

with 100 milligrams of iron dextran weighed more at weaning and had a lower death loss than those injected with iron-cobalt-folic acid which contained only five milligrams of elemental iron, or those receiving no injection.

Iron dextran had its largest effects on pigs raised on concrete in confinement without additional iron supplement. It was noted that the addition of iron in the water of the baby pig waterer or fresh dirt in the pen tended to increase the average weaning weight and the percentage survival for pigs raised in confinement.

A Comparison of Pasture and Confinement Systems For Raising Hogs

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In contrast to the long established practice of raising hogs on pasture, an increasing number are being raised in confinement on concrete floors. During the period of constructing confinement facilities for hogs at the Fort Reno station, confinement facilities were not available for the entire herd. This presented an opportunity to divide the herd and compare performance under the two systems of management.

1957 Fall Pigs

Procedure

The 42 sows farrowed in August and September of 1957 were divided equally into three groups according to age and line of breeding. All sows were fed alike on pasture during gestation and were farrowed in a central farrowing barn. Sows in Groups 1 and 2 were moved from the barn to alfalfa pasture where the litters were handled alike from 6 days of age until the litters were weaned at about 56 days of age. Six sows and litters were allotted to each 1½ acre pasture lot according to the age of litter.

After weaning, the litters from Group 1 sows were continued on pasture, and the litters from Group 2 sows were moved to concrete floored pens (10 x 22 feet) where each litter was fed in a separate pen. The Group 3 sows raised their litters in individual 10 x 22 feet concrete floored pens, and after weaning, the litters were continued in the same confinement pens.

Sows in all groups were self-fed the same mixed ration containing ground wheat, ground alfalfa hay, and a protein-mineral supplement. All litters were creep fed the same fortified pelleted ration. After weaning, the pigs on pasture and in confinement were self-fed the same free choice ration of ground grain mixture of wheat and milo and a fortified protein-mineral mixture. The alfalfa pasture furnished excellent grazing for the sows and litters up to weaning. After freezing weather in early November the pigs obtained little benefit from the alfalfa pasture.

No preventative treatment for anemia was given to litters moved to pasture at six days of age. Litters raised in confinement were not given injectable iron for the prevention of anemia, but pigs were given access to rags attached to the wall of the creep pen that were soaked daily in a commercially prepared iron-sugar solution.* Young pigs quickly learned to suck on this rag. After the young pigs had learned to eat well, this treatment was discontinued.

It was necessary to conclude the test on January 28, 1958, in order to prepare the barns for spring litters. At the termination of the test, the different groups of pigs averaged between 141 and 168 pounds. The average age was about 150 days.

Results

The farrowing to weaning data on the 1957 fall pigs are presented in Table 1. By chance in allotment, sows averaging larger litters at far-

TABLE 1. Farrowing to weaning performance of 1957 fall pigs at Fort Reno.

Groups	1 and 2	3	Difference
Management	Pasture	Confinement	
No. litters	29	13	
Av. no. farrowed per litter	9.2	9.8	—0.6
Av. no. weaned per litter	6.7	7.1	—0.4
% Survival	73	72	1
Av. litter weaned wt. (54 days), lbs.	241	230	11
Av. pig weaned weight, lbs.	36.2	32.5	3.7
Feed consumed per lb. of pig weaned, lbs. ¹			
Sow feed	2.73	3.00	— .27
Creep feed	.71	.45	.26
Total	3.44	3.45	

¹Measured between the time litters were 6 days of age and weaning (average of 54 days).

* The iron-sugar solution, sold under the name of Co-Fer-Mel, contained the following ingredients per ounce: 72 gm. Iron Sulfate; 1/8 gm. Cobalt Sulfate; 5% Glycerin; and trace amounts of Copper Sulfate, Zinc Sulfate, and Dextrose.

rowing were placed in confinement and more pigs were weaned per litter on this treatment, but the percentage survival was essentially the same (73 and 72 percent) for the two managements. The average weaning weight of pigs raised on pasture was 36.2 pounds and 3.7 pounds heavier than the pigs raised in confinement.

Sows in confinement consumed more feed than those on pasture, but the pigs on pasture consumed more creep feed than the pigs in confinement. The total feed per pound of pig weaned was the same for both groups.

After weaning the pigs on the pasture-confinement combination system gained the fastest and most efficiently with little difference between the pasture-pasture and confinement-confinement systems (Table 2).

TABLE 2. Post weaning performance of 1957 fall pigs at Fort Reno.

Management	1	2	3
Before weaning	Pasture	Pasture	Confinement
After weaning	Pasture	Confinement	Confinement
No. litters	15	14	10
No. pigs	77	86	71
Av. initial wt., lbs.	35.7	36.3	33.4
Av. fin. wt., lbs.	141	168	148
Av. daily gain, lbs.	1.13	1.45	1.19
Av. lbs. feed per lb. gain	3.77	3.65	3.85

1958 Spring Pigs

Procedure

During February and March of 1958, the 65 sows farrowing at the Fort Reno Station were divided into two comparable groups of equal age and breeding. All sows were fed alike on pasture during gestation and were farrowed in a central farrowing barn. Thirty-one sows were placed on alfalfa pasture when their litters were six days and thirty-four sows raised their litters in individual concrete floored pens.

Most of the pigs in each group were given iron injections at five days of age, but some pigs in each group received no injections at all (see the preceding article on that test in this same bulletin). The sows on pasture and those in confinement were self fed the same ration as that fed in the Fall of 1957. Pigs were also creep fed the same pelleted ration as was fed in the Fall of 1957. The alfalfa pasture, while not a full stand, furnished excellent and adequate forage for the sows in the pasture group.

All litters were weaned at approximately 56 days and all weights were adjusted to a 56 day standard age.

After weaning, each litter was divided equally so that half of the pigs in each litter remained on the same treatment as before weaning. Half of the pigs in each litter were changed to the other treatment. Considering both pre-weaning and post-weaning management treatments, there were the following four management systems: pasture-pasture, pasture-confinement, confinement-pasture, and confinement-confinement.

Eight alfalfa pasture lots were used in the experiment. These lots were about 1½ acres in size and contained about a half stand of alfalfa. This furnished adequate grazing for the four sows and litters placed in each lot.

After weaning, each pasture lot contained half of each of eight litters of nearly the same age and same pre-weaning treatment. This gave four pasture lots each for the pasture-pasture and confinement-pasture systems. Each lot contained between 20 and 29 pigs. Forage conditions of the pastures were considered adequate but not superior.

Twenty-four confinement lots, 10 x 22 feet with concrete floors, were used after weaning. Each lot had between 5 and 13 pigs of similar age, line and pre-weaning treatment. Water sprinklers were used under shades for cooling both pasture and confinement fed pigs.

All pigs were self fed the same free-choice ration of shelled corn and a protein-mineral supplement after weaning. Pigs were removed from the lots as soon as each pig weighed over 200 pounds on bi-weekly weigh days. A sample of barrows of each line and management system were slaughtered and carcass measurements taken.

Results

The farrowing to weaning data on the 1958 Spring pigs are shown in Table 3. Although sows assigned to the confinement system averaged one pig more per litter at farrowing, there was no difference in the number of pigs weaned per litter by the sows on the two treatments.

All sows were treated alike before farrowing and for the first six days after farrowing. The larger litters farrowed by the confinement sows was a chance result of allotment. The allotment of sows to the management treatments was made before farrowing and before it was known how many pigs would be farrowed by each sow. The sows raising pigs on pasture raised eight per cent more of their pigs than those raising pigs in confinement but this difference was not significant.

Sows raising litters on pasture weaned heavier litters than those in confinement. The average 56-day weight of the pigs raised on pasture was about four pounds heavier than that of the pigs raised in confinement. This difference, however, is exaggerated because of the inadequate anemia prevention treatment for some of the confinement pigs

TABLE 3. Farrowing to weaning performance of 1958 spring pigs at Fort Reno.

Groups	1 and 2	3 and 4	
Management	Pasture	Confinement	Difference
No. litters	31	34	
Av. no. far. per litter	9.8	10.8	-1.0
Av. no. wnd. per litter	7.2	7.2	0
% Survival	74	66	8
Av. litter 56 day wt., lbs.	276	242	34
Av. pig 56 day wt., lbs.	37.0	32.8	4.2
Feed consumed per lb. of pig weaned, lbs. ¹			
Sow feed	2.62	3.34	-.72
Creep feed	.89	.33	.56
Total	3.51	3.67	

¹Measured between the time litters were 6 days of age and weaning at 56 days of age.

(see previous article). Inadequate iron treatment adversely affected the weaning weights of confinement pigs, but had little effect on pasture raised pigs.

In comparing the weaning weights of pasture and confinement raised pigs that were given adequate iron by injection with 2 cc. of iron dextran, the difference in weaning weight in favor of the pasture pigs was only 1.7 pounds. As in the previous season the sows on pasture consumed less feed than those in confinement, but the pigs on pasture consumed more creep feed than those in confinement.

The post-weaning performance of the 1958 spring pigs is shown in Table 4. Weights were taken 28 days after weaning to determine if a change in management affected gains during the first month. There was a significant management effect on the first month's gain.

Pigs in Group 2 that were on pasture until weaning and were then shifted to confinement gained the fastest the first month after weaning, whereas those pigs in Group 3 that were raised in confinement until weaning and then shifted to the pasture lots made the poorest gains the first month. It was observed that the pigs in this latter group required several weeks to become adjusted to the changed environment on pasture. On the other hand, the pigs shifted from pasture to confinement seemed to adjust to the new conditions rather quickly.

In overall feeding performance after weaning, the pigs on the pasture-confinement combination system gained the fastest and the most efficiently (1.62 and 3.29 pounds respectively), while the pigs on the confinement-pasture combination gained the least rapidly and the least efficiently (1.32 and 3.55 pounds respectively). Differences in rate of gain were highly significant and differences in efficiency of gain were significant.

There was a tendency for the confinement fed pigs to be slightly fatter than the pasture fed pigs as indicated by the probe backfat thick-

TABLE 4. Post weaning performance of 1958 spring pigs at Fort Reno.

Management	1	2	3	4
Before weaning	Pasture	Pasture	Confinement	Confinement
Weaning to mkt.	Pasture	Confinement	Pasture	Confinement
No. pigs	97	97	93	97
Av. daily gain 1st month after wn., lbs. ¹	1.26	1.41	1.18	1.30
Av. daily gain from wn. to mkt. lbs. ²	1.47	1.62	1.32	1.47
Av. lbs. feed per lb. gain ¹	3.46	3.29	3.55	3.50
Av. probe backfat, in. (200 lb. barrow equiv.) ²	1.54	1.57	1.52	1.58
Av. length score ^{2 3}	6.3	6.0	6.4	6.3
Av. meatiness score ³	5.3	5.1	5.2	5.1
Av. leg score ^{2 3}	5.9	5.4	5.9	5.2
Carcass Data				
No. barrows	15	16	11	14
Av. wt., lbs.	213	208	210	212
Av. length, in.	29.4	29.4	29.4	29.7
Av. backfat, in.	1.68	1.66	1.65	1.64
Area loin eye, sq. in.	3.29	3.24	3.17	3.30

¹Differences statistically significant

²Differences highly significant statistically

³Scores were from 0 to 9, with the higher scores indicating increased desirability in the particular trait.

ness. Although these differences were highly significant, they were not very large and were not substantiated by the carcass backfat thickness on a sample of the pigs. Observers scored the pasture fed pigs longer, but again that was not supported by the carcass data. There were no significant differences in the carcass length, backfat thickness, and area of loin eye for the four treatments.

Observers scored the pasture fed pigs higher for straightness and soundness of legs. These differences were highly significant, although the confinement fed pigs were generally considered to be satisfactory on their legs.

Since five different lines of breeding were used in 1958 spring experiment, it was possible to study how the different lines performed on the different management systems.

There was a significant interaction between line and management for rate of gain and a difference approaching significance for backfat thickness. This indicates that pigs of different breeding react differently to different management systems. Also, some individuals and lines would perform relatively better than others under a confinement system while others perform relatively better under a pasture system. This would mean that certain lines or breeds might be better adapted to certain managements than others.

Indications also showed that breeding stock should be tested and selected for performance under the conditions that its progeny are expected to be grown. If a confinement system of producing hogs is to be used, breeding stock should be grown and selected for performance under confinement conditions. More information is needed and additional experiments are being conducted to gain more information on this subject.

Summary

Sows raising litters on pasture weaned heavier pigs and heavier litters at 56 days than those raising litters on concrete floors in confinement. This difference was greatly reduced if adequate anemia preventative treatment by iron-dextran injections were used for the confinement pigs.

After weaning, confinement fed pigs gained faster and more efficiently, although there was a tendency for them to be slightly fatter and not as straight and sound on their feet and legs as the pasture fed pigs.

The best combination system in this experiment was the pasture-confinement system in which the litters were raised by their dams on pasture from 6 days of age until weaning at 56 days of age. Then the pigs were moved to confinement lots for feeding to a market weight of 210 pounds. Pigs on this pasture-confinement system gained 1.62 pounds per day with a feed requirement per pound of gain of 3.29 pounds. The poorest system was the confinement-pasture system in which the pigs gained 1.32 pounds per day and required 3.55 pounds of feed per pound of gain.

The Influence of Sire Upon Some Carcass Characteristics of Angus Steers and Heifers

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The variation in slaughter cattle prices is probably the most important factor influencing the success of the beef cattle producer. These prices fluctuate widely with the over-all supply of and demand for beef. Costs of production affect only indirectly the prices paid. On any given market, prices vary widely for cattle of different market classes and grades. The estimated yields and grades are used by the buyers and sellers in price negotiation.

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