Alfalfa pasture			

Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
What Should Be the Proportion of Corn to Oats in Rations for Growing Pigs?	To determine the effects on rate and cost of gains of varying proportions of corn and oats in rations for growing pigs	Shelled corn Tankage	lb. 0.87	lb. 373	<ol style="list-style-type: none"> When oats replaced any part of the corn, the rate of gain was reduced and the feed to make gains was increased; Even in this trial when no attempt was made to fatten the pigs, oats was only about 60 per cent as valuable per pound as corn. When oats are to be fed to growing pigs, to be as cheap as corn the price per bushel should be less than half that of corn.
		Shelled corn $\frac{2}{3}$ Whole oats $\frac{1}{3}$ Tankage	0.81	393	
		Shelled corn $\frac{1}{2}$ Whole oats $\frac{1}{2}$ Tankage	0.74	430	
		Shelled corn $\frac{1}{3}$ Whole oats $\frac{2}{3}$ Tankage	0.71	439	
Mixtures of Protein Supplements for Growing and Fattening Pigs in Dry Lots	To compare the economy and efficiency of different protein supplements	Shelled corn Tankage	1.00	415	<ol style="list-style-type: none"> When tankage was the only protein supplement added to corn and minerals for dry-lot feeding, slower and more costly gains resulted than when mixtures were fed. Each of the three mixtures was more efficient than tankage in producing gains and at a lower cost. The mixture of tankage, linseed meal, and alfalfa meal cost less per hundredweight but made the most rapid and the cheapest gains.
		Shelled corn Tankage 90 Alfalfa meal 10	1.25	377	
		Shelled corn Tankage 50 Linseed meal 50	1.30	377	
		Shelled corn Tankage 45 Linseed meal 45 Alfalfa meal 10	1.32	375	



Title	Objects	Rations and Methods of Feeding	Av. Daily Gain	Feed for 100 lb. Gain	Summary
The Cost of Gains and the Quality of the Pork Produced by Three Breeds of Hogs	To compare the rate and cost of gains and the value of the finished product.	Yorkshire	lb.	lb.	<p>This is a progress report only. It is based on the feeding of 20 pigs of each breed. A final report will be made later.</p> <p>1. Poland China and Duroc Jersey pigs gained more rapidly and consumed slightly less feed than Yorkshire pigs.</p> <p>2. When the final average weight per lot was reached, the Yorkshire pigs were less uniform in size and finish than the other two breeds.</p> <p>3. The differences in quality and palatability of the meat as determined by cooking tests were not pronounced, but indications are that Yorkshires rank first, Duroc Jerseys second, and Poland Chinas third.</p>
		Poland China	1.07	771	
		Shelled corn $\frac{1}{2}$ Ground barley $\frac{1}{4}$ Buttermilk Middlings Tankage Linseed meal	1.16	736	
Duroc Jersey	1.14	745			

Detailed reports of any of these experiments may be obtained by addressing the Division of Animal Husbandry, University Farm, St. Paul, Minn.

Unless otherwise stated, ten pigs were fed in each lot.

Mineral mixtures were fed in all experiments.