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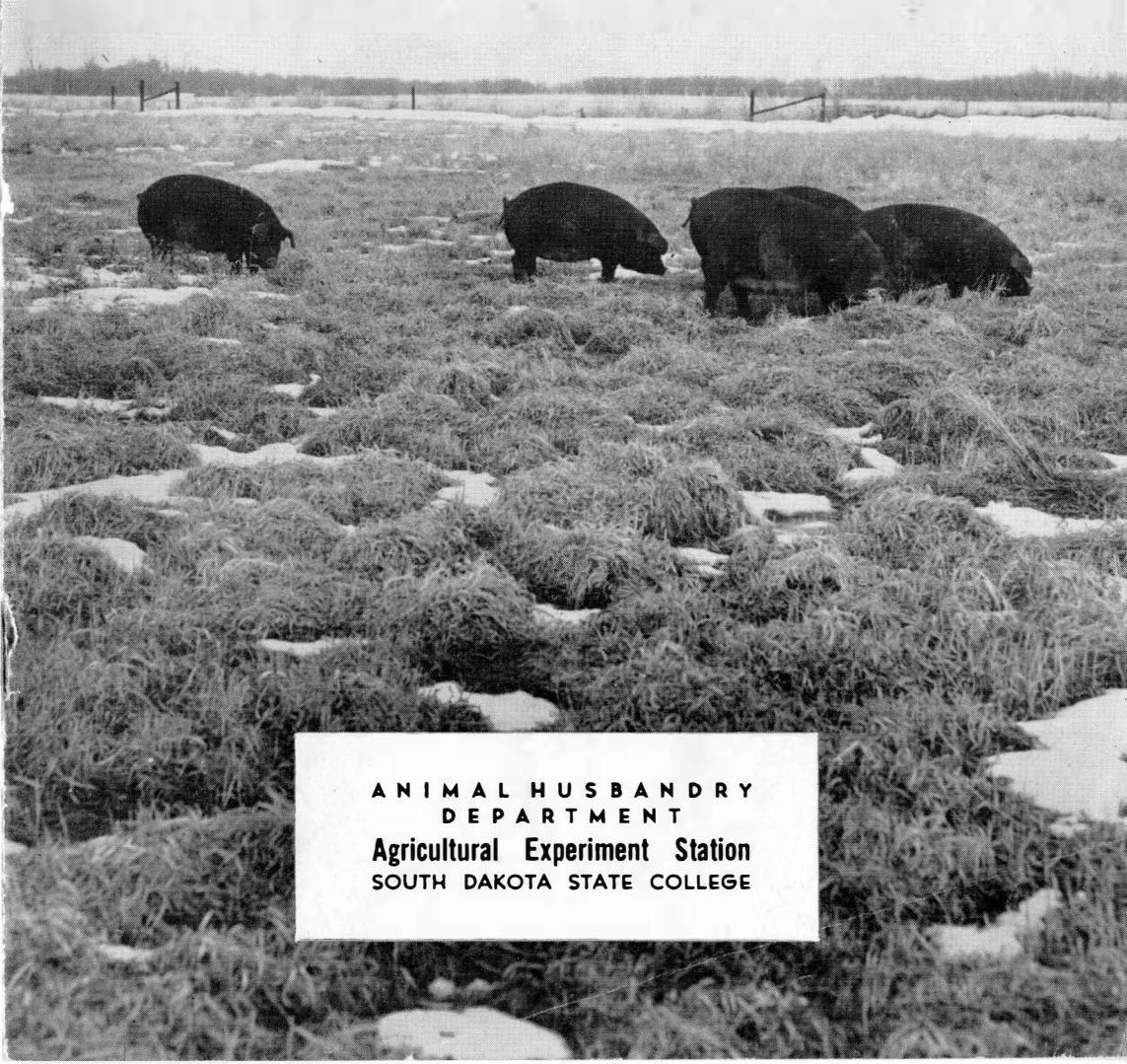
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Farrowing Systems

Their Effect on Returns In Hog Production

Early spring, late spring, summer
and fall farrowing. Performance of
gilts and second-litter sows. One-
and two-litter systems



ANIMAL HUSBANDRY
DEPARTMENT

Agricultural Experiment Station
SOUTH DAKOTA STATE COLLEGE

Farrowing Systems

Their Effects on Returns in Hog Production

RICHARD C. WAHLSTROM, R. F. WILSON, and TURNER WRIGHT¹

HOGS RANK second in the state of South Dakota as a source of cash farm income. During the years 1937 to 1951 they accounted for 18.9 percent of the total farm income. The sale of hogs and pigs has returned to South Dakota farmers approximately 100 million dollars annually for the past eight years.

The highest average prices paid for hogs usually occur in August and September when the receipts are low, and the lowest prices occur during the months of November, December, and January when the large spring pig crop comes to market. The average prices received by South Dakota farmers for hogs during 1949 to 1953 are shown in Figure 1. Figure 2 shows the percent of sows farrowing by months in South Dakota over the same 5-year period. It is quite evident that a relatively small percent of the total pigs now farrowed in South Dakota can be marketed during the two months of highest prices (August and September).

The availability of electricity at present and the prospective expansion will permit many farmers to use pig brooders and extend their present farrowing season. This will be especially helpful in farrowing earlier spring as well as late fall pigs. In 1950, 69.1 percent of the South Dakota farms had electric service.² Most of these farms, 56.4 percent, had central station electric service

and 12.7 percent had farm plants, either wind or gasoline driven. This shows a tremendous increase in the short period of five years since 1945 when only 27.7 percent of South Dakota farms enjoyed this advantage. The majority of hogs produced in South Dakota are raised in the eastern section of the state where REA and public utility companies are greatly increasing the number of farms served. In 1940, 5.5 percent of the farms were served and in 1950, 56.4 percent.

Thus, some shift in season of production appears possible and could result in a considerable increase in net return to producers and reduce the seasonal marketing load. A thorough investigation of the efficiency of producing pigs at different seasons of the year is reported in this bulletin which summarizes the results of an experiment designed to

¹Associate Animal Husbandman; Former Associate Animal Husbandman, and Associate Animal Husbandman, Emeritus, respectively, South Dakota Agricultural Experiment Station. This work was supported in part by a grant-in-aid from John Morrell and Company, Sioux Falls, South Dakota.

²U. S. Census of Agriculture, 1950.

(1) compare the efficiency of early and late spring-farrowed pigs, summer-farrowed pigs and fall-farrowed pigs, (2) compare the efficiency of gilts and second-litter sows and (3) compare the efficiency of the one-litter farrowing system with the two-litter farrowing system.

Review of Related Investigations

No well-controlled experimental studies of the relative merits of early and late spring pigs seem to have been made. Likewise no adequate

study has been made of the relative cost of producing pork by the one-litter and the two-litter systems. In cost studies on farms in central Illinois, there was practically no difference in the average total cost of producing 100 pounds of pork under the one-litter system and the two-litter system (Wilcox *et al.*).³ Death losses among suckling pigs were higher on the two-litter farms due, presumably, to the necessity of far-

³R. H. Wilcox, W. E. Carroll, and T. G. Hornung, *Some Important Factors Affecting Costs in Hog Production*, Bul. 390, Ill. Agr. Exp. Sta., 1933.

Fig. 1. Average prices received by South Dakota farmers for hogs.
(5-year average, 1949-53 inclusive)



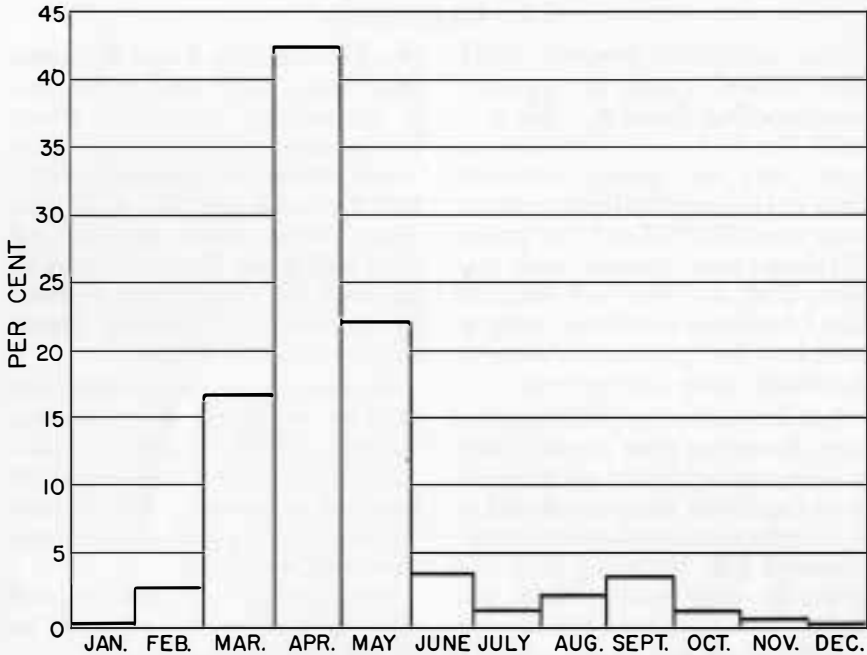


Fig. 2. Percentage of sows farrowing in South Dakota by months.
(5-year average, 1949-53 inclusive)

rowing spring litters earlier on these farms than on the others. Death losses were about 8 percent lower among late-farrowed spring pigs than among early spring pigs and 2 percent lower than among fall pigs. These investigators used April 1 as the dividing date between early and late farrowing.

Hopkins reported a 10 percent greater feed requirement for the two-litter system.⁴ In another report, Hopkins tabulated the losses

observed in a 3-year study on the basis of the month of farrow.⁵ In this report, the loss of pigs up to weaning time was 36 percent for pigs farrowed in March, 34 percent for April-farrowed pigs and only 29 percent of the pigs farrowed in May.

⁴J. A. Hopkins, Jr., *An Economic Study of the Hog Enterprise*, Bul. 294, Iowa Agr. Exp. Sta., 1932.

⁵J. A. Hopkins, Jr., *An Economic Study of the Hog Enterprise in Humboldt County*, Bul. 255, Iowa Agr. Exp. Sta., 1928.

The Experiment

The production program which was followed to make the necessary comparisons is shown in Table 1. In 1948, the first year of the experiment, only five groups farrowed since not enough fall-farrowed sows were available for Lot 1. Six groups of females were farrowed each year from 1949 to 1952 inclusive, and Lot 1 farrowed in 1953 in order to complete five continuous years of farrowing under each system.

Lot 1 consisted of fall-farrowed sows farrowing their second litters in early spring. They had farrowed their first litters the previous fall as Lot 5 gilts. Lot 2 consisted of spring-farrowed gilts farrowing their first litters in early spring. These two lots of sows were bred to farrow in late February and March which is considered as early spring farrowing in this bulletin.

Lot 3, the late spring-farrowed group, was composed of gilts farrowing their first, and only, litters from approximately April 10 to May 15. The summer-farrowed gilts, Lot 4, were also on the one-litter system. These gilts were bred to farrow during June and early July.

Lot 5 consisted of fall-farrowed gilts farrowing their first litters between August 15 and September 30, and Lot 6 was composed of spring-farrowed sows which farrowed their second litters during the fall.

As soon as Lots 2, 3, 4 and 5 were set up with gilts in 1948 the project became self-perpetuating as far as female breeding stock was concerned, since all gilts for succeeding years were taken from their respec-

tive lots and Lots 1 and 6 females came from Lots 5 and 2, respectively. All animals were of the Duroc breed, in order that breed variations would not be a complicating factor. Initially, some gilts had to be purchased from outside breeders and were high-grade Durocs. During later years the grades were replaced by purebreds. Registered Duroc sires were used in all years.

Twelve females were allotted into each lot during the first two years. Starting in 1950, 15 gilts were placed in each lot at the beginning of the breeding season in order to increase the likelihood of having 12 females farrowing in each lot.

Feed records and labor records were kept separately on each lot during the following periods:

- a. Period of gestation, the time from weighing of the gilts or sows at the start of the breeding season until farrowing.

- b. Period of lactation, the time from farrowing to weaning.

- c. Growing-fattening period, the time from weaning until the pigs were weighed out of the experiment at market weight (220 pounds).

- d. Drying-up period of sows, the time from removal of the pigs at weaning until the sows were marketed.

- e. Period during which boars were used in the experiment or carried in the experiment.

The labor records, which were kept separately on each lot, included time required for feeding, watering, breeding, bedding, cleaning houses and pens, farrowing, wean-

ing, marketing (sorting and loading), moving to and from the buildings and pasture and repairing fences, water and feed equipment.

All gilts and sows were weighed at the start of the breeding season and again when they were transferred to the farrowing house which was 5 to 7 days before their expected farrowing date. All pigs were weighed and ear marked within 24 hours after farrowing and all pigs and sows were again individually weighed at weaning time. The sows to be marketed were weighed at the time marketed while those that were kept for a second litter were weighed at an equivalent time. The pigs were weighed weekly as they approached 220 pounds and most of them were removed from the experiment when they weighed at least 220 pounds. The unthrifty, slow-gaining pigs were removed from the experiment when the lot averaged 220 pounds, regardless of their weight. The gilts had an average weight of approximately 250 pounds and the sows averaged about 400 pounds when started on the experiment.

The values used for the animals in this experiment were derived from

the price quotations of Morrell's Sioux Falls packing plant on the day an animal was weighed and placed on the experiment or was weighed out of the experiment. The prices for feed and bedding were those actually paid by the Animal Husbandry Department for the various feeds which were used.

Pasture costs were computed by determining the total pasture cost per acre for each lot, which included the cash rent per acre, fencing costs, cost of preparing the land, seeding and cost of the seed.

The price paid for labor was the monthly wage paid the laborers at the college swine farm during the course of the experiment.

The cost of new equipment was figured on the basis of the original cost, depreciation and length of serviceability, and the cost of housing and equipment on hand was figured in a like manner.

Veterinary costs were not considered in this study, since it was believed that the time and expense involved would be about the same per pig in each lot.

Management practices were similar between all lots. The gilts and

Table 1. Production Program

Lot Number	Number of Females	Start Breeding	Start Farrowing
1	12 fall-farrowed sows farrowing their second litters (Lot 5 gilts of previous year)	Oct. 25	Feb. 15
2	12 spring-farrowed gilts farrowing their first litters (become Lot 6 sows same year)	Oct. 25	Feb. 15
3	12 April-farrowed gilts farrowing their first and only litters	Dec. 18	April 10
4	12 June-farrowed gilts farrowing their first and only litters	Feb. 8	June 1
5	12 fall-farrowed gilts farrowing their first litters (become Lot 1 sows following year)	Apr. 24	Aug. 15
6	12 spring-farrowed sows farrowing their second litters (Lot 2 gilts of same year)	Apr. 24	Aug. 15



sows bred for spring farrowing, Lots 1, 2 and 3, were carried through the gestation period in dry lot. The sows and litters were likewise kept in dry lot most of the time, although the later farrowing sows and their litters were placed on pasture as it became available, generally after May 1. The pigs from these three lots were fed on pasture from weaning to market weight.

The Lot 4 females had access to pasture from the time that it became available in the spring until farrowing. After approximately 10 days in the farrowing barn the sows and litters were transferred to clean pastures. The pigs remained on these pastures until after the first killing frost, generally in the latter part of September. A brome-grass-alfalfa pasture was used predominantly in this experiment, although some rye or rape pasture was used in late fall and early spring.

The fall-farrowing gilts and sows, Lots 5 and 6, had access to pastures during all of their gestation period. After farrowing, these sows and their litters were placed on rape pasture which usually provided grazing until late October.

Nutritionally balanced rations were fed at all times with only small modifications from year to year. The

pregestation and gestation rations consisted of ground yellow corn, ground oats, ground alfalfa hay, tankage, soybean meal and a complex mineral mixture. These ingredients were fed as a mixed ration and the amounts were varied so as to include more or less ground alfalfa hay depending upon the condition of the animals and the method of feeding. A 14 to 15 percent crude protein ration was fed in dry lot and a 11 to 12 percent ration was fed when sows or gilts were on pasture.

Both hand- and self-feeding practices were used at various times. The sows and litters were self-fed a ground mixed ration consisting of the same feeds except that the alfalfa was removed when they were on pasture. The proportion of corn was increased to increase the energy content of the ration.

During the growing - fattening phase the pigs were self-fed free choice, shelled yellow corn, a protein supplement and a complex mineral mixture. The protein supplement was composed of equal parts of tankage and soybean meal when the pigs had access to pasture. The pigs fed in dry lot received approximately 25 percent of good quality ground alfalfa hay in the protein supplement.

After weaning the pigs, the sows were fed for approximately three weeks and then marketed. The sows were in relatively good condition at weaning time since they had been self-fed during the lactation period. This period of time was sufficient to smooth the underlines so the sows sold at a good price on the market.

Results of the Experiment

The results of this experiment were assembled for each year and then these results combined to get a 5-year average for each system of farrowing.

Production Comparisons

A summary of the production comparisons is shown in Table 2. A total of 317 sows farrowed in the six lots during the 5-year period. The number farrowing in each lot ranged from 50 in Lot 2 to 58 in Lot 5. The largest litters were farrowed by the sows in Lots 1 and 6 which were producing their second litter. However, this difference of from 0.6 to 2.2 more pigs per litter, for the second-litter sows, had nearly disappeared by weaning time. All lots but Lot 2 weaned from 6.0 to 6.4 pigs per litter. The very low number of pigs weaned and marketed by the gilts farrowing in early spring (Lot 2) is due to two litters in 1950 and three litters in 1951 that were lost because of failure of the sows to come into milk production. In the

other lots the greatest death loss from birth to weaning was due to pigs being overlaid by the sow.

The differences in birth weight of the pigs were very slight. The smallest pigs were from the gilts in Lot 5, which was probably due to the larger number of pigs in these litters than in the other gilt litters. The birth weights of the pigs from the second-litter sows were essentially the same and similar to the best weights of the gilt lots. The larger number of pigs farrowed by these sows, therefore, indicates a greater total litter weight for the sows than for the gilts. The weaning weights, which were adjusted to 56-day equivalent weights, show a greater average weaning weight for the pigs nursing the older sows. This reflects the greater milk producing ability of the sow during her second lactation period as compared to her first.

The number of days from farrowing until the pigs reached market weight appears to be affected more by weaning weight than by the sea-

Table 2. Production Comparisons of Sows and Gilts Farrowing at Different Seasons of the Year (Average Results of Five Years, 1948-53)

	Lot 1 Sows Far- rowing in Early Spring	Lot 2 Gilts Far- rowing in Early Spring	Lot 3 Gilts Far- rowing in Late Spring	Lot 4 Gilts Far- rowing in Summer	Lot 5 Gilts Far- rowing in Fall	Lot 6 Sows Far- rowing in Fall
Average farrowing date.....	3/12	3/16	4/27	6/23	8/31	9/6
Number sows farrowing	54	50	51	51	58	53
Pigs farrowed per litter	10.0	8.6	7.8	8.7	9.4	10.0
Pigs weaned per litter	6.3	4.8*	6.0	6.3	6.3	6.4
Pigs marketed per litter	6.1	4.6	5.9	5.8	5.7	5.9
Birth weight, lbs.	2.79	2.51	2.72	2.74	2.38	2.72
Weaning weight, lbs. (56 days)	30.8	27.7	29.6	28.8	27.5	35.6
Number days farrowing to market	196	203	199	203	205	195
Average daily gain, weaning to market, lbs. ...	1.36	1.31	1.35	1.32	1.30	1.34

*Five sows lost all their pigs due to failure to come into milk production.

Table 3. Pounds of Feed Required per Pig

	Average Farrowing Date					
	Lot 1 Sows 3/12	Lot 2 Gilts 3/16	Lot 3 Gilts 4/27	Lot 4 Gilts 6/23	Lot 5 Gilts 8/31	Lot 6 Sows 9/6
At time of birth	228	266	230	253	193	189
Birth to weaning	145	149	143	146	158	188
Weaning to market	645	624	622	667	737	699
Consumed by dry sows	22	23	36	35	19	34
Total feed	1040	1062	1031	1101	1107	1110
Feed per cwt. pork produced*	436	407	397	428	437	455

*Includes gain in weight made by sows.

son of farrow. Pigs from sows farrowing their second litters reached market weight 3 to 10 days sooner than did the pigs from the gilt litters. Since these pigs did not, in all cases, gain faster from weaning to market weight, their additional 1.2 to 8.1 pounds heavier weaning weight is reflected in a shortening of the period from birth to market.

During the last year of the experiment, an antibiotic was included in the protein supplement fed to the pigs from weaning to market weight. The average length of time from birth to market weight for all six lots during that year was 190 days as compared to 203 days for the first four years of the experiment. This shorter time from birth to market is a result of the faster rate of gain after weaning, as the weaning weights during the last year were no greater than the average of the other years.

If one compares the gilt litters only, there is a slight advantage for the April-farrowed litters. Regardless of the fact that these gilts (Lot 3) farrowed smaller litters, they weaned the highest percentage of pigs farrowed (77 percent) and the number marketed per litter was the

highest (5.9). Likewise they also had the heaviest 56-day weaning weights and the greatest average daily gain from weaning to market weight, which brought them to market four to six days sooner than the pigs from the other gilt litters.

Feed Comparisons

The pounds of feed required per pig marketed are shown in Table 3.

When the total amount of feed consumed by the sow is divided by the number of pigs in her litter, the amount of feed that is represented in each pig at the time of birth is slightly greater than given in most publications. This is due to several factors, among them being the fact that for three of the five years 15 females were saved for breeding purposes in order to try to have 12 farrow in each lot. The feed consumed by these extra sows that did not farrow was charged against the pigs marketed from the various lots. Also, since the feed records were maintained from the start of the breeding season, or the time that the gilts were selected for breeding, the feed consumed by the sows up to farrowing time is for a period of about three weeks longer than their

gestation period. The variation between the six lots is due to the different number of pigs weaned per litter as well as to the number of sows farrowing per lot.

There are only small differences in the amount of feed consumed during the lactation period. The greater amount consumed by Lot 6 during this period may have been due to their larger size, although the Lot 1 sows did not require any more feed than did the gilt lots. In all cases the sows and litters were self-fed.

Considerably more feed was required to raise the fall pigs from weaning to market weight than was needed for the spring or summer pigs. This was undoubtedly caused by the colder temperatures of the winter months when the feeding took place and the fact that they were raised in dry lot while the other lots had access to pasture during part or all of this period. The difference in feed required during this period is reflected in the total feed requirement and feed per hundred-weight of pork produced.

The spring pigs which were

raised on pasture made the most economical gains both during the period from weaning to market weight and over the entire period. The greater gains made by gilts farrowing their first litter as compared to sows farrowing their second litter are reflected in the improved feed efficiency for these lots. This is further emphasized in that the total feed per pig marketed did not show any consistent difference between the first- or second-litter sows.

Cost Comparisons

The main factors that enter into the cost of producing pork are listed in Table 4.

These are total cost figures that include both the breeding herd and the fattening pigs. It is quite evident that feed costs are the largest of all the costs listed. As an average of all lots, the feed cost represented 81.9 percent; feed and pasture combined accounted for 83.1 percent of the total cost of producing pork. There was very little difference between lots except for Lot 2, where feed costs were only 78.5 percent of the

Table 4. Average Production Costs of Producing 100 Pounds of Marketable Pork (One-Litter System)

	Average Farrowing Date					
	Lot 1 Sows 3/12	Lot 2 Gilts 3/16	Lot 3 Gilts 4/27	Lot 4 Gilts 6/23	Lot 5 Gilts 8/31	Lot 6 Sows 9/6
Cost per cwt.						
Feed	\$12.35	\$12.14	\$11.67	\$12.40	\$12.38	\$12.66
Labor	0.86	1.04	0.79	0.85	0.94	0.99
Boar	0.72	0.96	0.74	0.76	0.69	0.73
Housing	0.35	0.45	0.35	0.36	0.32	0.35
Equipment	0.24	0.31	0.24	0.25	0.23	0.25
Pasture	0.22	0.22	0.22	0.20	0.13	0.13
Straw	0.07	0.08	0.06	0.06	0.19	0.19
Electricity	0.18	0.20	0.12	0.00	0.00	0.00
Feed transportation ..	0.05	0.06	0.06	0.05	0.03	0.03
Total cost	\$15.04	\$15.46	\$14.25	\$14.93	\$14.91	\$15.33

Table 5. Marketing and Income Data for Pigs and Sows Under Different Farrowing Systems

	Lot 1 Sows	Lot 2 Gilts	Lot 3 Gilts	Lot 4 Gilts	Lot 5 Gilts	Lot 6 Sows
Pigs						
Average farrowing date	3/12	3/16	4/27	6/23	8/31	9/6
Average market date	9/24	10/5	11/12	1/2	3/24	3/20
Average number marketed	65.4	46.4	59.8	58.8	65.8	63.0
Average weight marketed, lbs.	221.1	220.9	222.5	222.8	221.8	222.4
Average selling price per cwt.	\$20.16	\$20.25	\$17.90	\$17.84	\$18.91	\$18.91
Sows						
Average cost per cwt.	\$15.81	\$20.72	\$18.74	\$18.69	\$17.80	\$16.12
Average selling price per cwt.	\$16.43	\$16.93	\$17.39	\$18.16	\$15.90	\$14.19
Average gain, lbs.	83.3	148.5	162.2	149.6	157.8	104.1
Income per cwt., total pork produced	\$20.33	\$18.53	\$17.47	\$17.53	\$17.95	\$17.81
Net return per cwt., total pork produced	\$ 5.29	\$ 3.07	\$ 3.22	\$ 2.60	\$ 3.04	\$ 2.48

total costs. In this lot the greater death loss before weaning accounts for a higher percentage of the total costs represented in labor, boar, housing and equipment.

As might be expected, labor is the next largest cost of production. An average of 6 percent of the costs were present in this item. More labor was required for fall-farrowed pigs than for spring- or summer-farrowed pigs. This was mainly due to the added labor of cleaning pens and houses during the period from weaning to market.

The housing costs were rather constant between lots and probably do not show the variation between housing costs that might be expected in comparing early spring or fall pigs with summer-farrowed pigs. It is recognized that less adequate housing would be needed for summer-farrowed pigs, although in this study all lots used essentially the same housing conditions. The system of late spring farrowing gave the lowest total cost per hundred pounds of pork produced. The lower death loss among the pigs in this lot, both before and after weaning,

was probably the most important factor in reducing the total production costs.

Marketing and Income Comparisons

The rather wide differences in profit from the six farrowing comparisons in this study are shown in Table 5. The difference in the prices at which the hogs were sold was a greater factor in causing differences in profit than were the differences in cost of production. The pigs farrowed in early spring brought the highest price per pound as would be expected in a normal market season. These pigs, marketed in late September and early October, brought approximately \$2.25 more per hundredweight than did the pigs marketed in mid-November or early January (late spring- and summer-farrowed pigs). The price received for the fall-farrowed pigs marketed in late March, was \$1.25 per hundredweight less than that received for the early spring-farrowed pigs.

The value received for the sows also affected the net return per hundred pounds of pork produced.

Only the Lot 1 sows (farrowing in early spring) sold for a higher price per pound than they cost. This is a leading factor in the greater net return from this lot. The gain in weight of all gilts and sows was great enough so that the total selling price was more than the cost price even though the price per pound was less. It is noted that the gilts made more gain than did the sows.

The income per hundredweight of pork produced was the highest for Lot 1, the pigs farrowed in early spring by second-litter sows, and the least for Lot 3, the late spring-farrowed group. However, since Lot 3 was the lowest cost lot, it was second to Lot 1 in net return per hundred pounds of pork produced.

Comparison of One- and Two-Litter Systems

The two-litter systems in this study were a combination of two of the one-litter systems previously discussed. These comparisons, of farrowing either early spring, late spring, summer, or fall pigs in a one-litter system with the farrowing of two litters per sow per year, are

shown in Table 6. "Spring and fall farrow" refers to gilts farrowing their first litter in the spring and their second in the fall while "fall and spring farrow" refers to gilts farrowing their first litter in the fall and their second in the spring.

The low number of pigs marketed per sow by the early spring farrowing gilts is reflected in its two-litter system counterpart (spring and fall farrow). Since all of the factors in this table from Lots 2 and 5 reflect on the two-litter system, Lots 3 and 4 are included for further comparative purposes. We then have a comparison of the two-litter system with farrowing one litter per year as late spring or summer pigs. This is the method which has been used by most South Dakota farmers as pointed out in Figure 2.

Where gilts were used for one litter only, their gain in weight while producing pigs was approximately 14 percent of the total pork produced. When these gilts were held over for their second litter, their gain in weight accounted for only 10 percent of total pork produced.

There is very little difference in

Table 6. Comparison of One- and Two-Litter Systems

	One-Litter System				Two-Litter Systems	
	Lot 2 Early Spring Farrow	Lot 3 Late Spring Farrow	Lot 4 Summer Farrow	Lot 5 Fall Farrow	Lots 2 & 6 Spring and Fall Farrow	Lots 5 & 1 Fall and Spring Farrow
Number pigs marketed per sow	4.6	5.9	5.8	5.7	10.5	11.8
Pork produced per sow, lbs.	1212	1524	1484	1438	2626	2864
Feed per cwt. pork produced, lbs.	407	397	428	437	433	435
Cost per cwt. total pork produced	\$ 15.46	\$ 14.25	\$ 14.93	\$ 14.91	\$ 14.87	\$ 14.54
Income per cwt. total pork produced..	\$ 18.53	\$ 17.47	\$ 17.53	\$ 17.95	\$ 18.21	\$ 19.21
Net return per cwt. total pork produced	\$ 3.07	\$ 3.22	\$ 2.60	\$ 3.04	\$ 3.34	\$ 4.67
Cost per sow	\$187.39	\$217.14	\$221.51	\$214.45	\$390.50	\$416.37
Income per sow	\$224.63	\$266.23	\$260.03	\$258.15	\$478.12	\$550.15
Net return per sow	\$ 37.24	\$ 49.09	\$ 38.52	\$ 43.70	\$ 87.62	\$133.78

the total amount of feed required to produce one hundred pounds of pork in the one- or two-litter system. The more feed required by the sow for maintenance during her second gestation period is offset by the fact that she does not have to be kept in the breeding herd for two months before she can be bred. This is generally true for gilts in that they reach market weight at about six months of age and then they must be fed for two months before they are of breeding age.

The cost of each hundredweight of pork produced differs very little between the one- or two-litter-a-year systems. Many factors are involved in affecting total production costs. The percentage death loss or the number of pigs weaned and marketed is of major importance. In

the two-litter system the costs of housing and equipment are less, per hundredweight of pork produced, due to more efficient use.

The income and net return data show an advantage for farrowing two litters per sow. This is particularly true of the system which farrows the first litter in the fall and the second litter in the spring. The difference in net return per sow between the two two-litter systems is due to the greater number of pigs produced and the higher selling price of the sows. Sows that are sold after weaning their pigs in the spring arrive on the market when receipts are low and prices high, while sows sold after weaning fall pigs will generally reach the market in November when receipts of pigs are high and prices declining.

Discussion

The relative merits of farrowing early or late spring pigs, summer pigs or fall pigs have been discussed by swine producers for years. Advocates of early spring pigs argue that the increase in price they receive more than offsets the higher death loss and somewhat more labor and better equipment which are required. It is generally considered, however, that the labor is more readily available during this time of the year than in late spring or summer when there is more competition for labor from the other farm enterprises.

The price at which hogs are sold has a big influence on the profits which are received. A factor often

overlooked, however, may be the gain or loss in value of the sow during her time in the breeding herd. The study reported in this bulletin has demonstrated quite clearly that the time of purchasing and selling the sows will influence the total profits of the enterprise.

One of the chief advantages of early pigs is that they are ready for what is generally the highest market of the year. However, the gilts producing these pigs have to be purchased on a relatively high market in early fall and are sold as sows in the spring, at about the time the fall pig crop is marketed. Gilts for late spring or summer pigs on the other hand, are purchased on a low

market and sold during the high prices of July to September. Therefore, part of the advantage of a higher price received for the pigs farrowed in early spring is lost due to the lower net return for the sows when sold.

There appears to be no decisive advantage for either the one- or two-litter system of pork production. If the production of a large amount of pork is wanted, the two-litter system will involve less investment in breeding herd and equipment. It is also shown that the production of two litters per sow, with the first litter in the fall and the second litter in the spring has an ad-

vantage in that a greater income is derived from the sale of the sow due to the market price increase.

The use of gilts or tried sows in the breeding herd offers little choice. The sows farrowed more pigs per litter and their pigs were considerably heavier at weaning time. This was reflected in a shorter period of time from farrowing to market. The gilts, however, required slightly less feed and the total costs were about equal. The distinct advantage in the net return from the Lot 1 sows was due to the fact that this was the only lot that sold for more per hundredweight than it cost.

Summary

In order to determine (1) the merits of farrowing pigs in early spring, late spring, summer or fall, (2) the advantages of gilts or tried sows in the breeding herd, and (3) a comparison of one- and two-litter systems of farrowing, an experiment was conducted at the South Dakota Agricultural Experiment Station during 1948-53, inclusive.

Gilts farrowing in late spring weaned and marketed the highest percentage of pigs, while gilts farrowing in early spring weaned and marketed the smallest percentage of pigs. There was very little difference in the percentage of pigs weaned and marketed between gilts and tried sows farrowing at the same time of the year, but the number weaned and marketed per sow was slightly greater for the second-litter sows due to larger number farrowed.

Average weaning weights, adjusted to a standard 56-day age, were greater for pigs in sow litters than for pigs in gilt litters. These heavier weights were reflected in a shorter time between farrowing and marketing. Of the gilt litters, those pigs farrowed in late spring had the greatest average weaning weight and shortest period from birth to market weight.

Pigs fed from weaning to market weight in dry lot during the winter required about 75 to 100 pounds more feed per pig than did those pigs raised on pasture during the summer months. The total feed required to produce a 220-pound pig varied from 1031 to 1110 pounds. The least amount of feed per hundredweight of pork produced was required by the pigs farrowed in late spring. Gilts were slightly more

efficient than sows in that the feed required per pound of total pork produced was slightly less for the gilts. This difference was due mainly to the greater gain made by the gilts than by the sows during their time in the breeding herd.

Feed was the greatest single item in the cost of producing pork. In this study, feed made up 81.9 percent of the total costs. The costs of producing 100 pounds of marketable pork ranged from \$14.25 for the system of late spring farrowing to \$15.46 for early spring farrowing.

Early spring pigs were marketed at the time of highest prices and late spring and summer pigs brought the lowest prices. However, the gilts farrowing the late spring or summer pigs brought higher prices than did the gilts farrowing either the early spring or fall pigs.

Second-litter sows farrowing in early spring returned the greatest net income per hundredweight of pork produced. In comparing only gilt litters, the system of late spring farrowing was the most profitable in this study. The factors that most greatly affected the net return in this study were the selling price of the pigs, gain in value of the sow and the number of pigs weaned and marketed per sow.

Under the conditions of this experiment, the net return per hundredweight of pork produced was slightly greater for the two-litter system than for the one-litter system. The biggest advantage was from farrowing the first litter in the fall and the second litter in the spring; not only were the pigs marketed at high prices but the sows were also sold on a high market.