

REPORT OF LIVESTOCK INVESTIGATIONS - 1959

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Cow Herd

The breeding herd is divided into 4 groups during the early part of the breeding season. One bull is turned with each group initially, then as the groups are recombined, all bulls except one are taken out. Breeding was slow in the summer of 1958, possibly for 2 reasons. The cow herd was suffering from Listeriosis and had received the first vaccination to clear up the disease. One, and probably two of the herd sires, both proved the year before, were not settling enough cows. Whatever the cause or causes, our 1959 calf crop was distributed from April until August, and one half or more of them were sired by one bull. The weaning weights of calves from each bull were as follows:

	Sire 4	Sire 5	Sire 6	Sire 7 with yearling hfrs.
No. of Hd.*	40	17	6	11
Av. Wt.	333	369	346	280
Av. Age, days	172	177	185	193

*Twelve additional calves of indefinite sire or birth date not included.

Weight and calving data for the cow herd as a whole is presented in [Table 1](#).

The cow herd apparently has recovered from the Listeriosis attack of the 1958 season. We now vaccinate every animal once yearly to keep Listeriosis in check. The same sires were used in 1959 as in 1958, except that bull #7 has been replaced. The cows lost weight late in the 1959 grazing season, due to the shortage of grass and water. The winter ration for 1959-60 has been changed to conform to available feed supplies. The daily ration per cow this winter is 12 lb. corn silage, 12 lb. crested and brome hay, and 5 lb. of oat straw.

Two Methods of Managing Steers from Weaning to Market
1957 & 1958 Crops

An experiment started in the fall of 1957 was designed to compare two rates of wintering steer calves, followed by dry lot finishing Vs summer pasturing and later dry lot finishing. Two lots of 16 steers each are wintered on a "Normal" ration and a "low" ration. About May 1, each lot is divided into a dry lot group and a pasture group. The dry lot steers are fed until late October and sold. The pasture steers graze tame and native grasses until late September, then are lotted for about 6 months finishing. Finishing rations are the same for all lots. The last 2 lots of steers from the first year's experiment were sold March 19, 1959. Steer calves for the third year's experiment were weaned and lotted early in November, 1959. [Table 2](#) presents the wintering phase for the first 2 years. Several calves became ill with Mucosal disease during the winter of 1958-59, and some substitutions were made as late as Jan. 31, 1959. This may have affected average daily gains and feed cost figures for those 2 lots. [Table 3](#) gives summer feed lot data for one half of the steers in each wintering lot. All steers were implanted with 24 mg. stilbestrol at one year of age, and when kept for the second winter, re-implanted at beginning of the winter feeding period.

Feed prices used in this study; C. silage \$7.20 ton, Alf. Hay or crested & brome hay \$18.00 ton, Oats 56¢ bu., Barley 84¢ bu., Soybean meal \$80.00 ton, Bonemeal \$6.00, Trace mineral salt \$2.80.

Gains and cost figures on the steers that were kept in dry lot from weaning to finished weights show a slight advantage in weight and net return for those which were wintered at the "normal" level. Discounting the differences in selling price per 100, which was insignificant, the lower feed cost per unit gain the first winter, and the approximate 100 lb. greater weight per head both favor feeding calves the higher winter ration. The difference in return per head between the two levels of wintering was \$16.96 in the first experiment and \$7.10 in the second.

The results from those steers which were turned out in the spring and finished the second winter are presented in [Table 4](#).

When steers were wintered at 2 levels, then summer grazed before being finished in dry lot, the net returns were slightly better for those steers which were fed lighter the first winter. The lightly wintered steers gained 16% faster on grass and 12% faster in the feed lot the following winter than did the steers which had been fed better the first winter.

One aim of this experiment is to determine whether it is more profitable to dry-lot feed all the way from weaning to market, or defer the finishing period until after a second summer's grazing. At this stage of the study, we favor feeding them out in one continuous period. The net returns per head per day favor the shorter total feeding period, as shown in [Table 5](#).

Full-Feeding Calves from Weaning to Slaughter 1958-59

Repeating an experiment of the preceding winter, 14 steer calves were placed on feed October 28, 1958. One half of the steers were implanted with 24 mg. of stilbestrol, while the others received no treatment. All were fed as one lot until May 8, when each steer received an implant of 24 mg. stilbestrol, and the group was divided into 2 lots on the basis of the October implant. The ration for both lots continued identical until all animals were graded and sold September 3, 1959. [Table 6](#) represents the winter feeding results, with a comparison of the results from the preceding year's trial.

Results of the 1958-59 winter trial showed less advantage for stilbestrol implants than the previous winter trial had shown. (.26 lb. and .06 lb. per day.) Even so, the 10.8 lb. additional gain per head from the implants was a good return for the few cents invested in implants. Again in May, all steers were implanted, regardless of previous implanting, and full-fed until early September. [Table 7](#) gives the results of the summer finishing period.

Light Weight Calves that Contracted Mucosal Disease.

Ten steers and 5 heifers, all below 300 lb. at weaning, were lotted together and full-fed a good wintering ration. They were all afflicted to some degree with colds or shipping fever early in the winter, but after antibiotic treatment appeared to get well and gain weight. In April, one steer became ill and died en route to the Veterinary laboratory. The cause was pronounced mucosal disease. Two others died before the final winter weights were taken May 8, and another was sick. The 11 remaining calves appeared healthy and had made near normal gains, so all were placed on fattening rations May 8. During the next 6 months, 5 more animals died and 2 became ill and were taken out of the lots. One year after weaning, 2 heifers and 2 steers of the original 15 calves remained and they had grown from an average 225 lb. to 988 lb. an average daily gain of 2.1 lb. The wintering phase is summarized in [Table 8](#).

These calves made reasonably good gains in spite of the disease which took all except 4 of them within one year. Earlier experience with small, late calves has been that they make about as good gains as larger calves when they are given enough feeder space so that competition at the feed trough is no problem.

Mucosal disease is hard to combat because there is as yet no cure for an infected animal. Vaccination of the entire herd once yearly, over a period of several years, is recommended to keep Listeriosis in check. Mucosal disease may be closely associated with Listeriosis.

Feeding Heifers from Weaning to Slaughter at 18 Months

Each year, the heifer calves that are not needed for replacements in the herd are fed out for slaughter. They are wintered as one lot, then divided into 3 lots for summer finishing. Two lots are bred as yearlings and one lot remains open. Several of the heifer calves which started the winter of 1958-59 became ill from Mucosal disease and were taken out before the end of the trial. All data pertaining to those animals which became ill have been removed from the tables.

Heifers gain less rapidly than steers on the same rations. The cost of 100 lb. gain on heifers is about the same as for steers. The lower daily gain of heifers is offset by their lower level of feed consumption per day. No feed additives or stimulants of any kind were used on the heifer calves in these trials.

Results of the summer feeding of bred and open yearling heifers in 1959 are given in [Table 10](#).

Two summers of feeding open and bred heifers gave mixed results. Bred heifers gained faster and more economically in the first trial, while

open heifers performed better in the second trial. When the two years data are averaged together, the bred heifers are seen to have gained faster and on less feed per unit of gain. There was a slight price advantage at market for open heifers. Bred heifers fed moldy silage, along with good quality supplements, made slower gains but neither they nor their calves appeared to suffer from the moldy feed. The heifers of the first trial gave birth to normal calves. The second group of heifers on spoiled silage will also be kept through calving.

Corn Silage Vs. Corn and Cob Meal

On October 31, 1958, 12 head of heavy yearling steers were divided into two lots to compare corn and cob meal with our conventional ration of corn silage supplements. None of our yearlings made good gains in the winter of 1958-59, yet they took on enough finish for slaughter in 139 days. The steers on corn and cob meal were slower in getting on feed than the silage fed animals. During the first 30 days, the silage fed lot gained over 75% faster than the corn and cob meal fed steers, but in each succeeding month, the meal fed animals out-gained the silage-feds. [Table 12](#) gives the results of the experiment.

In this experiment comparing corn silage with corn and cob meal, the meal fed steers outgained the silage feds, and the daily feed cost was lower on the cob meal. Feed prices used were \$7.20 per ton for silage, \$18.00 per ton for alfalfa hay, \$25.00 per ton for corn and cob meal, \$1.75 per 100 for ground barley, \$4.00 per 100 for soybean meal, and \$5.20 per 100 for bonemeal and salt mixed 3:1. The ear-corn bought for the trial was raised in S. W. North Dakota and was of above average quality, but not quite dry enough to shell and store.

It is planned to repeat this experiment when ear corn is again produced locally. Differences in the two lots on this experiment were too small to be considered conclusive.

Corn Pasturing Vs Corn Silage for Yearling Steers

The third in this series of corn pasturing vs. corn silage trials was begun September 22, 1959. Six steers were turned into a field of 5.5 acres of standing corn at the same time that 6 other steers were placed on feed in dry lot. As in 1958, we had poor corn for this trial, so took the steers out after 34 days. While almost half of the total dry matter in the field remained after the trial, there was no ear corn left. The field was sampled before and after grazing to determine how much corn was produced and how much was consumed. The field produced 5,460 lb. of potential silage per acre, and about 9 bushels of ear corn per acre. The results of the 1959 trial and a 3-year average are shown in [Table 13](#).

In each of the 3 year of this trial, the dry-lot steers fed corn silage and supplements have outgained the corn pasturing steers. The standing corn crop could be more fully utilized by animals on a maintenance ration, than by steers to be fattened. These trials indicate that fattening yearling steers in the corn field is a wasteful and inefficient practice.

Pellets, Dynafac, and Aureomycin for Steers

Last year, we reported a trial using 24 yearling steers in a 6-months feeding period, in which dynafac and aureomycin were added to a

basal silage and supplement ration. The supplements were pelleted in one lot, also. That experiment indicated that 75 mg. of aureomycin per hd. per day increased gains and profit above feed costs slightly. Dynafac did not improve gains, and reduced profits in that trial. Pelleting the concentrate and alfalfa portion of the ration increased gains and efficiency slightly, but reduced profit above feed cost about \$3.00 per head.

A similar experiment, using five lots of 6 yearling steers each, was conducted in the summer of 1959. The basal ration of corn silage, alfalfa hay, ground barley, soybean meal, and minerals composed of 3 parts bonemeal to 1 part trace-mineralized salt was fed to all lots. All steers were implanted with 24 mg. of stilbestrol at the beginning of the trial. All feeds, except corn silage, were pelleted together for 3 of the 5 lots. Dynafac was added at 4 grams per head per day (double the 1958 rate) to one pelleted ration. Aureomycin was added at 75 mg. per hd. per day in one pelleted ration and one loose ration. Barley was fed at about 4 lb. per head per day until the last month, when the daily allowance was gradually raised to 8 lb. per head per day. The results are presented in [Table 14](#).

Pelleting the hay, grain, protein and mineral supplements increased gains and feed efficiency slightly. Pelleting of the basal ration decreased profits about \$6.00 per head. Aureomycin added to the supplement increased gains about 3% in a loose ration and 6% in a pelleted ration. Profit above feed was \$4.00 per head higher when Aureomycin was added to the pelleted ration, but 80¢ per head less when added to a loose ration. Dynafac at 4 grams per head daily in a pelleted ration increased gains 5% over the same pelleted ration without dynafac. Dynafac increased profit by \$2.00 per head over the check lot, when both rations were pelleted, however this difference would have been reduced to \$1.22 per head if both lots had sold at \$22.95.

Grain on Spring Pasture for Steers 1959

The feeding of grain to yearling steers on good spring pasture has been advocated as a means of reducing cost of gains. The Dickinson Station has not recommended this practice. We have said unless the grazing is lush, gains will not be as good on pasture with grain as in dry lot with grain. Grass alone will produce rapid and inexpensive gains when grazing is good. The addition of grain on grass might increase costs more than it increases gains.

Twelve yearling steers were divided into 2 lots and turned out May 8 in a crested wheatgrass and alfalfa pasture that had been divided by an electric fence. One lot received no supplement and ne received 4 lb. per head per day of ground oats and barley, half & half. The lots were switched on the pastures so that each lot had equal time in each pasture. After 66 days the steers were weighed off because hot weather had matured the grass beyond its best grazing stage.

Daily gains averaged 3.06 lb. with grain and 2.95 without. This additional .11 lb. of gain per day was not enough to pay for the 4 lb. of grain consumed. Although grain on pasture did not pay in this case, there may be other rations and methods which will pay. One side-benefit from feeding grain on grass is the increase or extension of carrying capacity of the pasture.

At the close of the grain-on-grass trial, the two lots of steers were relotted, across lots, for a further comparison. One new lot was placed in dry lot and fed corn silage, grain and supplements, while the other was turned out on mixed tame and native grass pasture until

September 21. The latter was to be finished in dry lot and total cost figures compared with the group that went into dry lot earlier. The late pasture steers averaged 1.07 lb. gain per day from July 13 to September 21, when they were placed in dry lot for finishing. The dry-lot steers averaged 2.19 lb. gain per day from July 13 to December 10. They sold December 10 at \$23.10 and carcass grades were 5 choice, 1 good. Chilled dressing % was 60.75.

Early Spring Grazing - 1959

In this, the fifth successive year of grazing yearling steers on crested and crested-alfalfa pasture, daily gains were good and per acre yields were still at a high level. This experiment is reported fully in Dr. Whitman's section, "Grass and Legume Investigations". A summary of animal gains is reported in [Table 15](#).

Stilbestrol implants were used in 22 of the 28 steers turned out in 1958 and 1959. Results have been as follows:

	24 mg. Stilbestrol Implant		No Implant	
	1958	199	1958	1959
No. Steers	22	22	6	6
Initial wt.	555	537	538	484
Final wt.	684	661	672	603
Gain per hd.	129	124	134	119
Gain per day	2.05	2.35	2.13	2.25

Although daily gains have averaged higher on crested alfalfa pasture than on crested alone (2.16 vs 2.06), gains on the crested-alfalfa pastures fell below gains on crested alone in 1959 (2.13 vs 2.59). We might interpret this as an indication that the crested alfalfa mixture is no longer able to carry the customary 33% greater grazing load per acre than the crested carries. The yield of beef per acre has averaged 37% greater on grass and legume mixture (118 lb. vs 86 lb.), yet was only about 10% greater in 1959 (113 vs 103). Yield per acre, in terms of beef, has held up well on the crested pastures, and has always been higher on mixed pasture than on grass alone.

Stilbestrol implants have shown no definite advantage in these two spring grazing trials.

Hogs

Growing, Fattening Pigs - Winter 1958-59

The winter swine feeding work of 1958-59 had 2 objectives:

- To compare directly, pellets against meal-type rations.
- To compare meal-type rations having no protein supplements with the usual supplemented mixtures. Six lots of 10 pigs of each were lotted December 2 and fed the following rations:

Ingredients	Lot 1 meal	Lot 6 pellets	Lot 2 meal	Lot 5 pellets	Lot 3 meal	Lot 4 meal
Barley %	63		63		66	65
Oats %	32		32		33.5	.33
NDAC Supp. %	5					
DES Supp. %			5			
Steamed bonemeal %						1
Grnd. Limestone %						.5
Trace min. salt %					.5	.5

The D.E.S. Supplement contained 30% bloodmeal, 30% meat scraps, 20% steamed bonemeal, 10% trace mineralized salt, 8% ground limestone, and concentrates of A and B vitamins. Both the N.D.A.C. and D.E.S. Supplements cost about \$8.00 per 100 in Dickinson. Barley was priced at 84¢ per bu. and oats at 56¢ per bu. Grinding and mixing at home was priced at \$3.00 per ton, and custom grinding, mixing, and pelleting at \$13.00 per ton.

The results of the 1958-59 winter hog feeding work are shown in [Table16](#).

Pellet fed pigs gained slightly faster than meal fed pigs, but the difference was less than usual in this trial. Feed conversion is consistently better on Pellets than on meal. The cost of producing pork averages about \$1.00 per hundred pounds more on pelleted rations than on home-mixed meal rations. Both daily gains and feed efficiency dropped when no protein supplement was added to the grain and minerals. In spite of the poor performance on non-supplemented rations, total feed costs per 100 lb. of pork were lower than on balanced meal rations. While we cannot recommend feeding grain and minerals alone to pigs, we have a possible explanation for the fact that it did pay in this one case. These pigs were well started on a pelleted creep ration and weighed 63 lb. per head when placed on the unbalanced diet. They had passed their most critical age and size nutritionally.

Summer Pig Feeding - 1959

Last year, we reported that two lots of pigs on concrete slabs gained as fast and as cheaply as other pigs on good winter wheat pasture. This year, we put in 4 additional pens for confinement feeding. If pigs can be finished as quickly and cheaply on concrete as on grass, we should find another use for the grass. The 1959 summer tests had 2 objectives:

1. To compare 3 rations for pigs confined on concrete.
2. To compare gains and costs of gains between concrete and pasture.

Ninety spring pigs of Yorkshire and Yorkshire X Duroc breeding were lotted in 5 groups of 10 each, and 5 groups of 8 each. Three rations were fed. The NDAC supplemented ration and DES supplemented ration were the same as shown for the winter trial. The third ration was a commercial "barley" pellet. The results are given in [Table 17](#).

The North Dakota Agricultural College and commercial rations were about equal. Dickinson Experiment Station supplement had slight edge in rate and efficiency of gain. Again, the pigs on concrete performed about as well as those on pasture.

1959 Poultry Flock

Breed and number - White Plymouth Rock - 500

Hatching date - March 26, 1959

Starter Ration: Fed 300 lb. Commercial Krumlets, first 16 days, then switched to home-mixed mash.

Ration used: Yellow corn 50%, Oats 5%, Barley 6%, Soymeal 26%, Dry Buttermilk 5%, Meat scraps 2.5%, Alf. meal 1.6%, steamed bonemeal 1.5%, limestone 1.4%, salt .6%, plus B-complex supplement, Vitamins A & D premix, and Manganese.

Pullets moved to summer range - 229 out May 22, 8 wks.

Average Age of Cockerels marketed - 84 days.

Average wt. of Cockerels marketed - 3.91 lb.

Chicks were from the Blue Ribbon Hatchery at Mandan. Rate of growth of cockerels was not so rapid as in the 1958 season, but was quite satisfactory. The pullets developed very well on range and were ready to lay by Mid-August when they were housed.

The laying percentage for the 1958 pullet crop was as follows:

1958				1959							
Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July	Aug.
42	66	50	47	40	31	38	56	52	50	43	22

The 1958 pullet crop came into production very rapidly, hitting a peak 66% production in October, 1958, then falling off until late March when they revived for a good rate of laying during the spring months.

Date	Meeting and Subject	Attendance
Jan. 6-9, 1959	Annual Branch Station Conference	---
Jan. 26, 1959	Adams County Crop & Livestock Meeting	25
Jan. 27, 1959	Slope County Crop & Livestock Meeting	45
Jan. 29, 1959	Golden Valley County Feeders Tour	125
Feb. 25, 1959	Hettinger Livestock Meeting	40
March 1-4, 1959	Valley City Winter Show-Showed York gilts	---
March 24, 1959	Vet.-Ag. Class, Lemmon-Toured Station	20
April 2, 1959	Dunn Center High School Class Tour	5
April 6, 1959	Beach Elementary Class Tour	7
April 15, 1959	Cub Scout Pack 26 Tour	8
May 19, 1959	Dean Callenbach visited Station with Dr. Neal & Dr. Shackley of U.S.D.A.	---
May 20, 1959	Dr. Whitman's Class of N.D.A.C. toured Station	15
May 21, 1959	School children and parents from Hettinger County toured Station	30
May 25, 1959	Vocational Agriculture Class of Harvey, North Dakota toured Station	40
June 16, 1959	Dr. Mead and Mr. Nygard toured Station	---
June 24, 1959	Annual Crops Day	250
June 25, 1959	Medora Grazing Association, Annual Meeting	50
July 8, 1959	Prof. Murphy's Ag. class, D.S.T.C., the Cattle Business	30

July 10, 11, 1959	Northern Great Plains Sec. of A.S.R.M. annual meeting and tour of Badlands	60
July 22, 1959	S.W. District 4-H Judging Contest	75
July 24, 1959	Langdon Experiment Station, 50 th Anniversary	250
Aug. 13, 14, 1959	Toured University of Minn. Swine Farm with Mr. Douglas	---
Sept. 5, 1959	Richardton Fall Festival-Judged livestock	---
Sept. 11, 1959	Mott 4-H Achievement Day-Judged livestock with L. Johnson	---
Sept. 12, 1959	Belfield Fall Festival-Judged livestock	---
Sept. 18, 1959	Dickinson 4-H Achievement Day-Judged livestock with Mac McKenzie	---
Oct. 10, 1959	Dickinson Exchange Club-the Cattle Feeding Outlook	25
Oct. 21, 1959	N.D.A.C. Annual Swine Day, Fargo	50
Nov. 6, 1959	Church & Agriculture Institute, Dickinson	38
Nov. 12, 1959	Livestock Meeting at Halliday	45
Dec. 9, 1959	10 th Annual Livestock Research Roundup	1100
Dec. 15, 1959	Adult Education Class-Feeding livestock, Beach, North Dakota	25

Personal Activities

Radio Programs

Date	Subject
Jan. 15, 1959	Winter cow feeding
Feb. 12, 1959	Winter gains on Steer Calves
March 12, 1959	Facts about beef feeding
April 2, 1959	Swine Rations
April 23, 1959	Summer Cattle Feeding Plans
May 7, 1959	Early Spring pastures for Steers
June 4, 1959	Summer Cattle & Hog projects

July 2, 1959	Grain feeding of steers on pasture
July 30, 1959	Dry lot feeding progress report
Aug. 27, 1959	Cutting feed costs in cattle & hog feeding
Sept. 17, 1959	Feeding cattle in winter
Oct. 8, 1959	Feed cattle the year around
Oct. 29, 1959	Summer lots closed & winter lots started
Nov. 12, 1959	Fall cattle feeding under way
Dec. 3, 1959	About the coming Livestock Research Roundup
Dec. 17, 1959	Winter calves well if you intend to feed out

Television Programs

Feb. 16, 1959	Calf wintering & fattening on KDIX-TV, Extension Corner
March 3, 1959	Television Short Course - Fargo - WDAY
June 22, 1959	Showed pictures concerning Crops Day on KDIX-TV, Extension Corner

Abstracts of Research in Animal Husbandry

Beef Cow Herd

The Listeriosis outbreak that caused such poor performance of our 1958 calf crop appears to be under control. The calves of the 1959 crop are normal, except for a wide range of birth dates. It is probable that one or two of the bulls were responsible for the wide range of birth dates in 1959. One bull only sired 6 calves in about a 30 day breeding season with 30 cows.

Two Methods of Managing Steer Calves

When steer calves were kept in dry lot continuously for 12 months from weaning to market, it was more profitable to feed for more than 1 lb. daily gain the first winter than to feed for less than 1 lb. daily gain. Steers that gained 1.20 and 1.36 pounds per day the first winter made cheaper winter gains and returned more profit at the market than steers which were held down to .62 and .83 pound daily. When all calves were fed alike after the first winter, the better wintered calves returned \$7.10 and \$16.96 more profit per head than the lightly wintered steers in 2 trials. When steers were grazed about 5 months before being fattened, the margin of profit swung in favor of the lighter

first winter ration. The greater net profit per day was earned by steers that did not graze in summer, however.

Full-feeding Steers from Weaning to Slaughter

Steers implanted with stilbestrol both at weaning and at one year returned more profit than steers implanted at one year, only, when all were full-fed high roughage rations for 10 months after weaning. Daily winter gain was .26 lb. and .06 lb. greater for implanted steers in 2 trials. Subsequent summer gains were .10 lb. less and .03 lb. more for the twice-implanted steers. Feed costs per 100 lb. winter and summer gain ranged from \$12.92 to \$13.69 in 2 trials when daily grain allowance never exceeded 4 lb. per hd.

Feeding Bred Yearling Heifers vs Open Yearling Heifers

Bred heifers gained .09 lb. per day more at 23¢ less feed cost per 100 lb. gain, and sold 20¢ per 100 lb. lower than open heifers in 2-year average results at Dickinson Station. The net profit per head was only about 1 dollar more for bred heifers, not enough to pay for the extra feed eaten by the bull during breeding season.

Bred Heifers Survive and Calve When Fed Spoiled Silage

On trial with 6 yearling heifers bred and fed spoiled silage along with good hay and grain until calving brought forth normal calves and showed no ill effects. Summer gains of the heifers on moldy silage were lower than gains of heifers on good silage. A repeat trial is now in progress.

Corn and Cob Meal vs Corn Silage for Heavy Steers

In one trial with 12 steers averaging 921 lb. into the fed lot, a ration of corn and cob meal, alfalfa hay, protein and mineral supplements produced faster and cheaper gains than a ration of corn silage, ground barley, alfalfa hay, and protein and mineral supplements. Average daily gain and cost per 100 lb. gain were 1.82-1.68, \$20.33-\$24.72. Neither lot gained as well as was expected. The trial will be repeated.

Corn Pasturing vs Corn Silage in Dry Lot

In 3 successive years, a group of long yearling steers turned into a field of standing corn in the fall has made less gain than a similar group of steers placed in dry lot and fed corn silage. The same supplements were fed to each group. Average daily gain for the 3 trials was 3.20 lb. in dry lot and 2.78 lb. in the corn field. Dry lot steers consumed an average 2263 lb. of corn silage per 100 lb. gain while steers in the corn field consumed an average 4095 lb. of standing corn per 100 lb. gain.

Pelleted Supplements, Dynafac and Aureomycin for Steers

Steers fed corn silage and pelleted supplements gained slightly faster than steers fed corn silage and the same supplements not pelleted.

The difference was .15 lb. per day in the first trial and .05 lb. per day in the second trial. The feed cost of 100 lb. gain averaged \$1.11 higher in the pellet lots than in loose supplement lots. Pelleting the feed cost \$10.00 per ton.

In one trial, 2 grams of dynafac per head in the ration did not improve gains; while in a second trial, 4 grams of dynafac per head increased gains .14 lb. per day. This increased gain, plus 20¢ per hundred higher selling price resulted in \$2.22 greater profit per head for the dynafac Supplemented steers.

Aureomycin added at 75 mg. per head daily increased gains and profits slightly. Added gain from Aureomycin was .12 lb. per day in one comparison, .08 lb. in a second, and .16 lb. in a third comparison in which pelleted supplements were fed. The average feed cost per 100 lb. gain was only \$.07 lower for the Aureomycin Supplemented lots, and profit per head averaged \$2.72 higher.

In all the above lots the basal ration was a full feed of corn silage, 4.8 lb. ground barley, 2.5 lb. alfalfa hay, 1.5 lb. soybean meal, and .2 lb. bonemeal and trace mineralized salt 3:1.

Grain on Pasture for Yearling Steers

In one 66 day trial, the feeding of 4 lb. ground barley and oats mixed 1:1 to steers on good spring pasture did not pay. Supplemented steers gained 3.06 lb. per day, and non-supplemented steers gained 2.95 lb. per day. The cost of the grain supplement was greater than the value of additional gain.

Pelleted vs Meal Type Rations for Fattening Pigs

Two similar barley and oats rations were compared in both pelleted and meal forms for fattening fall pigs. Average daily gain was .09 lb. higher on pelleted rations, and feed per 100 lb. gain was 40 lb. less on pelleted rations. In spite of the improved performance on pelleted rations, cost of 100 lb. gain averaged \$1.06 higher than on meal rations. The charge of \$10.00 per ton for custom pelleting appears too high under conditions of this trial.

Confinement on Concrete Floors vs Pasture for Finishing Pigs

Three pelleted rations were fed in duplicate lots on concrete and 2 of the rations were fed on pasture to spring pigs. One ration was a commercial barley pellet, one was custom made using a commercial supplement (NDAC), and one was custom made using a home-mixed supplement (DES). No great differences were apparent between the performance of pigs on the 3 rations. Two lot averages on concrete for rate and conversion were 1.31-367 for NDAC, 1.35-371 for commercial, and 1.46-355 for D.E.S. Feed cost per 100 lb. gain was \$9.95, \$11.89, and \$9.62 for the 3 above rations. Freight on the commercial ration made it too expensive to compete. Four lot averages on concrete for rate and conversion were 1.33-369 compared to 1.34 and 353 for the same rations on pasture.

Table 1. Beef breeding herd record for 1959.

	Group 4	Group 5	Group 6	Group 7 (Yearlings)
No. cows	28	26	27	19
Av. Wt. at weaning Oct. 30, 58	1036	1093	1045	
Av. Wt. at weaning Nov. 2, 59	1008	1082	1020	901
Daily Ration, winter of '58-'59.				
Corn silage	25	25	25	25
Crested & Brome hay	12	12	12	12
Calf Production, 1959.				
No. calves born alive	26	23	26	19
No. calves weaned	26	22	23	15
No. dry cows	2	3	1	0
Av. birth wt.*	74.1	72.6	68.1	62.5
Av. weaning wt.*	358.6	368.8	306.9	280.0
Average weaning age, days	187	177	159	193
Av. wt. per day of age	1.92	2.09	1.94	1.45
*Birth & weaning wts. are for calves of known birth wts. only - 25 in lot 4, 17 in lot 5, 21 in lot 6, and 11 in lot 7.				

Table 2. Wintering phase for steers, 2 years data.

	Normal Ration		Low Ration	
	1957-58	1958-59	1957-58	1958-59
No. steers per lot	16	14*	16	14**
Weaning wt.	360.0	380.4	360.3	388.9
Spring wt.	606.6	607.9	511.3	506.4
Days on feed	181	189	181	189
Av. daily gain	1.36	1.20	.83	.62
Average Ration				
Corn silage	25	24	20	20
Cr. Wht-grass hay	4	3.9	4	4
Whole oats	2	2	0	0
Av. feed cost per 100 lb. gain	\$12.00	\$12.89	\$13.27	\$17.24
*Originally 16 hd., but 2 were removed because of mucosal disease.				
**Substitution of 2 hd. was made Jan. 31, so only 14 hd. are included in Table.				

Table 3. Summer dry-lot finishing of one half the steers in each lot above.

	From normal winter lot		From low winter lot	
	1958	1959	1958	1959
No. steers per lot	8	5	8	8
Initial wt.	605.6	633.0	507.5	503.8
Final wt.	1053.8	1125.0	946.9	1014.4
Days on feed	182	174	182	174
Av. daily gain	2.46	2.83	2.41	2.93
Average Ration				
Corn silage	48	54	45	48
Alf. Hay	2.5	2.5	2.5	2.5
Soybean meal	1.5	1.5	1.5	1.5
Grnd. barley	4.7	4.7	4.7	4.7
Bonemeal & salt, 3:1	.2	.2	.2	.2
Av. feed cost per 100 lb. gain	\$14.16	\$13.17	\$13.95	\$11.86
Live grades as sold	All choice	3 choice 1 good 1 std.	2 choice 5 good 1 std.	4 choice 3 good 1 std.
Selling price per 100	\$25.50	\$23.00	\$25.15	\$23.10
Return above feed costs, weaning to market	\$84.11	\$71.37	\$67.15	\$64.27

Table 4. Summer grazing of yearlings followed by winter finishing:

	From normal winter lot		From low winter lot	
	1958	1959	1958	1959
No. steers per lot	8	8	8	8
Wt. to grass	606.9	607.5	510.6	503.1
Wt. off grass	858.1	830.6	800.6	761.3
Days of grazing	152	136	152	136
Av. daily gain	1.65	1.64	1.91	1.90
Feed cost of 100 lb. gain (@5¢/hd./day)	\$3.03	\$3.05	\$2.62	\$2.64
Wt. into feed lot	858.1	830.6	800.6	761.25
Final wt.	1111.9	in progress	1084.4	in progress
Days on feed	173		173	
Av. daily gain	1.47		1.64	
Average Ration				
Corn silage	58		58	
Alf. Hay	2.50		2.50	
Ground barley	4.05		4.05	
Soybean meal	1.68		1.68	
Bonemeal & salt, 3:1	.27		.27	
Feed cost per 100 gain	\$26.12		\$23.44	
Live grades as sold	1 ch, 5 G., 2 std.		1 ch., 5 G., 2 std.	
Selling price per 100	\$24.80		\$25.35	
Return above feed costs, weaning to market	\$82.95		\$89.58	

Table 5. Value of gains above feed costs per head per day for steers.

	Normal first winter	Low first winter
1957-363-day direct method	\$.232	\$.185
1958-363-day direct method	.197	.178
1957-506-day deferred method	.164	.178
1958-deferred method	not completed	

Table 6. Feeding steer calves in winter, with and without stilbestrol implants - 2 years results.

	1958-59		1957-58	
	Implanted 24mg.	Non-implanted	Implanted 24mg.	Non-implanted
No. per lot	7	7	7	7
Initial wt.	451.4	451.4	396.4	397.1
Final wt.	798.6	787.8	747.1	700.7
Av. daily gain	1.81	1.75	1.97	1.71
Days on feed	192	192	177	177
Daily feed consumption (all steers)				
Corn silage	32.6		31.1	
Alf. hay	1.5		1.5	
Soybean meal	1.0		1.0	
Ground oats	3.0		3.0	
Steamed bonemeal	.15		.15	
Trace min. salt	.05		.05	
Feed per 100 lb. gain				
Corn silage	1820		1683	
Alf. hay	84		81	
Soybean meal	55.9		54.1	
Ground oats	167.6		162.3	
Steamed bonemeal	8.4		8.1	
Trace min. salt	2.8		2.7	
Feed cost/100 lb. gain	\$13.06		\$12.36	
Feed costs: Corn silage \$7.20 ton, Alf. hay \$18.00 ton, Soybean meal \$4.00/cwt., Oats 56¢ bu., barley 84¢ bu., bonemeal \$6.00/cwt., salt 2.80/cwt.				

Table 7. Summer finishing steers - two years.

	1958-59		1957-58	
	Implanted in fall and spring	Implanted in spring only	Implanted in fall & spring	Implanted in spring only
Steers in lot	7	7	7	7
Days on feed	118	118	126	126
Initial wt.	798.6	787.9	747.1	700.7
Final wt.	1111.4	1097.1	1053.6	1020.0
Av. Daily gain	2.65	2.62	2.43	2.53
Daily ration				
				(Both lots)
Corn silage	59	59	48	
Alfalfa hay	2.2	2.2	2.2	
Soybean meal	1.5	1.5	1.5	
Ground barley	4.0	4.0	4.0	
Bonemeal & salt, 3:1	.2	.2	.2	
Feed per 100 lb. gain				
Corn silage	2222	2238	1936	
Alfalfa hay	81	82	101	
Soybean meal	56.5	57.2	60.9	
Ground barley	151	153	162.4	
Bonemeal & salt, 3:1	7.6	7.6	8.1	
Feed cost /100 lb. summer gain	\$14.03	\$14.19	\$13.55	
Feed cost /100 lb. winter & summer gain	13.41	13.69	12.92	
Av. selling price per 100 lb.	24.95	25.20	24.15	24.20
On-the-hoof grades	3 ch., 4 g.	5 ch., 2 g.	7 ch.	7 ch.
Cost of steer calves per 100 lb.	\$33.00	\$33.00	\$24.00	\$24.00

Profit per hd. above feed and first cost	39.30	38.82	75.79	68.44
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Table 8. Wintering light weight calves, 1958-59	
No. calves	12 (15 started, 12 finished)
Initial wt.	237.5
Final wt.	515.0
Days on feed	189
Av. D. gain	1.47
Daily feed consumption, after taking out feed for those which died -	
Corn silage	19.2
Alf. hay	1.8
Ground oats	3.2
Soybean meal	1.05
Bonemeal & salt, 3:1	.21
Approximate feed cost of 100 lb. gain = \$13.19	

Table 10. Dry-lot Feeding of Open and Bred Heifers, 1959.

	Bred Heifers	Bred Heifers Moldy silage	Open Heifers
No. animals in lot	5	6	6
Days on feed	174	174	174
Initial wt. May 8	573	556	558
Final wt. Oct. 29	896	842	887
Av. daily gain	1.86	1.64	1.89
Daily Ration			
Corn silage	39	37	38
Alfalfa hay	2.6	2.6	2.6
Soybean meal	1.5	1.5	1.5
Ground barley	4.67	4.67	4.67
Bonemeal & salt, 3:1	.20	.20	.20
Feed/100 lb. gain			
Corn silage	2093	2226	1998
Alfalfa hay	140	158	131
Soybean meal	81	91	79
Ground barley	252	284	247
Bonemeal & salt, 3:1	11	12	11
Feed cost/100 lb. gain	\$17.01	\$18.69	\$16.43
Selling price per 100	\$22.00	not sold	21.90
On the hoof grades	4 ch., 1 G.		4 ch., 1 G., 1 std.
Value of grain after deducting feed costs	\$16.12		\$18.00

Table 12. Corn silage Vs. corn and cob meal for big yearlings.

	Corn silage lot	Corn and cob meal lot
Initial wt.	921	921
Final wt.	1154	1173
Days on feed	139	139
Av. daily gain	1.68	1.82
Av. daily ration		
Corn silage	60	0
Corn and cob meal	0	19.5
Ground barley	6.	0
Alfalfa hay	2.5	5.7
Soybean meal	1.5	1.5
Bonemeal & salt, 3:1	.27	.27
Feed per 100 lb. gain		
Corn silage	3546	0
Corn and cob meal	0	1072
Ground barley	355	0
Alfalfa hay	149	316
Soybean meal	89	83
Bonemeal & salt, 3:1	16	15
Feed cost per 100 lb. gain	\$24.72	\$20.33
Selling price per 100	24.55	24.40
On the hoof grades	4 G., 2 std.	1 ch., 3 G., 2 std.
Return per hd. above feed	\$-.40	\$10.28

Table 13. Corn pasturing vs corn silage for Yearling Steers.

	1959		3-year weighted Av.	
	Corn field	Silage in Dry lot	Corn field	Silage in Dry lot
Initial wt.	792.5	791.7	770.2	770.3
Final wt.	863.3	869.2	901.7	916.2
Av. daily gain	2.08	2.28	2.78	3.20
Days on trial	34	34	47.3	45.5
Feed per 100 lb. gain				
Standing corn	3390 (50% of crop)		4095	0
Corn silage	0	2194	0	2263
Alfalfa hay	0	110	75	78
Soybean meal	96	88	66	62
Steamed bonemeal & salt, 3:1	9.6	8.7	6.6	6.2
Beef produced per acre of corn	77	249	167	364

Table 14. Pellets, dynafac, and aureomycin for yearling steers - 1959 - 174 days.

	Check loose	Check pelleted	Aureomycin loose	Aureomycin pelleted	Dynafac pelleted
No. steers per lot	6	6	5*	6	6
Initial wt.	459	454	437	453	454
Final wt.	917	920	908	947	945
Av. daily gain	2.63	2.68	2.71	2.84	2.82
Daily ration					
Corn silage	43	43	43	45	45
Alfalfa hay	2.5	2.5	2.5	2.5	2.5
Ground barley	4.7	4.7	4.8	4.7	4.7
Soybean meal	1.5	1.5	1.5	1.5	1.5
Bonemeal & salt, 3:1	.2	.2	.2	.2	.2
Dynafac, (grams)					4
Aureomycin, (mg.)			75	75	
Feed per 100 lb. gain					
Corn silage	1617	1593	1604	1596	1613
Alfalfa hay	95	93	94	88	89
Ground barley	177	175	177	165	166
Soybean meal	27.0	56.0	55.4	53.0	53.0
Bonemeal & salt, 3:1	7.6	7.5	7.4	7.1	7.2
Dynafac, (grams)					142
Aureomycin, (mg.)			2.77	2.65	
Feed cost per 100 gain	\$12.45	\$13.90	\$12.62	\$13.75	\$14.11
Selling price per 100	23.00	22.95	22.70	23.20	23.15
Live grades	3 ch., 2 G. 1 std.	1 ch., 4 G., 1 std.	2 ch., 3 G.	2 ch., 4 G.	1 ch., 3 G., 2 std.

Return per hd. above feed costs, for the gain only	\$48.27	\$42.15	\$47.48	\$46.62	\$44.37
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Pelleted ration costs include \$10.00 per ton processing charge. Dynafac priced at \$1.75 per lb. Aureomycin priced at 11.2¢ per gram. All other ingredients priced as in the foregoing experiments.

*Mucosal disease took one steer from this lot.

Table 15. Steer gains on early spring grazing of 8 - acre lots.

		No. Hd.	Date In	Wt. In	Date Off	Wt. Off	Daily Gain	Gain/ Acre
Crested Wheatgrass	1955	7	May 4	494	July 5	568	1.44	64
Crested Wheatgrass	1956	6	May 17	520	June 30	601	1.79	60
Crested Wheatgrass	1957	6	May 4*	478	July 3	622	2.44	108
Crested Wheatgrass	1958	6	April 29	553	June 30	680	2.02	95
Crested Wheatgrass	1959	6	May 8	529	June29	666	2.59	103
5-year Average				515		627	2.06	86
Crested-Alfalfa	1955	7	May 4	494	July 5	600	2.07	92
Crested-Alfalfa	1956	8	May 17	520	June 30	616	2.14	96
Crested-Alfalfa	1957	9	May 4*	498	July 3	639	2.36	158
Crested-Alfalfa	1958	8	April 29	550	June 30	683	2.11	133
Crested-Alfalfa	1959	8	May 8	523	June29	636	1.13	113
5-year Average				517		635	2.16	118

*Two steers in each pasture were turned out 6 days late.

Table 16. Pellets, meal, and rations without protein supplements for pigs.

	Lot 1 NDAC meal	Lot 6 NDAC pellets	Lot 2 DES meal	Lot 5 DES pellets	Lot 3 Meal and salt	Lot 4 Meal plus minerals & salt
No. pigs per lot	\$10.00	\$10.00	9*	\$10.00	\$10.00	\$10.00
Initial wt.	\$62.70	\$62.70	\$61.00	\$62.70	\$62.70	\$63.10
Final wt.	\$213.20	\$214.60	\$203.90	\$223.50	\$192.70	\$194.20
Av. daily gain	\$1.34	\$1.36	\$1.28	\$1.44	\$1.16	\$1.17
Days on trial	\$112.00	\$112.00	\$112.00	\$112.00	\$112.00	\$112.00
Feed per 100 lb. gain	\$412.00	\$386.00	\$452.00	\$397.00	\$447.00	\$460.00
Feed cost per 100 lb. gain	\$9.11	\$10.46	\$9.99	\$10.76	\$8.54	\$8.97

*One pig died.

Table 17. Three pelleted rations on concrete and 2 on pasture, 1959

	Concrete-NDAC		Concrete-Com'cl.		Concrete-DES	
	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6
No. pigs per lot	10	7*	9*	8	10	8
Av. initial wt.	49.5	36.4	49.3	36.5	49.9	36.5
Av. final wt.	186.5	186.4	196.4	182.2	201.7	203.2
Av. daily gain	1.34	1.29	1.44	1.26	1.49	1.44
Days on feed	102	116	102	116	102	116
Feed per 100 lb. gain	366	368	372	371	365	345
Feed cost per 100 lb. gain	\$9.92	\$9.97	\$11.90	\$11.87	\$9.89	\$9.35

Table 17. Cont'd

	Pasture-NDAC		Pasture-Com'cl.	
	Lot 7	Lot 8	Lot 9	Lot 10
No. pigs per lot	10	8	10	7*
Av. initial wt.	49.7	37.1	49.9	37.0
Av. final wt.	184.5	188.2	193.4	192.1
Av. daily gain	1.32	1.30	1.41	1.34
Days on feed	102	116	102	116
Feed per 100 lb. gain	384	343	330	354
Feed cost per 100 lb. gain	\$10.41	\$9.30	\$10.56	\$11.33
4 lot averages of:				
	Av. daily gain		Feed/100 gain	
NDAC and commercial on concrete	1.33		369	
NDAC and commercial on pasture	1.34		353	
All pigs on NDAC supplement	1.31		365	

All pigs on Commercial ration	1.36	357
2 lot averages on concrete of:		
NDAC	1.31	367
DES	1.46	355
Commercial	1.35	371
*One pig lost due to erysipelas in these lots.		