DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION

SCOTT, SASK.

REPORT OF THE SUPERINTENDENT

G. D. MATTHEWS, B.S.A.

FOR THE YEAR 1929

A modern method of seeding.

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DOMINION EXPERIMENTAL STATION, SCOTT, SASK.

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SEASON

A dry fall followed by a dry spring provided little soil moisture for crop growth. May had less than half the normal precipitation and twenty degrees of frost three weeks after wheat was sown. Under such dry and cold soil conditions grain made slow growth, but weeds made comparatively better progress. Temperatures gradually became warmer but drought continued until June 17 when two inches of rain brought back the crops to their normal colour, but was not sufficient to fully recover them from the setback received. Advancing summer temperatures were accompanied by low precipitation, winds of high velocity and consequent high evaporation. Possibilities of good yields gradually faded under such conditions. Frost did not damage grain and harvest weather was comparatively good. The effect of the season on wheat was to produce low yield and high quality.

The dry conditions mentioned in the first sentence undoubtedly influenced low yields of grasses and clovers. Another influence was winter-killing which may be explained by dry conditions accompanied by severe winter temperatures and practically no snow cover. An unusually cold spell existed for eighteen days in the latter part of January and the first part of February. During this period the maximum temperature did not rise above zero and the average minimum temperature was slightly less than thirty below. Other forage crops produced low yields for reasons stated in the preceding paragraph.

Fall and spring dry soil conditions together with the severe winter temperatures already outlined, influenced the winter-killing occurring in perennial horticultural plants. Another influence was the temperature of more than sixty degrees at the end of March promoting signs of early growth, followed by temperatures of almost ten below early in April. Winter-killing was severe on strawberries, raspberries and gooseberries, but to a lesser extent on currants. During the summer, growth of perennial plants was short and all blooms of flowering plants were small. The light crop of vegetables harvested was most pronounced in potatoes and vine crops.

Abnormalities of the season can be better understood by comparisons with past records. Sunshine was the only weather factor establishing no new records. In temperatures, March produced a new high maximum and a new high average temperature, May not only produced a new low temperature for that month but broke the previous record on four occasions, and the maximum temperature in October equalled the previous record for that month. New high records of total miles of wind were established for the months of June, July, August and November, and a new high total for one hour of 61 miles was recorded on July 20 between 4 and 5 p.m. Evaporation was the highest on record for the months of June and August, and a new high total was established for the growing months. Slightly more than half of the total rainfall for May, June and July fell one time and new low precipitation records were made for July and August. The variable weather conditions recorded during the year should be kept in mind when studying the crop results stated in this report.

TABLE 1.—METEOROLOGICAL RECORDS 1929

Month	Temperature °F.						Precipitation				Sunshine		Wind		Evaporation	
	Maximum		Minimum		Mean											
	Highest	Mean maximum	Lowest	Mean minimum	1929	Average 18 years	Rain	Snow	Total 1929	Average 18 years	1929	Average 18 years	1929	Average 7 years	1929	Average 7 years
							in.	in.	in.	in.	hours	hours	miles	miles	in.	in.
January	37·5	−1·04	−45·0	−18·54	−9·79	−0·30	0·07	4·75	0·54	0·55	80·7	88·5	7,587	8,889	.....	.....
February	35·0	8·15	−39·0	−10·64	−1·25	3·38	.....	4·84	0·49	0·49	105·2	117·5	7,113	8,287	.....	.....
March	62·5	36·42	−17·5	16·05	26·24	15·17	0·08	3·60	0·44	0·58	156·9	158·5	9,183	9,859	.....	.....
April	70·5	43·03	−9·5	23·08	33·05	36·94	0·14	8·00	0·94	0·94	164·2	208·8	9,146	9,690	.....	.....
May	85·6	59·15	12·0	31·43	45·29	49·14	0·63	.....	0·63	1·36	287·9	264·3	10,224	10,333	4·64	4·67
June	84·0	70·43	31·5	44·73	57·58	57·44	2·64	.....	2·64	2·18	271·8	271·2	11,220	9,190	5·42	4·04
July	98·0	78·31	34·1	48·58	63·44	62·39	0·67	.....	0·67	2·31	362·8	307·2	10,639	8,554	6·70	5·71
August	93·6	79·13	33·3	47·00	63·06	60·18	0·45	.....	0·45	1·83	309·5	263·9	9,546	7,864	7·67	4·44
September	75·4	59·83	23·4	34·76	47·29	49·72	1·32	.....	1·32	1·40	163·2	181·6	8,020	8,347	2·64	2·96
October	79·7	47·06	12·2	26·84	36·95	37·93	0·12	1·00	0·22	0·61	176·7	146·9	8,176	8,698	.....	.....
November	59·0	34·68	−22·0	15·82	25·25	22·32	0·19	6·12	0·80	0·38	81·5	101·5	10,924	8,285	.....	.....
December	34·8	10·35	−42·0	−6·00	2·17	6·92	.....	8·25	0·83	0·52	70·7	79·4	8,198	8,849	.....	.....
Totals	.....	.....	.....	.....	.....	.....	6·31	36·56	9·97	13·15	2,231·1	2,189·3	109,976	106,845	27·07	21·82

TABLE 2—DATES OF FARM OPERATIONS, 1929

Farm operations	Began	Finished
Spring ploughing	April 15	April 30
Harrowing	" 15	" 10
Packing	" 15	May 11
Seeding wheat	" 22	" 6
Disking	May 6	" 18
Seeding oats	" 8	" 18
Seeding barley	" 11	" 11
Ploughing summer-fallow	" 29	June 13
Packing summer-fallow	" 29	" 13
Harrowing summer-fallow	" 30	Aug. 8
Seeding rye grass	June 10	June 10
Cultivating summer-fallow	" 11	Oct. 1
Cutting rye grass	July 16	July 16
" sweet clover	" 9	" 15
" Marquis wheat	Aug. 13	Sept. 4
" Garnet wheat	" 12	Aug. 16
" Reward wheat	" 2	" 6
" Banner oats	" 9	" 28
" barley	" 21	" 21
" fall rye	" 9	" 9
Threshing	" 28	Sept. 24
Seeding sunflowers	May 21	May 25
Cutting sunflowers	Sept. 5	Sept. 6
Filling silo	" 5	" 6
Disking	Oct. 22	Oct. 23

ANIMAL HUSBANDRY

Live stock work at this Station is under the supervision of E. Van Nice, B.S.A., who also supervises the work in poultry and apiculture.

HORSES

The horses at this Station consist chiefly of pure-bred Percherons and are used for farm work. One foal was raised in 1929—sired by Presto —8084—, a class A stallion, to which stallion several mares were bred for 1930 foals.

CATTLE

The Dual Purpose Shorthorn is the only breed of cattle at the Scott Station. The herd sire, Red Marquis —156496—, since coming to the Station late in 1927, has sired 14 male calves and 12 females which were born before December 31, 1929. There is a waiting list of farmers on file who want to purchase bull calves as soon as available, and a second waiting list is for adult females, a few of which are disposed of occasionally to reduce the herd. During the latter part of 1929, four cows were sold to farmers for breeding purposes and two which were not suitable for breeding were sold for beef.

The herd is tested annually for tuberculosis and is listed among the Canadian Tuberculosis-free Accredited Herds, certificate number 4215. Blood samples are taken periodically, which are used for infectious abortion tests; thus determining if the herd is free from this disease.

TABLE 3—MILK RECORDS COMPLETED DURING 1929

Name of cow	Lactation period	Days milking	Production of milk	Average per cent fat
			lb.	%
Scott Qu'Appelle	1st	377	6,187	4·2
Scott Prairie Rose	1st	336	5,815	5·2
Indian Head Pride 3	5th	363	5,571	3·8
Scott Pride 2	4th	275	5,371	4·0
Prairie Red Rose 13	7th	405	5,370	4·2
Jess Mayflower 2	7th	303	5,329	4·3
Scott Prairie Rose 2	2nd	288	4,425	4·2
Scott Qu'Appelle 2	1st	287	3,908	4·2
Scott Rosebud	2nd	327	3,794	4·5
Scott Mayflower 2	1st	307	3,289	4·0
Scott Pride 4	2nd	248	3,162	4·2
Scott Red Rose 2	1st	299	2,706	5·0

Some cows listed here have higher records, but these are the records completed in 1929 and were made without special feeding or forcing. The meal ration used during the winter consists of three parts oat chop, three parts bran, two parts oilcake meal and 1½ parts barley chop, all by weight. This is supplemented by sunflower silage and prairie hay.

Portion of a dual purpose Shorthorn herd.

STEER-FEEDING

A steer-feeding experiment was conducted from November 27, 1928, to May 13, 1929, with a view to ascertaining the value of frozen wheat and sweet clover hay for fattening steers.

A car of steers purchased at Bashaw, Alta., was divided into three lots. All lots were given free access to oat straw. Two lots received oat and barley chop. In one case this was supplemented with 10 pounds of sweet clover hay per head daily, while the other lot was used as a check. The third lot received the same quantity of meal but the barley chop was replaced with frozen wheat chop. The steers were confined to their pens in a single ply, lumber shed.

TABLE 4—STEER-FEEDING EXPERIMENT, 1928–29

—		Oats and barley	Oats and frozen wheat	Oats and barley with sweet clover
Number of steers in lot		6	6	6
Initial gross weight, Nov. 27	lb.	6,070	6,185	5,950
Initial average weight, Nov. 27	"	1,012	1,031	992
Final gross weight, May 13	"	7,330	7,410	7,520
Final average weight, May 13	"	1,222	1,235	1,253
Total gain per lot	"	1,260	1,225	1,570
Average gain per head in 167 days	"	210	204	261
Average daily gain per head	"	1·26	1·22	1·57
Oat chop at 34 cents per bushel plus $1.50 per ton for crushing	"	6,805	6,805	6,805
Barley chop at 60 cents per bushel plus $1.50 per ton for crushing	"	2,263	.....	2,263
Frozen wheat chop at 60 cents per bushel plus $1.50 per ton for crushing	"	.....	2,263	.....
Oilcake meal at $2.70 per cwt	"	104	104	104
Oat straw at $2.00 per ton	"	15,035	15,035	5,283
Sweet clover hay at $10.00 per ton	"	.....	.....	10,020
Salt at $1.60 per cwt	"	23	14	15
Meal required per 100 pounds gain	"	649	667	521
Cost of all feed per lot	$	121 35	115 55	161 64
Cost of all feed per 100 pounds gain	$	9 63	9 43	10 30
Initial cost of steers per head at $8.24 per cwt	$	83 36	84 94	81 71
Cost of all feed per head plus initial cost of steers per head	$	103 59	104 20	108 65
Selling price per head at Scott at $9.75 per cwt	$	119 15	120 41	122 17
Return per head less initial cost and cost of feed	$	15 56	16 21	13 52

Sweet clover has increased the gain by over 50 pounds per steer, but when allowing $10 per ton for the hay, the cost of feed more than balances the value of extra gains.

A similar experiment conducted one year previous, showed a net profit per head of $2.67 in favour of the sweet clover lot. It would appear that if sweet clover was plentiful and difficult to market at a reasonable price, steers would provide a profitable market but it would seem unwise to purchase sweet clover at $10 per ton for steers on a full grain ration.

Frozen wheat, combined with oats, failed to produce as great a gain as barley used in the same way, but due to the lower price in wheat it resulted in a greater net return. In view of the small difference in total gains produced, it would be reasonable to assume that when frozen wheat approached the level of barley in price it might well be used to replace barley for steer feeding.

SHEEP

Grade flocks of three breeds are found at this Station—Shropshire, Cheviot, and Rambouillet. Findings during the year of 1929 will be submitted here and the reader is referred to the annual report from this station for 1928 for further comparisons of these breeds.

In addition to grade flocks a few pure-breds of each breed are on hand.

TABLE 5—LAMB AND WOOL CROPS, 1929

Breed	Number of ewes	Per cent lambs born	Per cent lambs weaned	Average weight in Nov.	Average amount of wool per ewe	Principle grade
Shropshire	20	170	90	74·4	8·7	Low medium staple.
Cheviot	23	152	91	73·5	7·9	Low medium staple and low staple.
Rambouillet	37	151	122	85·7	10·8	Fine staple.

The Rambouillet ewes have again raised a higher percentage of lambs to weaning age, and the lambs averaged over 10 pounds heavier than either of the other breeds.

The average weight of wool was 8·8 pounds for the three flocks including yearlings. The average clip for each breed was, Shropshire 8·8 pounds, Cheviot 7·1 pounds, and Rambouillet 10·0 pounds.

TABLE 6—GRADING STATEMENT

Grades of wool	Rambouillet	Shropshire	Cheviot
	%	%	%
Fine staple	87·6	.....	.....
Fine clothing	5·0	.....	.....
Fine medium staple	5·0	.....	.....
Medium staple	2·4	29·3	.....
Low medium staple	.....	63·9	57·0
Medium clothing	.....	6·8	.....
Low staple	.....	.....	43·0

Since the Rambouillet has for a number of years, consistently raised a higher percentage of larger lambs and clipped a heavier fleece of higher quality than either of the other two breeds, it would seem to be a very desirable breed for the prairie farm flock.

FROZEN WHEAT FOR FEEDER LAMBS

When the price of frozen wheat drops below that of feed grain, its value as a feed determines whether it should be fed or sold at the low price.

During the winter of 1928-29, thirty lambs were divided into two lots for the purpose of testing the value of feed wheat.

TABLE 7—FROZEN WHEAT FOR FEEDER LAMBS

—		Frozen wheat	Oats
Number of lambs in lot		15	15
Initial gross weight	lb.	1,359	1,302
Initial average weight	"	91	87
Finished gross weight	"	1,537	1,510
Finished average weight	"	102	101
Total gain in 90 days	"	178	208
Average gain per head	"	11·9	13·9
*Amount of oats eaten at 1·5 cents per pound plus crushing	"	.....	1,769
*Amount of wheat eaten at 1 cent per pound plus crushing	"	1,769	.....
Amount of silage eaten at $3.00 per ton	"	1,769	1,769
Amount of oat straw eaten at $2.00 per ton	"	2,250	2,250
Total cost of feed	$	23 92	32 76
Grain required per 100 pounds gain	lb.	99	85
Total feed cost per 100 pounds gain	$	13 44	15 75

* Cost of crushing, $1.50 per ton.

Slightly greater gains were made in the oat lot but since the cost of oats was higher, the feed cost per hundred pounds gain proved to be in favour of the wheat lot. This experiment is being repeated as it would not be fair to draw conclusions from the results of one test.

SWINE

The Yorkshire is the only breed of swine at this Station. Thirty-eight head have been sold for breeding purposes during the year. These consisted of twenty-one males and seventeen females. Approximately twenty brood sows are used for spring litters and six to eight for two litters a year. The sows are bred for fall pigs so that they will farrow before September 1. This gives the pigs time to pass the weaning age and to attain a good size before the severe weather comes.

The breeding stock is treated regularly for worms and moved annually to land where swine has not been for two years. A mineral mixture used for both breeding stock and feeders, is made up as follows: Sulphur, 1 pound, slacked lime, 5 pounds, salt, 20 pounds, and fine soft coal, 75 pounds. This is kept before the pigs in a small trough and to the salt which is used in preparing the mixture for the brood sows during the gestation period, two per cent of potassium iodide is dissolved and added with a view to guarding against hairlessness in pigs.

WINTER-FEEDING EXPERIMENT.—Frozen Wheat vs. Barley (fed with oats)

During the winter of 1928-29, eighteen fall pigs were divided into two lots for the purpose of testing the value of frozen wheat for growing pigs in winter.

TABLE 8—FROZEN WHEAT VS BARLEY (Fed with oats)

—		Oats and frozen wheat	Oats and barley
Number of pigs in each lot		9	9
Initial gross weight of lot	lb.	408	409
Initial average weight	"	45·3	45·4
Final gross weight of lot	"	1,799	1,795
Final average weight per pig	"	199·9	199·4
Total gain per lot during test (145 days)		1,391	1,386
Average gain per pig	"	154·6	154·0
Oat chop consumed, at 1·8 cents per pound	"	2,755	2,755
Barley chop consumed, at 1·25 cents per pound	"	.....	1,587
Frozen wheat chop consumed, at 1 cent per pound	"	1,587	.....
Tankage consumed, at 2·5 cents per pound	"	583	583
Oilcake meal consumed, at 3·5 cents per pound	"	544	544
Bran consumed, at 1·5 cents per pound	"	544	544
Total quantity of meal consumed	"	6,013	6,013
Meal required per 100 pounds gain	"	432	432
Total cost of feed	$	107 24	111 21
Cost of feed per 100 pounds gain	$	7 71	8 02
Returns per head, at 10 cents per pound less cost of all feed	$	8 07	7 59

The meal required per hundred pounds gain is the same in both lots. The wheat has produced only a very slight increased gain but on account of its being one quarter of a cent per pound lower in price than barley, the cost of feed per hundred pounds gain has been reduced and the returns over feed costs are 48 cents per head higher. With such a small difference it would be reasonable to believe that frozen wheat should be as low, or below barley in price before it should be used in its place. The summer-feeding tests of frozen wheat are reported below and another winter feeding test of this nature is under way during the winter of 1929-30.

SUMMER-FEEDING EXPERIMENTS

TABLE 9.—BARLEY VS. FROZEN WHEAT (Fed with Oats)

—		Oats and barley	Oats and frozen wheat
Number of pigs in each lot		10	10
Initial gross weight of lot	lb.	360	354
Initial average weight	"	36·0	35·4
Final gross weight of lot	"	1,878	1,901
Final average weight	"	187·8	190·1
Total gain per lot, during test (124 days)	"	1,518	1,547
Average gain per pig	"	151·8	154·7
Oat chop consumed, at 1·8 cents per pound	"	2,400	2,400
Barley chop consumed, at 1·25 cents per pound	"	1,899	.....
Frozen wheat chop consumed, at 1 cent per pound	"	.....	1,899
Tankage consumed, at 2·5 cents per pound	"	238	238
Oilcake meal consumed, at 3·5 cents per pound	"	238	238
Mineral mixture, at 72 cents per cwt	"	29	31
Total quantity of meal consumed	"	4,804	4,806
Meal required per hundred pounds gain	"	316	311
Total cost of feed	$	81 43	76 69
Cost of feed per hundred pounds gain	$	5 36	4 96
Return per head at 10c. per hundred less cost of all feed	$	10 64	11 34

This test was conducted in the same manner as the winter test except that the pigs had access to a limited quantity of oat and rape pasture during the early part of the experiment.

The meal required per hundred pounds gain is nearly the same in this case which indicates again that the two feeds are approximately equal in value, pound for pound.

FROZEN WHEAT ALONE VS. BARLEY ALONE VS. OATS AND BARLEY

With a view to ascertaining the value of frozen wheat fed alone, it was compared with barley fed alone and a third lot of pigs were fed a mixture of oats and barley.

TABLE 10.—FROZEN WHEAT ALONE VS. BARLEY ALONE VS. OATS AND BARLEY

—		Frozen wheat chop alone	Barley chop alone	Oat chop and barley chop
Number of pigs in each lot		10	10	10
Initial gross weight of lot	lb.	591	591	591
Initial average weight	"	59·1	59·1	59·1
Final gross weight of lot	"	1,967	1,965	1,989
Final average weight	"	196·7	196·5	198·9
Total gain per lot during test (104 days)	"	1,376	1,375	1,398
Average gain per pig	"	137·6	137·5	139·8
Oat chop consumed, at 1·8 cents per pound	"	.....	.....	2,785
Barley chop consumed, at 1·25 cents per pound	"	.....	4,650	1,866
Frozen wheat chop consumed, at 1 cent per pound	"	4,650	.....	.....
Tankage consumed, at 2·5 cents per pound	"	275	275	275
Oilcake meal consumed, at 3·5 cents per pound	"	258	258	258
Mineral mixture, at 72 cents per hundred	"	26	26	27
Total quantity of meal consumed	"	5,209	5,209	5,211
Meal required per 100 pounds gain	"	379	379	373
Total cost of feed	$	62 60	74 23	89 56
Cost of feed per 100 pounds gain	$	4 55	5 40	6 41
Returns per head at 10 cents per 100 less cost of all feed	$	13 41	12 23	10 93

The total gains are again very similar and the feed required per hundred pounds gain, is practically the same for the three lots. Only the difference in cost of the different feeds accounts for the small differences in net returns.

In the several experiments listed above testing the value of frozen wheat, there is a remarkable similarity in the amount of meal required per hundred pounds gain, indicating the value of frozen wheat to be similar to that of oats and barley, whether fed alone or in combination. The price of each feed should be the factor determining which to use.

CO-OPERATIVE WORK IN ADVANCED REGISTRATION OF SWINE

In co-operation with the Dominion Live Stock Branch, this Station for the past two seasons has carried on tests with a view to assisting in a project concerning the advanced registration of swine, which is not yet reported on by the Live Stock Branch. The policy has at the present time, no fixed standard but the combined data will probably be published by the Dominion Live Stock Branch at an early date.

The tables submitted below merely show data which have been collected at his Station during the season of 1929. It is proposed that females may become eligible for advanced registration only after measuring up to certain standards themselves and producing pigs which prove economical feeders and pass a slaughter test satisfactorily. Data concerning each litter were recorded and five pigs from each litter were selected for the feeding test, four of which were shipped for the special slaughter test.

TABLE II.—ADVANCED REGISTRATION OF SWINE

Tag number of dam	Name of dam and number	Sire of litter and number	Date of farrowing	Number born	Weight at birth	Number weaned	Litter weight when weaned
					lb.		lb.
3	Scott Augustine 4, —110887—	Ottawa Beau 32, —129909—	March 2	11	30·5	9	150
4	Scott Belle 45, —129916—	Indian Head Y115, —134293—	" 22	16	35·0	10	146
8	Scott Augustine 5, —110888—	Count 161F, —134831—	" 13	12	26·0	9	169
10	Scott Belle 41, —129912—	Count 161F, —134831—	" 20	15	36·5	11	183
A71	Scott Belle 54, —133676—	Count 161F, —134831—	" 15	10	25·5	9	154

TABLE 12.—FEED CONSUMPTION

Tag number of of dam	Farrowing to weaning		Five Pigs, Weaning to Maketing											
	To dams	To litter in creep	1st 30 days		2nd 30 days		3rd 30 days		4th 30 days		To finish		Total meal	Total minerals
			Meal	Minerals	Meal	Minerals	Meal	Minerals	Meal	Minerals	Meal	Minerals		
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
3	410	35	124	8	274	9	400	10	616	10	970	11	2,384	48
4	365	35	190	8	394	9	519	10	791	10	1,552	11	3,446	48
8	452	35	154	8	287	9	453	10	694	10	1,048	11	2,636	48
10	451	35	129	8	262	9	404	10	638	10	1,177	11	2,610	48
A71	434	35	180	8	312	9	331	10	646	10	1,530	11	3,099	48

TABLE 13.—MEAL MIXTURES—PERCENTAGE, COMPOSITION AND COST PER 100

Feeds used	Farrowing to weaning		Five feeder pigs		
	Dams	Litter	1st 60 days	60 to 90 days	90 day to finish
	%	%	%	%	%
Oat chop	30	45	50	61	53
Middlings	.....	45	7	.....	.....
Tankage	10	10	10	6	5
Frozen wheat chop	30	.....	15	27	37
Oilcake meal	.....	.....	7	6	5
Shorts	.....	.....	11	.....	.....
Bran	30	.....	.....	.....	.....
Cost of mixture per hundred	$1 54	$1 87	$1 87	$1 73	$1 62

Feed Prices.

Oat chop	1·8	cents per pound
Barley chop	1·25	cents "
Bran	1·5	cents "
Frozen wheat chop	1·0	cents "
Tankage	2·5	cents "
Middlings	1·8	cents "
Oilcake meal	3·5	cents "
Shorts	1·65	cents "

A mineral mixture consisting of one pound sulphur, five pounds of hydrated lime, twenty pounds of salt and seventy-five pounds of fine, soft coal, was kept before the growing pigs, and each lot of five pigs consumed forty-eight pounds at a cost of 72 cents per hundred.

TABLE 14.—WEIGHTS OF FIVE FEEDER PIGS

Tag number of sow	At weaning	30 days	60 days	90 days	120 days	At finish	Total gain
	lb.	lb.	lb.	lb.	lb.	lb.	lb.
3	104	213	362	518	769	974	870
4	88	184	313	445	638	1,161	1,073
8	107	200	346	496	725	1,003	896
10	100	177	327	471	717	1,003	903
A71	103	126	230	340	573	1,107	1,004

TABLE 15.—COSTS AND RATES OF GAIN (5 pigs)

Tag numbers of dams	3	4	8	10	A71
Total gain per lot after weaning..... lb.	870	1,073	896	903	1,004
Total meal eaten per lot after weaning "	2,384	3,446	2,636	2,610	3,099
Meal required per 100 pounds gain... "	274	321	294	289	309
Average age in days, to reach market weight.....days	201	220	201	189	227
Cost of meal per 100 pounds gain..... $	4 48	5 13	5 06	4 83	4 94

During the entire feeding period the appetite of the pigs was the only guide as to the quantity of meal fed. This not only accounts for the difference in total quantity of meal eaten, but some lots ate more of certain mixtures than others, which gives a total cost not always in proportion to the total quantity of meal eaten.

The meal required per hundred pounds gain is low in every case. The pigs from sow No. 3 made most economical gains, but pigs from sow No. 10 reached market weight at an earlier age than any other lot. Pigs from sows A71 and No. 4 seemed less thrifty during the greater part of the feeding period.

FIELD HUSBANDRY

CROP ROTATIONS

The importance attached to rotations on this Station is shown by the fact that approximately two hundred acres is used for a study of nine different cropping systems ranging in duration from two to eight years.

In order to make this study more complete, all items of expense and amounts received for crops are recorded to determine their economic usefulness. Manual labour was charged at the rate of 30 cents per hour with 40 cents per hour in harvest time. Horse labour was calculated at 8 cents per hour. Summer-fallow costs in the tables are not shown under this item, but have been charged to the two crops following in the proportion of two-thirds to the first and one-third to the second. The cost and return values used in 1929 to determine the net profits and net losses were as follows:—

TABLE 16.—COST AND RETURN VALUES, 1929

Field work	Number of horses	Size of implement	Acres per day	Cost per acre
Cultivating	6	9-foot	14·0	0 56
Cultivating	2			0 46
Cutting grain	4	8-foot	15·0	0 48
Cutting hay	2	5-foot	10·0	0 46
Disking	6	8-foot	14·0	0 56
Harrowing	6	24-foot	52·0	0 15
Packing	6	15-foot	29·0	0 27
Ploughing (sod)	5	Two fourteen-inch	3·96	1 77
Ploughing (stubble)	5	Two fourteen-inch	4·81	1 46
Raking hay	2	8-foot	20·0	0 23
Scuffling	1			0 57
Seeding	4	10-foot	20·6	0 30

Cost Values

Ensiling sunflowers	per ton	$1 00
Machinery	per acre	1 35
Manure	per ton	1 00
Rent	per acre	2 60
Seed barley	per bushel	0 85
Seed oats	per bushel	0 60
Seed rye	per bushel	0 90
Seed wheat	per bushel	1 25
Sunflower seed	per pound	0 11
Stacking hay	per ton	1 50
Stooking	per acre	0 20
Sweet clover seed	per pound	0 14
Threshing barley	per bushel	0 12
Threshing oats	per bushel	0 08
Threshing rye	per bushel	0 14
Threshing wheat	per bushel	0 14
Twine	per pound	0 14
Western rye grass seed	per pound	0 11

Return Values

Wheat, No. 1 Northern	per bushel	$1 27
Barley, 3 C.W	per bushel	0 57
Barley straw	per ton	2 00
Oats, 2 C.W	per bushel	0 55
Oat straw	per ton	2 00
Pasture (cow or horse)	per month	1 20
Pasture (sheep)	per month	0 30
Rye	per bushel	0 75
Sunflower silage	per ton	3 50
Sweet clover hay	per ton	12 00
Western rye hay	per ton	12 00

Two-Year Rotation

Summer-fallow.
Wheat.

Table 17.—Summary of Yields, Value and Profit and Loss per Acre

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average nine years			1929	Average nine years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow						
Wheat	7·7	23·1	9 78	15 32	−5 54	4 13
Average per acre			4 89	7 66	−2 77	2 07

This two-year rotation ranks among the simplest used under prairie conditions. This method is used in drier areas to insure more crop every year. In other sections it is used to keep down annual weeds. Under our conditions these results are not obtained because wild buckwheat is gradually increasing but other annual weeds are held in check. An examination of results of other rotations published in this report will show this cropping plan is less profitable. The wheat crop must take care of the total summer-fallow cost every year, which makes the cost of production high for the only crop. The cost to produce a bushel of wheat by this system in 1929 was $1.99 and $1.05 over a period of nine years.

Three-Year Rotation

Summer-fallow.
Wheat.
Wheat.

Table 18.—Summary of Yields, Value and Profit and Loss Per Acre

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average eighteen years			1929	Average eighteen years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow						
Wheat	9·3	18·6	11 81	13 81	−2 00	5 05
Wheat	8·7	16·8	10 09	12 55	−2 46	3 91
Average per acre			7 30	8 79	−1 49	2 99

Two grain crops and summer-fallow, with varying procedure in cultural practice, constitute the most common rotation on the prairies. Its popularity is on the wane. Increase of annual weeds has brought about this increasing feeling against it. Our experience is in line with the general opinion. Wild buckwheat and pigweed are fighting for control, especially in the summer-fallow crop. The wheat in the summer-fallow crop lacks vigour in the early stages of its growth during which time certain annual weeds gain headway. Taking an average of the two crops, it has cost $1.26½ to produce a bushel of wheat for an average of eighteen years.

THREE-YEAR ROTATION

Summer-fallow.
Wheat.
Fall Rye.

TABLE 19.—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average six years			1929	Average six years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow						
Wheat	8·2	20·9	10 41	13 86	−3 45	6 03
Fall rye	5·8	18·0	4 35	11 00	−6 65	1 34
Average per acre			4 92	8 29	−3 37	2 45

Two ideas were in mind in laying out this rotation. The first was to try fall rye as an aid against drifting, and the second to test the possibility of using a biennial crop in the control of annual weeds. Only one ploughing is given every three years as the fall rye is sown on disked stubble after the binder. The presence of volunteer fall rye in the wheat is serious from a commercial standpoint and makes the growing of registered wheat almost impossible. While this procedure aids in controlling annual weeds, it does not check June grass which happens to be present in this area. The season of 1929 was particularly disastrous for this rotation when a loss of $3.37 per acre was recorded. It has cost $1.55 to produce a bushel of rye by this cropping system covering an average of the past six years. For the same period, the cost of producing a bushel of wheat has been 97 cents.

THREE-YEAR ROTATION

Summer-fallow.
Wheat.
Sweet clover.

TABLE 20.—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit and loss per acre	
	1929	Average eight years			1929	Average eight years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow						
Wheat	9·4	20·3	11 66	13 12	−1 46	5 11
Sweet clover	tons 1·00	tons 1·32 (7-yrs.)	12 00	11 30	0 70	1 52
Average per acre			7 89	8 14	−0 25	2 21

This is a common three-year rotation with sweet clover substituted for wheat or oats. In this rotation the sweet clover is cut for hay and handled as summer-fallow the following year. Seed wheat is mixed in the proportion of

one bushel of wheat to 15 pounds of sweet clover and the drill set at one bushel rate for wheat when seeding. Generally speaking, the percentage of weeds varies inversely with percentage stand of sweet clover. Covering a period of eight years the sweet clover has not materially influenced the yield of wheat. For the same period, the cost of producing a bushel of wheat has been five cents under a dollar and the profit per acre on the rotation has been comparatively low.

Three-Year Rotation

Summer-fallow.
Wheat.
Oats.

Table 21.—Summary of Yields, Value and Profit and Loss Per Acre

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average eight years			1929	Average eight years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow						
Wheat	11·1	22·5	14 10	13 98	0 12	6 48
Oats	20·6	48·6	11 63	12 21	−0 58	5 93
Average per acre			8 58	8 73	−0 15	4 14

In comparison with the rotation previously discussed, oats take the place of sweet clover. Both of these rotations have been in operation for the same period and should form a reasonable basis for comparison. Compared with the rotation where sweet clover takes the place of oats, this cropping system has an average increase of slightly over two bushels per acre for wheat. Taking the whole rotation, the one containing oats shows an increased net profit of almost $2 per acre. This latter fact is accounted for by an increased profit of $4.41 per acre for the oats over the sweet clover. This result is not in keeping with the general belief of the beneficial results of sweet clover on the yield of wheat.

Four-Year Rotation

Summer-fallow.
Wheat.
Oats.
Sweet clover.

Table 22.—Summary of Yields, Value and Profit and Loss Per Acre

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average four years			1929	Average four years
	bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
Summer-fallow						
Wheat	23·1	28·1	29 34	16 79	12 55	13 93
Oats	21·1	39·0	11 61	11 61	0 00	7 00
	tons	tons				
Sweet clover	0·16	0·92	3 15	6 98	−3 83	2 22
Average per acre			11 03	8 85	2 18	5 79

In this rotation an opportunity is afforded to study the effect of sweet clover in a four-year cropping system. No difficulty is experienced in seeding sweet clover mixed with oats, provided the oats are not seeded wet or damp following treatment with formalin. Because weeds continue to be held in check by this rotation, details of the procedure followed are given.

Before seeding wheat the summer-fallow is cultivated, followed by harrowing and seeded immediately. Wheat stubble is spring ploughed, packed and harrowed as soon as conditions permit. Ten days to two weeks after, this land is double harrowed and seeded immediately. Our stand of sweet clover is usually best in this rotation, due to preparation of seed bed and cropping system combined. After cutting the first crop of sweet clover for hay, sheep are usually pastured on this field for the balance of the season.

The yields of grain for 1929 by this system are higher than in any of our other rotations. Therefore this rotation gave the highest profit in 1929. For the past four years the average cost of producing a bushel of wheat in this rotation has been 68 cents and oats 41 cents.

FOUR-YEAR ROTATION

Intertilled wheat.
Wheat.
Oats.
Sweet clover.

TABLE 23.—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average four years			1929	Average four years
	bush.	bush.	$	$	$	$
Intertilled wheat	6·0	15·7	7 44	9 61	−2 17	6 92
Wheat	8·9	21·2	11 04	10 05	0 99	10 92
Oats	18·9	37·8	10 40	9 06	1 34	8 80
	tons	tons				
Sweet clover	0·16	0·73	3 15	6 98	−3 83	0 61
Average per acre	.....	.....	8 00	8 92	−0 92	6 81

Compared with the previous rotation, grain in rows is substituted for summer-fallow in this case. These consist of three rows of grain and three feet between the rows. Two to three cultivations are given during the growing season. In seeding this wheat the drill is set to sow 1½ bushels for wheat. This rotation was started four years ago on comparatively clean land and weeds have not been troublesome but are increasing where grain in rows has been tried. On neighboring farms the practice has been discontinued after a few years owing to the rapid multiplication of weeds. In previous years the wheat following grain in rows has shown little difference in height and maturity, but in 1929 these differences were quite pronounced.

It is interesting to compare the table given for this rotation with that given for the previous one. This rotation returned a loss of almost a dollar an acre in 1929, while the previous one gave a profit of over two dollars. In these two rotations the yields of wheat are striking in their comparison. Covering a period of three years, this rotation showed an average profit of $2.40 an acre more than the previous one, but including 1929 the margin has been reduced to $1.02.

Six-Year Rotation

Summer-fallow.
Wheat.
Wheat.
Oats
Hay or pasture.
Hay or pasture.

Table 24.—Summary of Yields, Value and Profit and Loss per Acre

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average eighteen years			1929	Average eighteen years
	bush.	bush.	$	$	$	$
Summer-fallow						
Wheat	7·0	23·9	8 89	12 99	−4 10	10 75
Wheat	7·5	19·3 (12-yrs.)	9 30	12 36	−3 06	4 19
Oats	14·7	46·5	8 75	9 37	−0 62	7 86
	tons	tons				
Hay or pasture	0·08	0·86 (14-yrs.)	1 60	5 84	−4 24	1 69
Hay or pasture			1 22	5 03	−3 81	1 72
Average per acre			4 96	7 60	−2 64	4 37

This cropping system is known as rotation "J" in our records and by the farmers in northwestern Saskatchewan who are using it. Its popularity has grown because of its ability to control weeds and return profits.

The summer-fallow really represents breaking of western rye grass sod which is usually pastured by sheep before and after ploughing. Pasturing is also done by the same class of stock in the hay years, depending upon conditions. After ploughing, packing and disking, the summer-fallow, little extra working is required to control weeds. No volunteer sweet clover is found in the grain crops. Stubble wheat and oat land are prepared by spring ploughing, packing and harrowing before seeding. In seeding down oats, Arctic sweet clover and Grazier western rye grass are mixed together in small lots and seeded at the usual depth for oats with the drill set at two bushels and three pecks for oats. While 6 pounds of sweet clover and 12 pounds of western rye grass per acre have been used in this rotation, a more suitable mixture would be 8 pounds of sweet clover and 10 of western rye grass. Where it is desired to drop a year of hay or pasture, a mixture of 12 pounds sweet clover and 6 of western rye grass instead of sweet clover alone would be preferable because if the sweet clover is a poor catch the wetsern rye grass will be a safeguard by providing hay or pasture and a measure of weed control. In this rotation which consists of twenty acres for each field, the grain crops are not only clean for commercial purposes, but provide a suitable place for the production of registered grain. Common annual weeds have been kept under control in this rotation. While this cropping system is helpful in weed control, no small amount of credit is due to the pasturing of sheep.

To adequately measure the profit in this rotation a comparison with the common three-year rotation provides a convenient yardstick as shown in the following table:—

TABLE 25.—COMMON GRAIN ROTATION VERSUS A GRAIN AND HAY ROTATION

Number of years averaged	Summer-fallow wheat and wheat			Summer-fallow, wheat wheat, oats, hay and pasture		
	Cost of summer-fallow	Yield of fallow wheat	Profit in rotation	Cost of summer-fallow	Yield of fallow wheat	Profit in rotation
	$	bush.	$	$	bush.	$
18 years (1912–1929)	6 85	18·6	2 99	6 37	23·9	4 37
9 years (1912–1920)	5 73	20·4	4 99	6 31	25·6	5 26
9 years (1921–1929)	7 97	16·7	0 98	6 42	22·2	3 47

It will be noted from a study of the above table that the average cost of summer-fallow for the past nine years, in the common grain rotation, shows an increase of $2.24 over the previous nine, while in the six-year rotation this item has remained practically stationary. Correlated with this is the striking decrease in the net profit of the grain rotation for the past nine years. This increase in the cost of summer-fallow and the consequent decrease in the net profit in the three-year rotation is no doubt partly due to more weeds creeping into this rotation resulting in an extra cost for their control. When the difference in yields between the two nine-year rotations is compared, it is slight.

It should be mentioned that as the summer-fallow in the six-year rotation can be pastured, as a rule, before the land is ploughed, the value of this pasturage offsets to some extent the costs of the summer-fallow.

EIGHT-YEAR ROTATION

Summer-fallow.
Wheat.
Wheat.
Summer-fallow (manured).
Sunflowers.
Barley (seeded down).
Hay or pasture.
Hay or pasture.

TABLE 26.—SUMMARY OF YIELDS, VALUE AND PROFIT AND LOSS PER ACRE

Crop	Yield per acre		Value of crop 1929	Cost of production 1929	Profit or loss per acre	
	1929	Average eighteen years			1929	Average eighteen years
	bush.	bush.	$	$	$	$
Summer-fallow						
Wheat	15·3	21·9	19 43	17 77	1 66	6 15
Wheat	6·7	16·7	8 31	14 88	−6 57	2 35
Summer-fallow						
	tons	tons				
Sunflowers	7·47	9·43 (10-yrs.)	26 15	25 50	0 65	4 12
	bush.	bush.				
Barley	13·8	27·7 (17-yrs.)	8 99	14 23	−5 24	0 72
		tons				
Hay or pasture		1·22 (17-yrs.)		7 42	−7 42	2 94
	tons					
Hay or pasture	0·92	1·10 (14-yrs.)	11 04	9 49	1 55	1 72
Average per acre			9 24	11 16	−1 92	2 25

This cropping system is more essentially a stock farming rotation than any of those previously listed. Peas were used for the fifth year in this rotation for the first eight years the rotation was in operation, but sunflowers have been substituted for this crop. Manure is applied to each field at the rate of 15 tons per acre once in eight years. It is ploughed down at the time of ploughing for the second summer-fallow. When seeding down, a mixture of 10 pounds western rye grass and 6 pounds of sweet clover is used per acre. This is mixed with two bushels of barley per acre at the time of drilling. Sunflowers are seeded at the rate of 12 pounds per acre. Compared with rotation "J" this rotation has shown only about half as much profit.

CULTURAL EXPERIMENTS

Crop production involves a large number of field operations which are called cultural practices. It is not feasible to carry out all the tests on large fields. Consequently small plots are employed to enable such a large number of tests to be conducted. At this Station 426 one-fortieth acre plots are used for this work. A four foot pathway separates these plots on the sides and an eighteen foot roadway on the ends. Before harvesting, a border of one foot is removed all around the plots to make them comparable with field conditions. These experiments are summarized and discussed briefly under this heading, but where further detailed information is required it will be cheerfully supplied.

METHODS OF SUMMER-FALLOWING

OBJECT OF EXPERIMENT.—To test certain methods of handling summer-fallow.

PLAN OF EXPERIMENT.—A number of plots are ploughed in June at different depths and another group, handled the same way, are backset in September. Cultivation only and using an annual pasture after ploughing are compared with the above. Different dates of ploughing summer-fallow are tested. Four plots are ploughed the same depth but given different treatments previous to summer-fallow.

The rotation used is summer-fallow, wheat, oats on spring-ploughed stubble.

TABLE 27.—SUMMER-FALLOW TREATMENT
(Project No. F 144)

Plot No.	Plot treatment	Average yield per acre	
		Wheat 14 years	Oats 15 years
		bush.	bush.
1	Fallow ploughed 4 inches in June. Wheat stubble ploughed 6 inches	26·5	59·0
2	Fallow ploughed 6 inches in June. Wheat stubble ploughed 6 inches	26·7	55·1
3	Fallow ploughed 8 inches in June. Wheat stubble ploughed 6 inches	26·4	56·7
4	Fallow ploughed 4 inches in June and 4 inches in September. Wheat stubble ploughed 6 inches	26·4	55·6
5	Fallow ploughed 6 inches in June and 6 inches in September. Wheat stubble ploughed 6 inches	25·6	54·0
6	Fallow ploughed 8 inches in June and 8 inches in September. Wheat stubble ploughed 6 inches	25·1	54·3
7	Fallow ploughed 6 inches in June and 4 inches in September. Wheat stubble ploughed 6 inches	27·5	54·1
8	Fallow ploughed 4 inches in June and 6 inches in September. Wheat stubble ploughed 6 inches	29·8	52·8
10	Fallow ploughed 5 inches in June, seeded with ½ bushel oats per acre and pastured. Wheat stubble ploughed 6 inches	24·5	51·0
11	Fallow ploughed 6 inches May 15. Wheat stubble ploughed 6 inches	30·2	54·4
12	Fallow ploughed 6 inches June 15. Wheat stubble ploughed 6 inches	27·2	50·0
13	Fallow ploughed 6 inches July 15. Wheat stubble ploughed 6 inches	24·4	51·0
14	Cultivated in fall before summer-fallowing 6 inches in June. Wheat stubble ploughed 6 inches	26·1	50·3
15	Fallow ploughed 4 inches in fall before summer-fallowing 6 inches in June. Wheat stubble ploughed 6 inches	27·1	52·9
17	Cultivated in spring before summer-fallowing 6 inches in June. Wheat stubble ploughed 6 inches	28·5	53·0

Discussion of Results.—Over a period of years early ploughing of summer-fallow has given highest yields of wheat as shown for plots 11, 12 and 13. Under the dry season of 1929, date of ploughing was still more convincing than in previous years when 10·7 bushels of wheat per acre was obtained for ploughing May 15, 6 bushels for ploughing June 15 and a crop failure for ploughing summer-fallow July 15.

Two ploughings of summer-fallow at different depths have been tested. While a shallow ploughing in June and normal ploughing in September has given increased yields, it is usually impossible to plough the second time in the busy season.

Fall ploughing or cultivating the stubble previous to summer-fallowing has increased the yields sufficient to pay for the extra work.

Left—Summer-fallow ploughed July 15. Right—Summer-fallow ploughed in early June.

Pasturing a light crop of oats in the summer-fallow year has reduced the yield equal to late ploughing.

The least work which can be given to summer-fallow at the right time and keep weeds under control, will lower the cost of production and result in greatest profit in the common grain rotation.

SUMMER-FALLOW SUBSTITUTES

Object of Experiment.—To determine the practical usefulness of using intertilled crops as a substitute for summer-fallow.

Plan of Experiment.—A two-year rotation is followed, substitutes and wheat. The wheat stubble is spring-ploughed for the fallow substitutes, and the row-crops are cultivated as necessary during the summer to control weeds. In preparation for the wheat crop the following year, the row-crop stubble is double-disked before seeding. Summer-fallow is used as a check.

TABLE 28.—SUMMER-FALLOW SUBSTITUTES
(Project No. F 145)

Plot treatment	Average yield per acre	
	Substitutes 8 years	Wheat 7 years
	bush.	bush.
Summer-fallow ploughed 6 inches deep in June	.....	25·4
Oats sown in 2-drill groups 36 inches apart	39·5	23·6
Oats sown in 3-drill groups 36 inches apart	46·2	23·1
Barley sown in 2-drill groups 36 inches apart	16·1	22·4
Barley sown in 3-drill groups 36 inches apart	20·9	23·1
Wheat sown in 2-drill groups 36 inches apart	12·5	22·5
Wheat sown in 3-drill groups 36 inches apart	15·2	21·3
Potatoes sown in rows 36 inches apart	146·8	24·5
	tons 7-year average	tons
Corn sown in rows 36 inches apart	2·43	25·8
	tons	6-year average
Sunflowers sown in rows 36 inches apart	10·54	19·6
Continuous wheat	.....	18·8

DISCUSSION OF RESULTS.—Three drill rows of wheat, oats or barley as a summer-fallow substitute, have proven more profitable than two drill rows. Both became equally weedy and under farm conditions have not proven successful. Among the hoed crops, wheat following sunflowers has given the lowest yield. Wheat following corn has given practically the same yield as after summer-fallow but as the yield indicates the corn crop has never been of much importance. Continuous wheat is gradually decreasing in yield.

STUBBLE TREATMENT FOR WHEAT AND OATS

OBJECT OF EXPERIMENT.—To determine the best method of treating wheat stubble for wheat and oats.

PLAN OF EXPERIMENT.—Wheat is grown on summer-fallow, on all plots, to provide uniform stubble land for the various stubble treatments tested for both wheat and oats.

TABLE 29—STUBBLE TREATMENT FOR WHEAT AND OATS
(Project No. F 146)

Plot No.	Second crop after fallow	Plot treatment	Yield per acre	
			Yield 1929	Average yield 15 years
			bush.	bush.
1	Wheat	Stubble ploughed 4 inches in fall	2·4	16·7
2	"	Stubble disked in fall	2·4	17·1
3	"	Stubble burned before disking in fall	2·0	18·8
4	"	Stubble burned before ploughing 4 inches in fall	1·6	17·5
5	"	Stubble burned in spring—seeded without further cultivation	4·0	20·4
7	"	Stubble disked at cutting time—ploughed 4 inches in spring	4·0	18·
8	"	Stubble disked at cutting time—ploughed 4 inches in fall	2·0	17·
10	"	Stubble ploughed 4 inches in spring	5·8	19·
11	Oats	Stubble ploughed 4 inches in fall	8·4	47·5
12	"	Stubble ploughed 4 inches in spring	15·4	55·4
13	"	Stubble cultivated in spring—seeded at once	16·1	50·6
				6-year average
14	Wheat	Stubble cultivated shallow in fall—no further cultivation	1·6	13·8
15	"	Stubble cultivated deeply in fall—no further cultivation	4·0	16·7
16	"	Seeded in stubble in spring—no further cultivation	1·6	4·3
17	"	Stubble cultivated in spring—seeded at once	2·4	.....

DISCUSSION OF RESULTS.—Under conditions prevailing at this Station, spring ploughing of wheat stubble has produced an average of approximately three bushels more per acre than fall ploughing. The same increase has been obtained by burning stubble in spring and seeding without additional treatment as against burning stubble in fall and fall ploughing combined. Eight bushels per acre has been the average increase of spring ploughing wheat stubble for oats as against fall ploughing. The practice of stubbling in wheat, as shown for plot 16, is a disastrous procedure and the whole experiment demonstrates the necessity for working the stubble before seeding.

DEPTH OF PLOUGHING

OBJECT OF EXPERIMENT.—To determine the best depths for ploughing summer-fallow and to test the value of subsoiling.

PLAN OF EXPERIMENT.—Summerfallow is ploughed in June from 3 to 8 inches deep, and in addition depths from 5 to 8 inches are subsoiled below the sole of the furrow. Additional necessary cultivation is given throughout the season to control weeds. The rotation used is summer-fallow, wheat, oats on spring-ploughed stubble.

TABLE 30—DEPTH OF PLOUGHING SUMMER-FALLOW

(Project No. F 148)

Plot No.	Plot treatment	Average yield per acre 15 years	
		Wheat	Oats
		bush.	bush.
1	Fallow ploughed 3 inches deep. Stubble 3 inches	23·6	48·6
2	Fallow ploughed 4 inches deep. Stubble 4 inches	25·1	50·4
3	Fallow ploughed 5 inches deep. Stubble 5 inches	24·3	49·5
4	Fallow ploughed 6 inches deep. Stubble 5 inches	23·7	48·4
5	Fallow ploughed 7 inches deep. Stubble 5 inches	23·9	48·3
6	Fallow ploughed 8 inches deep. Stubble 5 inches	23·3	49·4
7	Fallow ploughed 5 inches deep and subsoiled 4 inches below furrow. Stubble ploughed 5 inches	24·5	51·2
8	Fallow ploughed 6 inches deep and subsoiled 4 inches below furrow. Stubble ploughed 5 inches	24·7	50·9
9	Fallow ploughed 7 inches deep and subsoiled 4 inches below furrow. Stubble ploughed 5 inches	24·6	52·2
10	Fallow ploughed 8 inches deep and subsoiled 4 inches below furrow. Stubble ploughed 5 inches	23·4	45·4

DISCUSSION OF RESULTS.—The results of this experiment show that there is no advantage in ploughing summer-fallow deeper than four inches when a good job can be done at this depth, and that subsoiling does not increase the yield, much less pay for the extra cost involved. Furthermore, this result has a wide application in that soil moisture is equally well conserved, that the operation is less expensive, and that annual weeds can be more readily kept in check.

SOIL PACKING

OBJECT OF EXPERIMENT.—To determine the best time to pack and the best type of packer to use.

PLAN OF EXPERIMENT.—Summer-fallow, spring ploughing and fall ploughing are packed at different times with two different types of packers, and the yields are compared with a plot which received an extra stroke of the harrow in place of packing.

TABLE 31—PACKING SUMMER-FALLOW

(Project No. F 149A)

Plot No.	Crop	Plot treatment	Yield per acre	
			Yield 1929	Average yield 7 years
			bush.	bush.
2	Wheat	Extra stroke of harrow after ploughing	9·9	25·3
3	"	Culti-packed after ploughing	10·7	27·1
4	"	Surface-packed after ploughing	9·5	27·5
5–18	"	Extra stroke of harrow in spring before seeding	8·7	28·5
6–19	"	Culti-packed in spring before seeding	9·7	27·9
7–29	"	Surface-packed in spring before seeding	10·7	28·7
8–21	"	Harrowed after seeding	8·9	28·2
9–22	"	Culti-packed after seeding	9·5	27·9
10–23	"	Surface-packed after seeding	8·5	27·3
11–24	"	Harrowed before and after seeding	7·9	26·8
12–25	"	Culti-packed before and after seeding	8·7	26·9
13–26	"	Surface-packed before and after seeding	8·7	27·0
15	"	Harrowed after ploughing and after seeding	10·3	27·5
16	"	Culti-packed after ploughing and after seeding	9·5	28·3
17	"	Surface-packed after ploughing and after seeding	10·3	27·7

DISCUSSION OF RESULTS.—1. A study of the above table will show that harrowing and two types of packers were used at five different stages in the preparation of summer-fallow land for wheat for a period of seven years.

2. These three implements were used—(*a*) after ploughing summer-fallow, (*b*) before seeding, (*c*) after seeding, (*d*) before and after seeding, and (*e*) after ploughing summer-fallow together with after seeding.

3. Where slight differences in yield occur following the use of the two packers, operations (*a*) and (*b*) favour the surface packer, operations (*c*) and (*e*) favour the culti-packer and practically equal for operation (*d*).

4. Packing immediately after ploughing summer-fallows produced an increase of approximately two bushels compared with harrowing after the same operation.

5. There is practically no difference in yield between harrowing and packing when these operations are done before seeding or when done both before and after seeding.

6. In comparing harrowing and packing after seeding, the slight difference is in favour of harrowing, but when these operations are performed on the same plot after ploughing the summer-fallow and after seeding, the slight advantage is in favour of packing, but in neither case is the difference significant.

7. Differences in yield noted in this discussion, are merely indicative and are not pronounced enough to draw definite conclusions.

8. Field notes show that where harrowing was done at seeding time it had a tendency to slightly delay maturity, but where packing was done at this time, it had a tendency to slightly hasten maturity.

9. In this experiment the harrowing and packing after seeding were done immediately following this operation and not after the grain emerged. This statement is made so that the reader will not compare these operations in relation to weed control.

10. Under soil conditions at this Station, it is regularly observed that there is more tendency for the soil to drift following the culti-packer than after the surface packer.

11. In considering the application of these practices to farm conditions, it should be borne in mind that the per acre costs are 15 cents for harrowing and 27 cents for packing.

TABLE 32—PACKING OF SPRING PLOUGHING
(Project No. F 149B)

Plot No.	Crop	Plot treatment	Yield per acre	
			Yield 1929	Average yield 8 years
			bush.	bush.
2–11	Wheat	Harrowed before and after seeding	3·0	21·2
3–12	"	Culti-packed before and after seeding	6·0	23·4
4–13	"	Surface-packed before and after seeding	2·6	21·5
5	"	Harrowed before seeding	4·4	22·4
6	"	Culti-packed before seeding	3·6	22·5
7	"	Surface-packed before seeding	4·0	23·3
8	"	Harrowed after seeding	4·4	22·2
9	"	Culti-packed after seeding	4·8	23·5
10	"	Surface-packed after seeding	4·4	22·0

DISCUSSION OF RESULTS.—1. No advantage has been obtained by two harrowings because a single harrowing before or after seeding has produced a bushel more than where harrowing has been done both before and after seeding.

2. Better results were obtained by using the culti-packer after seeding, but the surface packer gave better results by using it before seeding.

3. Averaging the results from the three methods tested, packing gave slightly better results than harrowing, and the culti-packer was slightly better than the surface packer.

4. There is not enough margin between the results compared to draw definite conclusions.

5. In spring ploughed stubble, packing results in more uniform germination than harrowing and also produces a surface which is easier on harvesting machinery.

TABLE 33.—PACKING FALL PLOUGHING
(Project No. F 149C)

Plot No.	Crop	Plot treatment	Yield per acre	
			Yield 1929	Average yield 8 years
			bush.	bush.
15	Wheat	Harrowed after ploughing	0·8	18·9
16	"	Culti-packed after ploughing	2·0	20·1
17	"	Surface-packed after ploughing	1·6	20·2
18	"	Harrowed before seeding	0·8	21·5
19	"	Culti-packed before seeding	0·8	18·9
20	"	Surface-packed before seeding	1·6	20·2
21	"	Harrowed after seeding	0·8	19·1
22	"	Culti-packed after seeding	2·4	19·7
23	"	Surface-packed after seeding	1·2	17·7
24	"	Harrowed before and after seeding	0·8	18·3
25	"	Culti-packed before and after seeding	0·8	18·7
26	"	Surface-packed before and after seeding	1·2	18·3

DISCUSSION OF RESULTS.—1. It should be noted that the yields in this experiment are lower than those in the experiment previously discussed where spring ploughing was done.

2. When the four methods tested are averaged, there is practically no difference in the results obtained.

3. For harrowing, a slightly higher yield was obtained by performing this operation before seeding.

4. These results do not show any consistent relation between these practices and yields of grain produced.

APPLYING BARNYARD MANURE

OBJECT OF EXPERIMENT.—To determine the value of barnyard manure for wheat, oats and barley, and to compare different times and methods of applying it.

PLAN OF EXPERIMENT.—Fresh and rotted manure are applied to different plots, and at different times of the year, at the rate of 12 tons per acre. A charge of $1 per ton is made for the manure with the cost divided equally between the two crops. Return values used for grain are given in the list of cost and return values for 1929. Manure is applied to the second crop after fallow but tables show yields from both crops as the first crop after fallow also derives benefit from this application of manure.

TABLE 34.—MANURE FOR WHEAT—SUMMER-FALLOW, WHEAT, WHEAT
(Project No. F 189)

Plot No.	Plot treatment	Average yield 15 years		Value of crops less cost of manure
		First crop after manure on stubble	Second crop after manure on summer-fallow	
		bush.	bush.	$
1	Fresh manure in winter on first year stubble	18·1	22·5	19 17
3	Rotted manure after seeding second crop on spring ploughing	19·3	24·6	21 22
5	No manure. Spring ploughed	18·4	21·4	24 68
6	Rotted manure before ploughing first year stubble in fall	22·6	24·4	23 14
7	Rotted manure before ploughing first year stubble in spring.	25·0	26·3	25 81

DISCUSSION OF RESULTS.—The highest increase in yield per acre for both crops is where the rotted manure is applied before spring ploughing. When the average net values are compared, it will be observed that the plot which received no manure gave the highest net returns with the exception of plot 7. The application of fresh manure in the winter on first year stubble proved the least profitable.

TABLE 35—MANURE FOR BARLEY—SUMMER-FALLOW, WHEAT, BARLEY
(Project No. F 190)

Plot No.	Plot treatment	Average yield 15 years		Value of crop less cost of manure
		Barley first crop after manure on stubble	Wheat second crop after manure on summer-fallow	
		bush.	bush.	$
1	Fresh manure in winter on first year stubble	26·9	22·7	15 74
3	Rotted manure after seeding second crop on spring ploughing	23·4	24·1	15 61
5	No manure. Spring ploughed	21·5	21·5	19 46
6	Rotted manure before ploughing first year stubble in fall	28·4	25·0	17 60
7	Rotted manure before ploughing first year stubble in spring.	29·4	26·7	18'94

Discussion of Results.—Under conditions at this Station, barley gives a more ready response than wheat from applications of manure. All methods of application used gave increased yields of barley. It should be noted, however, that the highest net returns were obtained where no manure was applied.

Table 36—Manure for Oats—Summer-fallow, Wheat, Oats

(Project No. F 191)

Plot No.	Plot treatment	Average yield 15 years		Value of crops less cost of manure
		Oats first crop after manure on stubble	Wheat second crop after manure on summer-fallow	
		bush.	bush.	$
1	Fresh manure in winter on first year stubble	53·7	25·8	24 77
3	Rotted manure after seeding second crop on spring ploughing	51·7	24·9	23 66
5	No manure. Spring ploughed	48·5	21·5	26 67
6	Rotted manure before ploughing first year stubble in fall	55·3	24·5	24 40
7	Rotted manure before ploughing first year stubble in spring	58·6	25·8	26 11

Discussion of Results.—The reaction of oats to manure has been similar to that of barley, but the crop returns for the rotation are considerably higher in all cases where oats are used. When live weeds are present in fresh manure it should be rotted before applying.

Green Manure Crops Ploughed Under

Object of Experiment.—To compare the increase in soil fertility, as shown by the increase in yields from ploughing under green crops, with that supplied by rotted manure.

Plan of Experiment.—Sweet clover and peas are grown in separate plots and ploughed down in July and compared with plots summer-fallowed in June with and without rotted manure ploughed under. The rotation is summer-fallow or legume crop, wheat, oats.

Table 37—Green Manure Crops Ploughed Under

(Project No. F. 194)

Plot No.	Plot treatment	Average yield per acre	
		Wheat 7 years	Oats 6 years
		bush.	bush.
1	Sweet clover ploughed under in July	23·2	45·8
2	Peas ploughed under in early bloom	24·0	45·0
3	Peas ploughed under in late bloom	23·8	45·4
4–6	Fallow ploughed in June—cultivated	23·3	45·7
5	12 tons barnyard manure per acre applied before summer-fallowing in June	30·6	49·6

Discussion of Results.—Ploughing down sweet clover or peas has not given any material increase over the plot receiving no manure, but the application of rotted manure has given an increase of over seven bushels per acre in yield of wheat. The same holds true for oats in the second crop after fallow, but the increases in yield for rotted manure are not so pronounced.

It is interesting to compare plot 5 in this experiment with plot 7 in the previous experiment where the rotations are the same. Where the rotted manure was ploughed under when summer-fallowing, the yield of wheat was increased approximately seven bushels and the oats about four bushels. Where the rotted manure was ploughed in when spring ploughing wheat stubble for oats, the yield of wheat was increased approximately four bushels and the yield of oats about ten bushels. When the returns of these crops are averaged, in both cases the results are practically equal.

STRAW MULCH FOR WHEAT

OBJECT OF EXPERIMENT.—To determine the value of a straw mulch for wheat.

PLAN OF EXPERIMENT.—After wheat is seeded, straw is scattered on the land at the rate of 1½ tons per acre on summer-fallow and spring-ploughed stubble for wheat. Check plots are seeded and left unmulched.

TABLE 38—STRAW MULCH FOR WHEAT

(Project No. F. 243)

Plot treatment	Average yield per acre 3 years	
	Wheat on fallow	Wheat on spring-ploughed stubble
	bush.	bush.
Straw mulch 1½ tons per acre	23·1	21·2
Check	24·5	19·9

DISCUSSION OF RESULTS.—Volunteer grain is always present in plots mulched with straw. Before the grain is long enough to hold the covering of straw, the mulch blows around in windy weather. This practice is dangerous from the standpoint of weed distribution. Results covering three years' test do not justify recommending straw mulch for wheat.

CO-OPERATIVE FERTILIZER EXPERIMENTS

For a number of years commercial fertilizer experiments have been in progress. No increased yields were obtained by using nitrogen or potash in small plots, but wherever superphosphate was used, a striking increase in yield was obtained. In 1928, plots of five acres were sown on rented land using two rates of superphosphate on wheat. An increase of eight bushels per acre was obtained for an application of 25 pounds per acre, and an increase of twelve bushels per acre for an application of 125 pounds of fertilizer per acre. The result was so outstanding that an effort was made in 1929 to extend these tests to farms covering different conditions in the immediate vicinity of this Station.

A small fertilizer drill was purchased. Three tons of superphosphate was obtained. Areas representing different soil types within a radius of thirty miles were selected. The next problem was transportation of the drill. This was made possible by the whole-hearted co-operation of John Grill of Scott who supplied a man and truck free of charge and thus made possible the sowing of these plots. In practically all cases the plots were slightly over four acres and two rates with a check plot were sown on each farm.

Ready assistance was offered by farmers when asked if their land could be used for this purpose. Demonstrations were sown on the farms of E. L. Kennedy, Arthur Brown, Abraham Love, Werhahn Bros., Jack Martin, Fred Silver, Nick Schilie, Pat Giblin and the Experimental Station. Rates of 50 to 100 pounds per acre were used.

TABLE 39—YIELDS PER ACRE FROM COMMERCIAL FERTILIZER DEMONSTRATIONS WITH WHEAT, 1929

Farm	Variety	Grown on	No fertilizer	50 pounds super-phosphate per acre	75 pounds super-phosphate per acre	100 pounds super-phosphate per acre	125 pounds super-phosphate per acre	100 pounds ammonium phosphate per acre
			bush.	bush.	bush.	bush.	bush.	bush.
Nick Schilie	Marquis	Fallow	19·6	24·6	.....	25·0	.....	.....
Arthur Brown	"	"	14·3	20·4	.....	20·4	.....	.....
Pat Giblin	"	"	13·2	.....	19·8	30·7	.....	.....
Fred Silver	"	"	9·0	15·5	.....	15·5	.....	.....
Jack Martin	Garnet	"	6·7	11·3	.....	13·4	.....	.....
Abraham Love	"	"	6·2	9·4	.....	9·0	.....	.....
Werhahn Bros.	Marquis	"	12·5	16·0	.....	16·0	.....	.....
Experimental Station	Reward	"	7·7	.....	13·9	10·4	10·5	.....
Experimental Station	Marquis	"	10·0	.....	13·0	13·8	.....	15·2
Experimental Station	"	Stubble	9·7	.....	10·3	9·8	9·8	.....

Shortly after the grain germinated, treated plots commenced to show a more vigorous growth. As June progressed the difference was noted by a darker green colour, taller plants, and a much heavier stooling. A commanding lead was in evidence well into July, as heading was earlier some four to seven days with a thicker and more even stand of grain. The disastrous weather with its drought, terriffic hot winds, and continuous heat which followed, blasted all hopes for paying yields of wheat this year, but it is interesting to review the results obtained from these tests.

E. L. Kennedy is 3½ miles northeast of Scott. This farm is located on the edge of an unoccupied flat where frost is frequent. The soil is a silty loam and rather uneven. In spite of the fact that treated plots headed four to five days earlier, Mr. Kennedy is the only person who reports no increase in yield.

The farm of Arthur Brown borders on the road leading to Coldspring beach. A portion was chosen which was in a spot most exposed to early fall frosts. In this area the yellowish-brown subsoil is somewhat nearer the surface and is frequently exposed in ploughing. Hundreds of persons examined these plots and many inquiries were made concerning them. Weather conditions mentioned cut the yields here by at least half. On the portion untreated the yield was 14·3 bushels and 20·4 bushels per acre for each of the treated plots.

Another demonstration was located on the farm of Abraham Love, northeast of Wilkie on the highway to Battleford. The patchy growth quite noticeable in this area was corrected where this fertilizer was used. Differences were pronounced earlier in the season. An increase of 3 bushels per acre was obtained on this farm.

Two miles south of Rockhaven on the road to Phippen, on the farm of Werhahn Brothers, was located another demonstration.

Differences in growth were much in evidence from the roadside. Unfortunately the fertilizer was sown unevenly here, like many others, but this feature was corrected later. Treated plots headed six days earlier here. A yield of 12·5 bushels was obtained on the untreated plots and 16 for a 50-pound application, and 16·5 bushels per acre for an application of 100 pounds per acre.

There was another test on the farm of Jack Martin, 2 miles west of Phippen just south of the Unity highway. An additional objective in this case was to test the effect on a badly infested cutworm field. Differences during the grow-

ing season were not particularly striking for yield increase. However, the yield per acre was increased from 6·7 to 11·3 and the other plot to 13·4 bushels per acre, which is exactly double.

An effort was made to test this on sandy land, and for this purpose the farm of Fred Silver, 3½ miles southeast of Unity, was used. It was surprising how the crop here stood the terrible drought experienced this year. Threshing returns gave a yield of 9 bushels per acre on the untreated plot and 15·5 on both the others.

A slightly darker soil than commonly found in this area was tested on the farm of Nick Schilie, some 9 miles southwest of Scott. There was a striking difference here in all stages of the crop, but, like the others, weather effects reduced the yields. Nevertheless, the yield was increased from 19·6 bushels to 24·6 and 25 bushels for rates of 50 and 100 pounds.

Heavy dark loam soil located west of Tramping Lake was tested, on the farm of Pat Giblin. This soil was able to stand the extreme drought better than the lighter soils. A yield of 13·2 bushels was obtained on the untreated plots and 19·8 bushels for an application of 75 pounds per acre, but where 100 pounds was used, the yield was 30·7 bushels. This represents the largest gain recorded.

Most persons would expect the Experimental Station to have the largest increase in yield and this was a dominant reason why these demonstrations were made. Here, the untreated plot yielded 7·7 bushels and 75-pound application yielded 13·9 bushels, but where rates of 100 and 125 pounds were used, the yield was only 10·5 bushels. It is interesting to note that nearly 200 farmers estimated the untreated plot at 15 bushels per acre and an average of the other plots at 29 bushels, before the disastrous weather played havoc with the yields. This is more in keeping with the results obtained in 1928 and illustrates its possibilities.

An increase of approximately 5·5 bushels per acre was recorded when all these increases are averaged. These results were obtained on summer-fallow. Other tests have shown it is not so advantageous to use this fertilizer on stubble. Other things being equal, early seeding is preferable. Indications are that well-prepared land gives a wider increase where this fertilizer is used. An enlarged root system was developed and a noticeably reduced growth of weeds was also in evidence on treated plots. The nearer the fertilizer was placed to the seed, the greater its effect.

The above summary does not enable the reader to visualize the effect of these results of superphosphate for wheat. In order to appreciate the effect, a visit to this Station with an organized party during the growing season will provide an opportunity to see this and other lines of work. An enlarged fertilizer program will be in progress during 1930.

HORTICULTURE

After eighteen years of experimental work in horticulture, a summary of varieties recommended covering vegetables, flowers, fruit, trees and shrubs is presented in this report. These recommendations, with respect to vegetables, cover numerous varieties which have been tested for a period of years, but it is quite possible that certain other varieties not tested may be equally suitable. Where the reader desires further information it will be gladly furnished. The recommendations stated in this section of the 1929 report constitute answers to the majority of horticultural inquiries and constitute a valuable reference for residents of Northwestern Saskatchewan.

TABLE 40—VEGETABLES

Kind	Variety	Remarks
Asparagus	Argenteuil	Medium to large in size—bluntly pointed tip shaded with purple.
"	Colossal	Green tips.
Beans	Stringless green pod	Round podded, decidedly stringless, very brittle.
"	Wardwell Kidney Wax	Long pods, brittle and stringless, free from rust.
"	Davis White Wax	Vigorous and productive. Rust proof.
"	Challenge Black Wax	Very prolific, pods golden yellow, very brittle.
"	Jones White	Extremely fleshy, stringless yellow pod.
Beets	Detroit Dark Red	Excellent main crop, flesh a deep red with inconspicuous rings. Roots round and smooth.
"	Crosby Egyptian	Roots are globular or roundish having a decided fullness on the under side tapering to a tap root.
"	Flat Egyptian	Deep blood red in colour, roots round but flattened to the extreme on the bottom.
Brussels sprouts	Long Island Improved	Brussels sprouts cannot be considered a success at this Station.
Cabbage	Early Jersey Wakefield	Solid heads, conically pointed.
"	Golden Acre	Round headed type, early and short stemmed.
"	Copenhagen Market	Early maturing, large uniform heads, excellent for winter storage.
"	Danish Ballhead	Roundly flattened heads tapering to a stem. good winter keeper.
"	Danish Stonehead	Uniform, solid dark red heads, excellent for pickling.
Cauliflower	Early Snowball	Heads desirable, size compact, fine and smooth.
"	Early Dwarf Erfurt	Medium size heads, snow white and of fine texture.
"	Veitch Autumn Giant	Late variety producing heads of excellent quality.
Carrots	Chantenay	Roots are unusually thick at the shoulder tapering to a blunt apex. Flesh a good rich orange red. A most satisfactory carrot.
"	Danvers Half Long	Almost equal to Chantenay in shape ,root slightly blunt pointed.
"	Guerande or Oxheart	Short thick roots. Flesh bright orange colour.
"	Early Scarlet Short Horn	Medium size, tender, with only a slight indication of core.
"	Half Long Scarlet Nantes	Roots blunt ended, fine grained almost coreless.
Celery	Golden Self Blanching	Stalks medium height and possessing of a fine nutty flavour.
"	Golden Plume	Stalks yellow golden, exceedingly crisp and sweet in flavour.
"	Paris Rose Ribbed	Large stalks, thick, of rich nutty flavour, free from bitterness.
"	Giant Pascal	Stalks yellowish white colour, crisp and tender.
"	White Plume	Exceedingly crisp and sweet in flavour.
Corn	Pickaninny	Early maturing variety, medium ears. Kernels white with purplish tinge, later changing to purplish black.
"	Banting	Matures early bearing medium ears, kernels a good yellow.
Citron	Colorado	Does not mature, susceptible to early frosts.
"	Red Seeded	Does not mature, susceptible to early frosts.
Cucumbers	Improved Long Green	Flesh firm and crisp, splendid flavour.
"	Early Russian	Medium size fruit, suitable for pickling.
"	Davis Perfect	Fruit long, smooth and tapering at both ends, flesh crisp, solid, with few seeds. (Cucumbers are subject to early frost but usually produce a portion of crop.)
Egg Plant	Extra Early Dwarf	Plant of robust growth with oblong shaped purple fruit. (Subject to early frosts) but usually produces some fruit.
Lettuce	Grand Rapids	Outstanding of the loose-leaved sorts, very tender, good quality, leaves are wavy, fringed and very curly.
"	Iceberg	Compact heads and crumpled, very white inside crisp and tender.
"	Hanson	Large heads with curled and twisted leaves exceptionally crisp and tender.
"	New York	Heads large in size, firm white inside and tender, slightly curled at edges, outstanding head lettuce.
Onions	Ailsa Craig	Large size, oval in shape, clear skin, most satisfactory onion.
"	Yellow Globe Danvers	Uniform globular type moderately early, firm, deep yellow in colour.

TABLE 40—VEGETABLES—*Concluded*

Kind	Variety	Remarks
Onions	Large Red Wethersfield	Bulbs round, slightly later maturing, deep purplish red skin.
"	Giant Prizetaker	Large bulbs, mild, good keeper.
"	White Barletta	Thin skin, white variety, suited for picklers, bulbs round but flattened on under side.
Parsnips	Hollow Crown	Roots have broad shoulder, well hollowed round stalk and tapering to a slender point, long and smooth.
"	Elcombe Improved	Long and smooth, roots tapering to a slender point, flesh white, tender and well flavoured.
Peas	English Wonder	Early maturing, pods of medium size, peas of exceedingly good quality.
"	Little Marvel	Early dwarf variety, pods medium size, peas large, of excellent quality.
"	Thomas Laxton	Pods medium to large size, peas medium size, tender and sweet. Most satisfactory pea.
"	Gradus	Vigorous grower, large green pointed pods containing 6 to 8 peas of excellent quality.
"	Stratagem	Late maturing, produces large dark green tender peas, an exceptionally fine variety.
Peppers	Harris Earliest	Rich red in colour with thick tender flesh (subject to early frosts). Usually 5 per cent ripen outside.
Pumpkin	King of the Mammoth	Deep orange yellow skin, flesh thick, fine grained.
"	Connecticut Field	Large yellow pumpkin, flesh fine in texture, thick and sweet. (Pumpkins are subject to early frosts.)
Potatoes	Irish Cobbler	Matures early, somewhat spreading habit of growth, tubers roundish with blunt ends, eyes medium in number varying from shallow to rather deep, skin smooth and of a light creamy white colour.
"	Early Ohio	Tubers round, oblong, skin flesh coloured or light pink.
"	Gold Coin	Tubers slightly oblong, broad, ends slightly rounded, eyes small, skin thin, smooth, glossy and of a light golden tint.
"	Everett	Matures early, vigorous habit of growth, tubers round oblong to oval, eyes numerous medium in depth, skin flesh coloured or light pink.
Radish	Twenty Day	Roots bright scarlet, delicate flavour, matures quickly.
"	French Breakfast	Bright red with white tip, excellent flavour.
"	White Icicle	Roots long, gradually tapering to the apex. Flesh very tender and brittle.
Spinach	King of Denmark	Dark green in colour, large leaves, rounded, crumpled or blistered.
"	Broad Flanders	Leaves nearly round, deep green, and somewhat crumpled in centre.
Squash	Hubbard	Fruit medium size, skin smooth to slightly warted, dark green.
"	Golden Hubbard	Moderately warted orange red skin, flesh thick of bright orange yellow. (Squash very subject to early frosts.)
Tomatoes	Alacrity	Extra early variety, bright red colour, large size and excellent quality.
"	Bonny Best	An early heavy cropper, producing fruit of large size and fine flavour.
"	Earliana	Bright scarlet fruit, large size, round smooth, solid. (All tomatoes are subject to early frosts.)
Turnips	Purple Top Milan	Root of medium size, flat and white, with a purple top.
"	White Stone	Globe shaped, flesh white and mild in flavour.
Vegetable marrow	English Vegetable	Very large handsome shape, a prolific bearer. (Subject to early frosts.)

TABLE 41.—ANNUAL FLOWERS SOWN DIRECTLY OUT OF DOORS

Name	Variety	Colour of bloom	Approximate height
Asperula	Azurea setosa	Pale blue	1 foot.
Alyssum	Snow carpet	White	4 inches.
Bartonia	Aurea	Yellow	1 foot to 1½ feet.
Brachycome	Swan River Daisy	Bright blue	6 inches.
Calendula	Orange King	Orange	2 feet.
Candytuft	Hyacinth flowered	White	9 inches.
Clarkia	Salmon Queen	Salmon	2 feet.
Chrysanthemum	Bridal Robe	White	1 foot 6 inches.
Coreopsis	Marmorata	Reddish maroon	2 feet 6 inches.
Dimorphotheca	Africa Daisy	Mixed colours	10 inches.
Larkspur	Rosy Scarlet	Rosy scarlet	2 feet.
Lavatera	Loveliness	Rosy pink	2 feet 6 inches.
Linum	Rubrum	Scarlet	1 foot.
Linaria	Mixed	Mixed colours	1 foot.
Malope	Mixed	"	2 feet.
Mignonette	Giant Red	Reddish buff	10 inches.
Nasturtium	Dwarf	Mixed colours	6 inches.
"	Tall	"	1 foot.
Portulaca	Double Mixed	"	6 inches.
Poppy	Shirley and Paeony flowered	"	2 feet to 3 feet.
Tagetes	Signata Pumila	Golden yellow	1 foot.
Virginian Stock		Mixed colours	10 inches.
Sweet peas	Dorothy Eckford	White	3 feet.
"	King Edward VII	Bright crimson	2 feet 6 inches.
"	Lord Nelson	Deep navy blue	3 feet.
"	Miss Willmott	Orange pink	3 feet.
"	Hawlmark	Salmon pink	4 feet.
"	King White	White	3 feet.
"	Matchless	Deep rich cream	3 feet 6 inches.
"	Picture	Cream and pink	3 feet.
"	Sunset	Soft rich rose	3 feet.
"	Blue bird	Wedgewood blue	4 feet.
"	Edna May Improved	White	3 feet.
"	Supreme	Pink	3 feet.
"	Ivory Picture	Deep cream pink	3 feet.
"	Royal Mauve	Rich bright mauve	4 feet.
"	Fordhook Orange	Orange scarlet	3 feet.
"	Crimson King	Rich blood crimson	3 feet.

TABLE 42.—ANNUAL FLOWERS STARTED INDOORS OR IN HOT BEDS

Name	Variety	Colour of bloom	Approximate height
Antirrhinum		Mixed colours	18 inches.
Alonsoa	Warscewiczii compacta	Brilliant red	1 foot.
Ageratum	Blue Perfection	Deep amethyst blue	8 inches.
Asters	Late Branching	Mixed colours	18 inches.
"	Early	"	18 inches.
Browallia	Elata	Bright blue	11 inches.
Cosmea	Single and Double	Mixed colours	2 feet 6 inches.
Carnation	Marguerite	"	18 inches.
Datura	Golden Queen	Golden	1 foot 3 inches.
Gaillardia	Double	Mixed colours	1 foot 6 inches.
Heliotrope	Regale		1 foot 6 inches.
Helichrysum	Everlasting	Mixed colours	2 feet 6 inches.
Lobelia	Ramosa tenuior	Rich blue	6 inches.
Marigold	African Mixed	Lemon coloured	2 feet.
Nemesia	Large flowered	Mixed colours	1 foot 3 inches.
Nicotiana	Affinis	"	2 feet to 2½ feet.
Petunia	Giant of California	"	1 foot 6 inches.
Phlox	Drummondii	"	1 foot to 1½ feet.
Schizanthus	Bronze and Amber	"	2 feet.
Salpiglossis	Large Flowered	"	3 feet.
Salvia	Fireball	Brilliant scarlet	2 feet.
Stock	Giant Perfection	Mixed colours	1 foot 6 inches.
Zinnia	Giant Mixed	"	18 inches.

TABLE 43.—PERENNIAL FLOWERS GROWN FROM SEED

Name	Variety	Colour of bloom	Approximate height
Aquilegia	Long Spurred	Mixed colours	2 feet 6 inches.
Campanula	Persicifolia	White	2 feet.
Delphinium		Blue	4 feet to 5 feet.
Dianthus	Barbatus	Mixed colours	1 foot 3 inches.
Gypsophila	Paniculata	White	2 feet to 3 feet.
Hesperis	Matronalis	Pink and white	2 feet 6 inches.
Lychnis	Chalcedonica	Brilliant scarlet	3 feet.
Papaver	Oriental poppy	Scarlet	3 feet.
Papaver nudicaule	Iceland poppy	Mixed colours	1 foot 6 inches.
Polemonium	Himalayanum	Blue	3 feet.

TABLE 44.—PERENNIAL FLOWERS GROWN FROM DIVISIONS

Name	Variety	Colour of bloom	Approximate height
Achillea	The Pearl	White	2 feet.
Aster	Rudolphe goethe	Lavender blue	1 foot.
Centaurea	Ruthenica	Lemon	3 feet.
Dicentra	Bleeding Heart	Pink	3 feet.
Dictamnus	Fraxinella	White	2 feet.
Gypsophila	Paniculata	"	2 feet to 3 feet.
Hemerocallis	Daylily	Bright yellow	2 feet 6 inches.
Lychnis	Chalcedonica	Brilliant scarlet	3 feet.
Thalictrum	Aquilegifolium	White in loose panticles	2 feet to 3 feet.
Paeony	Madame D. Verneville	Pure white	2 feet 6 inches.
"	Octave Demay	Pink	2 feet 6 inches.
"	La Tulipe	Lilac white fading to cream white	3 feet.
"	Duchesse de Nemours	Sulphur white	3 feet.
"	Victor Lemoine	Light red	2 feet.
"	Festiva Maxima	White, centre flecked crimson	2 feet to 3 feet.
"	La Perle	Deep lilac white	2 feet.
"	Sarah Bernhardt	Mauve rose	2 feet 6 inches.
"	Marie Stewart	Light red	2 feet 6 inches.
"	Claire Dubois	Salmon pink	2 feet 6 inches.
"	Germain Bigot	Pale lilac	2 feet.
"	Mons Krelage	Silvery crimson	2 feet.
Veronica	Speedwell	Blue	2 feet.
Iris	Mrs. H. Darwin	Light lavender	1 foot.
"	Mrs. Sherwin Wright	Lavender blue	1 foot.
"	Moon King	Creamy yellow	1 foot.
"	Gracchus	Primrose yellow	1 foot.
"	Prosper Laugier	Copper crimson	1 foot 3 inches.
"	Flavescens	Creamy yellow	1 foot.

TABLE 45.—FLOWERING BULBS GROWN INDOORS AND OUTDOORS

Name	Variety	Colour of bloom	Approximate height
Single tulips	Vermilion Brilliant	Bright vermilion	1 foot 6 inches.
"	Rose Grisdelin	Pink	10 inches.
"	Prince of Austria	Bright orange vermilion	1 foot.
"	White Swan	Pure white	1 foot.
"	Yellow Prince	Deep yellow	1 foot.
"	Prosperity	Deep pink	10 inches.
"	Brilliant Star	Brilliant scarlet	1 foot.
"	Cerise Grisdelin	Cerise	1 foot.
Double tulips	Peach Blossom	Deep pink	10 inches.
"	Tearose	Saffron yellow	8 inches.
"	Rubra Maxima	Deep red	10 inches.
"	Murillo	Blush pink	10 inches.
"	Couronne D'Or	Yellow	11 inches.
"	Salvator Rose	Deep pink	11 inches.
Darwin tulips	Blue Aimable	Lilac blue	1 foot 6 inches.
"	Centenaire	Lilac pink	1 foot 6 inches.
"	Painted Lady	Cream white	1 foot 6 inches.
"	William Copland	Light lilac	1 foot 6 inches.

TABLE 46.—FLOWERING BULBS GROWN INDOORS

Name	Variety	Colour of bloom
Narcissi	Orange Phoenix	White, orange centre.
"	Golden Spur	Deep rich yellow.
"	Victoria	Yellow trumpet, white perianth.
"	Paper White	White.
Hyacinths	Sir William Mansfield	Bright purple violet.
"	Queen of the Blues	Light blue.
"	Yellow Hammer	Golden yellow.
"	Marconi	Pink.
"	Queen of the Pinks	Bright rosy pink.
"	King of Belgium	Bright scarlet.
"	La Victoire	Brilliant red.
"	Garibaldi	Bright carmine.
"	Lord Balfour	Violet.
"	General Pelissier	Carmine red.

TABLE 47—TREE FRUITS

Name	Variety
Crab apples	Jewel x Simbirsk
"	Jewel x Tetofsky
"	Northern Queen x Cranberry Pippen
"	Osman
"	Alberta
"	Prince
"	Elsa
"	Silvia
Plums	Manitoba Native
Cherries	Tom Thumb
"	Rocky Mountain

Shelter belt necessary for the prairie garden.

TABLE 48—BUSH FRUITS

Name	Variety
Red raspberry	Count
"	Brighton
"	Herbert
"	Sunbeam
"	Ohta
Black currant	Black Naples
"	Black Beauty
"	Black Grape
"	Buddenborg
"	Climax
"	Clipper
"	Saunders
"	Magnus
Red currant	Victoria Red
"	Stewart
"	Simcoe King
"	Pomona
"	Long Bunch Holland
"	Raby Castle
White currant	Large White
"	White Grape
"	White Cherry
Gooseberry	Silvia
"	Charles
"	Duncan
"	Red Jacket
"	Smith Improved
"	Houghton
Strawberry (summer bearing)	Dakota
" "	Senator Dunlop
"	Alaska
" "	Minnehaha
" "	Dr. Burrill
" "	Glen Mary
Strawberry (everbearing)	Americana
" "	Superb

TABLE 49—TREES

Kind	Common name	Scientific name
Evergreen	Lodge pole pine	*Pinus contorta murrayana*
"	White spruce	*Picea canadensis*
"	Blue spruce	*Picea pungens kosteriana*
"	Norway spruce	*Picea excelsa*
"	Balsam fir	*Abies balsamea*
"	Scotch pine	*Pinus sylvestris*
"	Dwarf Mountain pine	*Pinus mughus*
"	Swiss Stone pine	*Pinus cembra*
"	Savin juniper	*Juniperus sabina cupressifolia*
Deciduous	Northwestern poplar	
"	American elm	*Ullmus americana*
"	Russian poplar	*Populus petrowskyana*
"	Manitoba maple	*Acer negundo*
"	Green ash	*Fraxinus pennsylvanica lanceolata*
"	Alberta cottonwood	
"	Willow	*Salix vitellina*
"	Willow	*Salix dasyclados*
"	Willow	*Salix uralensis*
"	Willow	*Salix bullata*

TABLE 50—SHRUBS

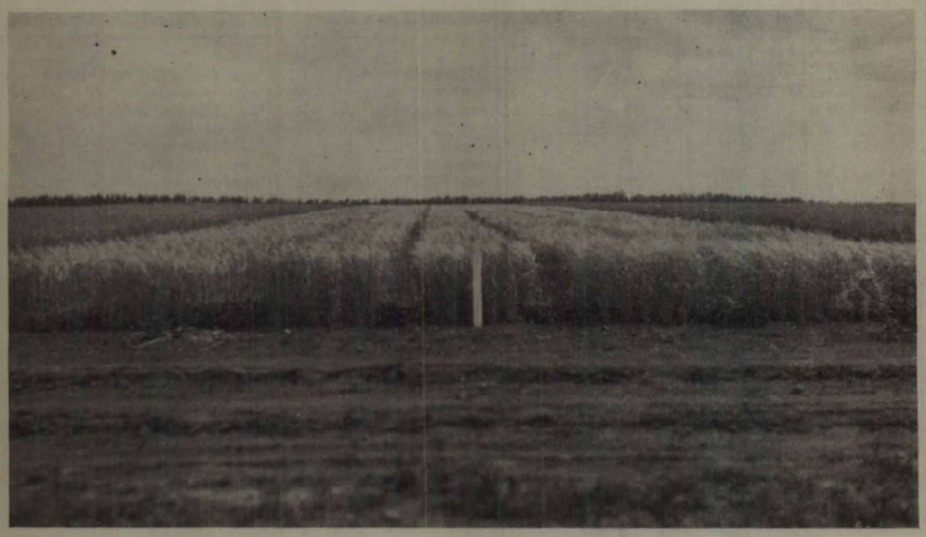
Name	Variety	Colour of bloom	Height
Lilac	Syringa Congo	Wallflower red	5 feet 6 inches
"	Syringa alba grandiflora	White	7 feet
"	Syringa villosa	Shell pink	8 to 9 feet
"	Syringa amurensis	Creamy white	7 to 10 feet
"	Syringa chinensis	Pale lilac	5 to 6 feet
Mountain ash	Pyrus ancuparia	Creamy white	10 feet
Maple	Acer tataricum rubrum	Creamy white	7 to 10 feet
"	Acer tataricum aidzuense	Creamy white	7 to 10 feet
Flowering almond	Prunus triloba	Pink	7 to 10 feet
Chokecherry	Prunus maackii	White	8 to 10 feet
Missouri currant	Ribes aureum	Yellow	5 feet
Honeysuckle	Lonicera tatarica	Bright pink	6 to 9 feet
"	Lonicera alberti	Bright pink	5 feet
Cotoneaster	Tomentosa	Creamy shade with pink	4 feet
Potentilla	Fruticosa	Yellow	4 feet
Caragana	Pygmaea aurantiaca	Yellow	4 to 5 feet
"	frutescens (Woody caragana)	Yellow	5 to 6 feet
Spiraea	oblogifolia	White	5 to 6 feet
Dogwood	Cornus sibirica	Creamy White	5 to 6 feet

CEREALS

The experimental work in cereals is under the supervision of F. M. MacIsaac, who is also in charge of forage crop investigations and cultural experiments.

For a comprehensive review of cereal investigations in progress at this Station the reader is referred to our report for the year 1928. This report will deal more particularly with the behaviour of varieties during a season which was abnormal in many respects.

Cold spring weather did not noticeably affect coarse grains but had a pronounced effect upon wheat. Information as to its effect will be found more in detail under the different classes of grain. Stands were uniformly good



Elite stock seed plots.

but growth of grain was slow, lacked vigour and was subnormal in colour until the middle of June when almost two inches of rain quickly restored plants to their normal condition. From that date rain came in small showers while the velocity of the wind gradually increased, accompanied by mounting temperatures. As an example, on July 20, which falls in a critical period for our grain crops, the wind reached a maximum velocity of 61 miles per hour and the temperature soared to 93·5° F. Naturally the loss of soil moisture was high under such conditions, in fact our evaporation for the growing months was one-third more than the average evaporation for the past seven years. This combination of unusual weather conditions resulted in low yields.

SPRING WHEAT

Variety tests of wheat were sown on April 25 which was earlier than usual. Plants of early varieties appeared above the ground on May 10 and the emergence was spread over a week. This retarded germination was due to cool temperatures. Growth of wheat was slow but annual weeds, principally pigweed, made comparatively better progress. These tests were made in triplicate one-fortieth acre plots, but borders were removed at harvest time.

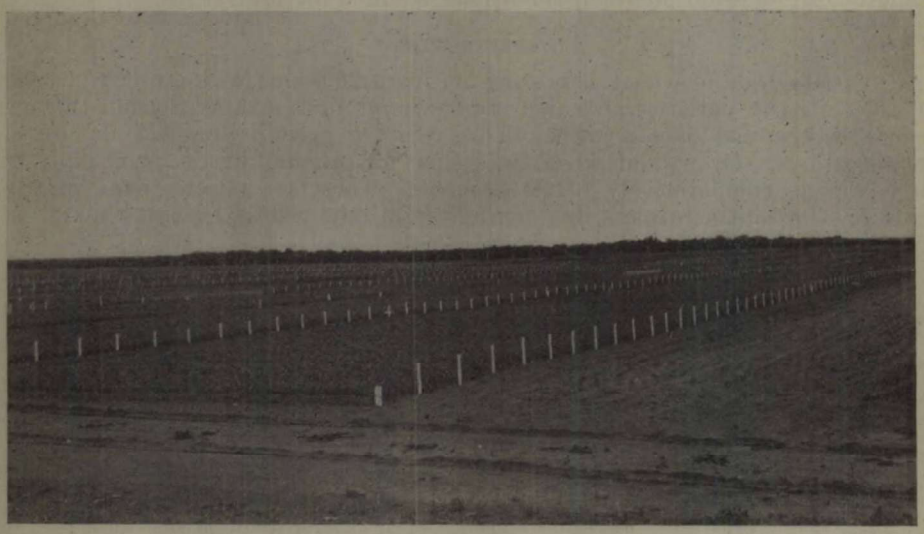
TABLE 51—WHEAT—TEST OF VARIETIES OR STRAINS, 1929

Name of variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (Marquis Ottawa 15 =100)	Weight per measured bushel after cleaning
			in.		bush.	per cent	lb.
Early Red Fife, Ottawa 16	Aug. 24	121	33	9·3	18·6	99·5	62·0
Early Triumph	" 14	111	30	9·8	18·1	96·8	60·0
Garnet, Ottawa 652	" 11	108	30	9·3	15·7	84·0	58·5
Kitchener	" 23	120	31	9·3	20·3	108·6	61·0
Kubanka, Sask. 6	" 27	124	31	8·8	13·6	72·7	62·0
Marquis, Ottawa 15	" 19	116	30	9·8	18·7	100·0	61·0
Marquis 10B	" 19	116	30	9·8	18·1	96·8	60·0
Marquillo	" 18	115	29	9·8	17·4	93·0	56·5
Mindum	" 27	124	32	9·0	14·8	79·1	65·0
Pelissier	" 25	122	31	8·8	16·0	85·6	65·5
Red Bobs (Wyler)	" 15	112	31	9·8	18·3	97·9	60·0
Red Bobs 222	" 15	112	30	10·0	20·1	107·5	59·0
Red Fife, Ottawa 17	" 26	123	29	9·5	16·1	86·1	62·0
Reliance	" 20	117	28	9·4	17·8	95·2	59·0
Renfrew	" 25	122	30	10·0	15·0	80·2	58·5
Reward, Ottawa 928	" 11	108	31	9·8	18·1	96·8	62·5
Supreme	" 17	114	29	9·8	18·9	101·1	62·0

TABLE 52—WHEAT—FIVE-YEAR AVERAGE, 1925–1929

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (Marquis Ottawa 15 =100)	Weight per measured bushel after cleaning
		in.		bush.	per cent	lb.
Early Red Fife, Ottawa 16	119·6	39·4	9·3	28·9	89·5	63·1
Early Triumph	112·0	36·5	9·8	34·7	107·4	61·3
Garnet, Ottawa 652	107·4	35·3	9·0	34·4	106·5	61·8
Kitchener	119·6	38·6	9·2	31·4	97·2	62·0
Kubanka, Sask. 6	124·4	41·3	6·2	30·1	93·2	62·5
Marquis, Ottawa 15	116·8	36·8	9·4	32·3	100·0	62·3
Marquis 10B	116·8	36·4	9·4	31·9	98·8	62·0
Red Bobs (Wyler)	112·8	36·1	9·8	35·2	109·0	61·2
Red Fife, Ottawa 17	122·6	37·4	9·1	29·6	91·6	61·7
Reward, Ottawa 928	109·4	36·7	9·6	33·0	102·2	63·5
Supreme	114·4	35·2	9·8	33·6	104·0	61·9

Late maturing common spring wheats and durums were lower in yield than those which matured earlier with the exception of Garnet. However, in an average of the past five years, Garnet occupies a leading position for yield. In the past dry season the individuality of the varieties was reflected. For the first time in six years Reward headed a day earlier than Garnet but matured the same date. On the other hand, in the five-year average, it is two days later. Grain from all varieties harvested this year had a slightly wrinkled appearance. The quality of all varieties was uniformly high.



A portion of cereal improvement work.

When quality is satisfactory, yield is the deciding factor in a variety of wheat. The five-year average permits an analysis, to a certain extent, on this basis. If varieties are listed in order of maturity, including durum, we have five groups. Taking Marquis as a standard, as has been done in the comparative yield column, we have two groups which are earlier and later than Marquis. The earlier groups are higher in yield which is a fortunate advancement for our conditions. The later maturing groups yield less and nothing is gained by growing them. On a comparative yield basis the early group, represented by Garnet and Reward, is 4·4 per cent better than Marquis, while the Red Bobs group excel by 6·9 per cent. Medium late varieties such as early Red Fife and Kitchener yield 6·6 per cent less than Marquis and Red Fife 8·4 per cent less.

OATS

Fifteen varieties of oats were sown in one-fortieth acre plots in triplicate on May 9. In spite of a light rainfall in May, uniform, even stands of oats were obtained. Adverse weather conditions already noted proved more disastrous for oats than wheat.

TABLE 53—OATS—TEST OF VARIETIES OR STRAINS, 1929

Name of variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (Banner Ottawa 49 =100)	Weight per measured bushel after cleaning
			in.		bush.	per cent	lb.
Abundance	Aug. 11	94	28	9·0	35·9	105·0	35·0
Alaska	" 6	89	28	8·5	29·6	86·5	35·0
Banner, Ottawa 49	" 13	96	27	9·2	34·2	100·0	31·0
Banner, Sask. 144	" 13	96	27	9·5	33·3	97·4	31·0
Cole, Sask. 795	" 5	88	27	8·5	27·0	78·9	31·0
Gerlach, Sask	" 13	96	26	8·8	31·0	90·6	30·5
Gopher	" 8	91	24	8·8	32·6	95·3	32·0
Irish Victor P	" 12	95	29	9·0	30·0	87·7	34·0
Laurel, Ottawa 477	" 9	92	26	8·7	25·9	75·7	47·0
Leader	" 14	97	26	9·2	25·4	74·3	34·0
Legacy, Ottawa 678	" 9	92	26	9·7	31·9	93·3	30·0
Liberty, Ottawa 480	" 8	91	28	9·0	18·4	53·8	44·0
Longfellow, Ottawa 478	" 11	94	29	8·2	30·3	88·6	37·0
O.A.C. No. 3	" 6	89	27	8·3	27·9	81·6	31·0
Victory	" 13	96	27	9·2	31·7	92·7	34·0

TABLE 54—OATS—FIVE-YEAR AVERAGE 1925-1929

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (Banner Ottawa 49 =100)	Weight per measured bushel after cleaning
		in.		bush.	per cent	lb.
Alaska	92·0	36·1	9·1	63·2	86·7	37·9
Banner, Ottawa 49	103·6	38·4	8·6	72·9	100·0	36·6
Banner, Sask. 144	104·2	38·5	8·5	73·2	100·4	35·9
Cole, Sask. 795	90·8	33·8	8·5	64·2	88·1	34·0
Gerlach, Sask	104·6	37·8	8·4	70·9	97·3	36·5
Laurel, Ottawa 477	99·2	37·1	9·6	57·6	79·0	50·9
Leader	104·8	37·6	8·1	68·9	94·5	34·8
Legacy, Ottawa 678	98·0	35·7	9·0	75·5	103·6	36·1
Liberty, Ottawa 480	98·2	39·4	9·4	47·7	65·4	48·7
Longfellow, Ottawa 478	100·6	39·7	8·2	64·9	89·0	38·2
O.A.C. No. 3	92·8	35·5	9·2	64·1	87·9	36·1
Victory	105·2	37·9	8·7	71·5	98·1	38·7

To choose an oat variety from their performance in this unusual season would be unwise, but this can be more safely made from the results given in the five-year average table. In 1929 the weight per bushel of all oats was below normal for this area, but covering the past five years the varieties are well above the standard weight per bushel. In 1929 straw was short and showed little difference in length and strength between varieties and percentage of blasted heads was higher, being about equal in all varieties. Disease was noticeable by its absence. For a better index of the merits of these varieties in time of maturity, length of straw, strength of straw, yield and weight per bushel, the five-year average is more reliable than a one-year test.

BARLEY

The season of 1929 was particularly disastrous for barley. Drought, with its combination of conditions, came at a vital time for the barley crop and continued until harvest. Varieties were sown on May 15. Early varieties made more rapid progress in the early stages and yielded comparatively higher than in an average year. Stands were good. Late varieties were backward all season. The order of maturity was little affected by the character of the season.

TABLE 55—BARLEY—TEST OF VARIETIES OR STRAINS, 1929

Name of variety	Date of ripening	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (O.A.C. 21 =100)	Weight per measured bushel after cleaning
			in.		bush.	per cent	lb.
Bearer, Ottawa 475	Aug. 24	101	20	9·0	10·9	178·7	45·0
Canadian Thorpe	" 27	104	18	10·0	8·2	134·4	49·0
Chinese, Ottawa 60	" 18	95	21	9·0	5·2	85·3	47·0
Colsess	" 17	94	24	9·7	15·3	250·8	37·0
Duckbill, Ottawa 57	" 28	105	18	9·7	5·7	93·4	46·0
Gold	" 21	98	20	9·7	12·7	208·2	49·0
Hannchen, Sask. 229	" 19	96	21	9·5	16·8	275·4	49·0
Himalayan, Ottawa 59	" 11	88	26	9·3	14·2	232·8	60·0
O.A.C. 21	" 18	95	22	9·0	6·1	100·0	42·0
*Plumage Archer	" 30	107	19	10·0	6·9	113·1	47·5
Star	" 12	89	20	9·3	9·1	149·2	37·0
Swedish Chevalier	" 26	103	18	10·0	12·2	200·0	51·0
Trebi	" 16	93	21	9·2	12·4	203·3	40·5

*One plot only.

TABLE 56—BARLEY—FIVE-YEAR AVERAGE, 1925-1929

Name of variety	Number of days maturing	Average length of straw including head	Strength of straw on a scale of 10 points	Yield of grain per acre	Comparative yields (O.A.C. 21 =100)	Weight per measured bushel after cleaning
		in.		bush.	per cent	lb.
Bearer, Ottawa 475	102·4	34·3	7·0	37·9	94·0	47·1
Chinese, Ottawa 60	96·4	35·3	8·3	41·4	102·7	40·6
Duckbill, Ottawa 57	104·4	32·3	9·7	35·3	87·6	50·3
Hannchen, Sask. 229	99·2	31·3	7·8	47·2	117·1	52·4
Himalayan, Ottawa 59	90·6	29·4	9·1	41·4	102·7	62·3
O.A.C. 21	96·4	35·9	7·8	40·3	100·0	47·4
Swedish Chevalier	103·8	30·2	6·9	35·9	89·1	49·4
Trebi	95·6	29·5	8·6	51·9	128·8	46·9

Hannchen gave the highest yield in 1929, but Trebi exceeds it by almost twelve per cent in an average covering the past five years. Conditions were too abnormal during the past season to make a definite statement on the comparative value of barley varieties. In the five-year average of barley varieties, Hannchen leads the two-row varieties but has a tendency to be weak in the straw when grown on summer-fallow or other moist conditions. Duckbill, another two-rowed variety, yields low at this Station but possesses exceptional merit for strength of straw. Among the six-row bearded types O.A.C. 21 is comparatively low in yield but is valued highly for its malting qualities. Trebi, another six-rowed bearded type, while inclined to be short in the straw, leads all varieties tested in the production of straw.

FLAX

Four varieties of flax were sown in triplicate on summer-fallow land May 21. Good stands were obtained, but annual weeds (principally pigweed) predominated. These were not harvested until early in September.

TABLE 57—FLAX—TEST OF VARIETIES, 1929

Name of variety	Date of ripening	Number of days maturing	Average length of straw	Strength of straw on a scale of 10 points	Yield of grain per acre	
					1929	Eight-year average
			in.		bush.	bush.
Crown, Sask.	Sept. 6	108	16	10·0	4·8	11·6
Linota	" 5	107	16	10·0	4·8	.....
Novelty, Ottawa 53	" 9	111	15	10·0	4·9	11·2
Premost	" 3	105	17	10·0	2·4	11·5

Little flax is grown in the immediate vicinity of this Station and this class of grain is relatively unimportant here. All yields were exceptionally low for the past season. Covering a period of eight years, there is nothing to choose from the standpoint of yield.

FORAGE CROPS

Classes of forage grown in northwestern Saskatchewan and discussed under this heading are intertilled crops, annual hay crops and permanent hay crops. In spite of the crop limitations existing in the vicinity of this Station, one or more classes of forage are usually profitable, but in 1929 none produced economic returns. This was caused by drought as outlined in the introduction of this report.

No changes were made in methods employed, but an explanation of the tables should be helpful to the reader.

Several weights are shown in the tables. Green weights represent the tonnage at time of cutting, but these weights cannot be used as a basis of comparison because the percentage of moisture varies. It not only varies for each crop of the same class, but varies widely for different classes of forage. Cured hay normally contains, in this climate, about twelve per cent moisture, but all forage is not cured in this way. Dry matter weights represent the crop minus the moisture and provide a convenient basis for comparing the value of all classes of forage.

INTERTILLED CROPS

Sixteen varieties of corn were sown on summer-fallow, May 28. A corn planter was used to sow these rows three feet apart. Plants were thinned to 12 inches apart in the rows to give varieties an even chance in this respect.

TABLE 58—CORN—TEST OF VARIETIES FOR ENSILAGE
(Project No. Ag. 1)

Name of variety	Source of seed	Average height of plants	Maturity at harvest	Yield per acre, 1929	
				Green weight	Dry weight
		in.		tons	tons
Northwestern Dent	Experimental Farm, Brandon.	28	Cobs forming	2·71	0·42
Longfellow	J. O. Duke	22	Early tassel	2·99	0·46
N. Dakota White Flint	Steele Briggs	20	Early tassel	2·70	0·40
Golden Glow	J. O. Duke	25	Tassel	2·54	0·37
Wisconsin No. 7	J. O. Duke	23	Tassel	2·48	0·36
Wisconsin No. 7 Twitchells.	Summerland	24	Late tassel	2·48	0·38
Leaming No. 7	J. O. Duke	23	Tassel	2·46	0·37
Northwestern Dent	Dak. Imp. Seed Co.	25	Cobs forming	2·40	0·38
Bailey	J. O. Duke	23	Tassel	2·19	0·31
Pride Yellow Dent	Dak. Imp. Seed Co.	22	Late tassel	2·10	0·32
Yellow Dent	Wimple	21	Late tassel	2·11	0·34
Quebec 28	McDonald College	22	Cobs forming	2·11	0·34
90 Day White Dent	Dak. Imp. Seed Co.	23	Tassel	2·08	0·29
Amber Flint	Wimple	23	Early tassel	1·85	0·28
White Cap Yellow Dent.	Steele Briggs	17	(Not reached flower stage.)	1·76	0·28
Hybrid	Wimple	23	Tassel	1·57	0·22

Not only are the yields from corn varieties low, but they represent what might be termed, a crop failure. One hundred days of growing for this crop in 1929 produced corn approximately two feet tall. The maximum green weight was less than three tons per acre and no variety produced half a ton of dry matter per acre.

Such yields for corn are not unusual at this Station. In the past six years, twice the crop was frozen, twice it was a failure and twice a moderate crop was harvested. Similar results have been obtained over a longer period of years. In other words, corn cannot be regarded as a dependable forage crop for this area.

SUNFLOWERS

Sunflower varieties were sown on summer-fallow May 23. Methods similar to those for corn were used in this test. All varieties were harvested September 6, due to a slight frost occurring the previous night.

TABLE 59—SUNFLOWERS—TEST OF VARIETIES
(Project No. Ag. 76)

Variety	Source of seed	Average height of plants	Stage of maturity at harvest	Yield per acre 1929	
				Green weight	Dry matter
		in.		tons	tons
Mammoth Russian	Dak. Imp. Seed Co.	47	Heads forming	8·69	1·45
Ottawa 76	Cen. Exp. Farm	50	Late milk 50%	7·78	1·28
Manchurian	A. E. McKenzie	49	in bloom.	7·19	1·21
Mammoth Russian	K. McDonald	47	Heads forming	7·47	1·19
Mennonite	Rosthern Exp. Station	35	Firm dough	4·99	0·74

Although sunflowers yielded somewhat low in 1929, the crop was decidedly superior to corn in all respects. In height it was approximately double, more advanced in maturity and the yield was more than three times that of corn. A similar comparison can be made for these two crops in practically every season at this Station. For this area, sunflowers are a more dependable ensilage forage crop than corn.

FIELD ROOTS

Mangels, fall turnips, swedes and sugar beets were seeded the last two days in May and harvested the last week in September. All were sown in rows three feet apart and plants thinned to twelve inches apart in the row.

TABLE 60—MANGELS—TEST OF VARIETIES
(Project No. Ag. 16)

Name of variety	Source of seed	Yield per acre 1929	
		Green weight	Dry matter
		tons	tons
Prizetaker Yellow Globe	A. E. McKenzie	3·83	0·58
Giant Yellow Globe	A. E. McKenzie	4·35	0·57
White Green Top Half Sugar	Hjalmar Hartmann	3·30	0·50
Yellow Intermediate	Cen. Exp. Farm	2·78	0·51
Giant Long Red	A. E. McKenzie	3·00	0·45
Elvetham Mammoth	Hjalmar Hartmann	2·63	0·44
Yellow Eckendorfer	Svalof	3·15	0·43
Tarroje Barres	Hjalmar Hartmann	2·70	0·40
Red Eckendorfer	Svalof	2·58	0·35

TABLE 61.—FALL TURNIPS—TEST OF VARIETIES
(Project No. Ag. 46)

Name of variety	Source of seed	Yield per acre 1929	
		Green weight	Dry matter
		tons	tons
Purple Top Mammoth	Sutton	12·83	1·16
Early Six Weeks	Sutton	10·28	1·06
Red Paragon	Sutton	8·03	0·92
Fynsk Bortfelder	Hjalmar Hartmann	8·03	0·88
Purple Top		6·00	0·88
Purple Top Mammoth	Steele Briggs	7·35	0·84
Hardy Green Round	Sutton	6·90	0·80
Greystone Devonshire	Steele Briggs	7·28	0·78
Purple Top Aberdeen	Sutton	6·15	0·73
Pomeranian White Globe	Steele Briggs	6·08	0·70
White Globe	Ewing	4·88	0·63
Green Top Yellow Aberdeen	Ewing	4·35	0·58

TABLE 62.—SWEDES—TEST OF VARIETIES
(Project No. Ag. 51)

Name of variety	Source of seed	Yield per acre 1929	
		Green weight	Dry matter
		tons	tons
Bangholm	Svalof	7·80	1·13
Monarch	A. E. McKenzie	7·13	1·13
Olsgaard Bangholm	Hjalmar Hartmann	7·73	1·09
Bangholm	Exp. Farm, Kentville	6·75	1·03
Ditmars	McNutt	7·13	1·01
Superlative	A. E. McKenzie	6·30	0·97
Bangholm Klank	Hjalmar Hartmann	6·45	0·94
Improved Yellow Swedish	General Swedish Seed Co.	5·55	0·86
Magnum Bonum	Ewing	5·33	0·86
Bangholm	Ewing	5·63	0·85
Bangholm	Exp. Farm, Nappan	5·40	0·83
Bangholm	A. E. McKenzie	5·55	0·82

TABLE 63.—SUGAR BEETS—TEST OF VARIETIES
(Project No. Ag. 66)

Name of variety	Source of seed	Yield per acre 1929	
		Green weight	Dry matter
		tons	tons
Horning	Dom. Sugar Co.	2·93	0·70
Rabbethge & Giesecke	Dom. Sugar Co.	2·25	0·47
Fredericksen	Dom. Sugar Co.	2·70	0·40

Growth was slow for all roots during the past season and at no stage was there a rally in the growth. Dry weather continued in late summer and early fall so that the roots did not have a chance to recover. In most seasons at this Station, turnips and swedes produce a moderate crop, but it is rare to obtain economic returns from mangels and more particularly from sugar beets. Tests of field roots over a period of years indicate that this crop is not destined to become popular in this vicinity.

ANNUAL HAY CROPS

Among the cultivated forage, annual hay crops continue to provide the largest proportion of feed used in northwestern Saskatchewan. Several factors have contributed to its present status. A fair yield is usually obtained. Seed is readily available. Machinery for its production is used on the average farm. Other classes of forage do not fill these requirements so readily. Hence the popularity of annual hay crops. Experiments in progress under this heading include dates of seeding oats for hay, time of cutting oats for hay, comparison of different annual hay crops and varieties of peas for hay.

TABLE 64.—DATES OF SEEDING OATS FOR HAY
(Project Ag. 242)

Date	Yield per acre 1928-1929					
	Alaska			Banner		
	Green weight	Cured hay	Dry matter	Green weight	Cured hay	Dry matter
	tons	tons	tons	tons	tons	tons
1st date	4·76	2·04	1·80	5·85	2·49	2·19
2nd "	3·32	1·47	1·29	5·71	2·57	2·27
3rd "	3·33	1·44	1·26	3·75	1·68	1·47
4th "	3·20	1·48	1·30	2·32	1·26	1·56
5th "	1·94	0·91	0·80	2·30	1·34	1·18
6th "	1·52	0·94	0·83	1·30	0·78	0·69
7th "	1·63	0·95	0·84	1·55	0·83	0·73

In this experiment an early variety and a late variety are used, represented by Alaska and Banner respectively. Dates extend from late in May until early July. The late oat, represented by Banner, has yielded more forage than the early variety. These results indicate that seeding oats for hay after the middle of June cannot be recommended and that this crop should be seeded as soon as the spring rush work is finished.

TABLE 65—TIME OF CUTTING OATS FOR HAY
(Project Ag. 245)

Name of variety	Stage cut	Yield per acre					
		1929 Results			Three-year average 1927-29		
		Green weight	Cured hay	Dry matter	Green weight	Cured hay	Dry matter
		tons	tons	tons	tons	tons	tons
Banner	Bloom	3·09	1·00	0·88	10·04	2·69	2·37
Victory	"	3·27	1·13	0·99	10·37	2·67	2·35
Gold Rain	"	3·15	1·06	0·93	9·74	2·56	2·25
Leader	"	2·94	0·98	0·86	9·99	2·45	2·16
Columbian	"	2·67	0·93	0·82	9·28	·36	2·08
Longfellow	"	2·48	0·82	0·72	8·34	2·09	1·84
Liberty	"	1·53	0·56	0·49	7·01	1·58	1·39
Daubeney	"	1·47	0·56	0·49	6·36	1·44	1·27
Alaska	"	2·01	0·76	0·67	5·31	1·23	1·08
Gold Rain	Milk	3·00	1·19	1·05	8·41	2·76	2·43
Victory	"	2·67	1·09	0·96	7·74	2·66	2·34
Banner	"	2·52	1·00	0·88	8·06	2·58	2·27
Leader	"	2·46	0·98	0·86	7·46	2·48	2·18
Columbian	"	2·28	0·97	0·85	7·20	2·48	2·18
Longfellow	"	2·37	0·97	0·85	6·86	2·38	2·09
Daubeney	"	1·59	0·76	0·67	6·87	2·32	2·04
Alaska	"	2·07	0·92	0·81	6·91	2·31	2·03
Liberty	"	1·74	0·65	0·57	6·96	2·24	1·97
Banner	Dough	2·28	1·03	0·91	6·59	3·19	2·81
Columbian	"	2·16	1·10	0·97	6·03	3·16	2·78
Victory	"	2·34	1·15	1·01	6·42	3·01	2·65
Gold Rain	"	2·46	1·05	0·92	6·99	2·94	2·59
Leader	"	1·95	0·97	0·85	5·82	2·85	2·51
Longfellow	"	1·71	0·88	0·77	6·08	2·80	2·46
Daubeney	"	1·56	0·82	0·72	5·85	2·53	2·23
Alaska	"	1·80	0·91	0·80	5·33	2·49	2·19
Liberty	"	1·35	0·70	0·62	5·93	·44	2·15

When varieties of oats are cut for hay at different stages of maturity, late varieties have produced a higher yield than earlier sorts whether cut in bloom, milk or early dough. Generally speaking, higher yields of hay are obtained as maturity advances. The bloom stage has a higher percentage of moisture than the dough stage and is, consequently, more difficult to cure.

TABLE 66.—COMPARISON OF CROPS FOR ANNUAL HAY

(Project Ag. 246)

Crops	Rate of seeding per acre	Yield per acre					
		1929 Results			Three-year average 1927-29		
		Green weight	Cured hay	Dry matter	Green weight	Cured hay	Dry matter
	lb.	tons	tons	tons	tons	tons	tons
Banner oats	70	2·85	1·33	1·17	7·37	3·10	2·73
Mckay peas	56						
Banner oats	85	2·50	1·17	1·03	6·56	3·08	2·71
Feeder barley	96	2·80	0·85	0·75	6·23	2·58	2·27
Alaska oats	85	2·45	1·13	0·99	6·05	2·56	2·25
Chancellor peas	40	2·24	1·00	0·88	6·28	2·40	2·11
Alaska oats	56						
Hungarian millet	30	1·80	0·95	0·84	4·46	1·80	1·58
Siberian millet	30	2·27	0·91	0·80	4·98	1·74	1·53
Prolific spring rye	70	2·80	1·08	0·95	6·47	1·70	1·50
Common millet	30	0·95	0·60	0·53	*2·13	0·95	0·84
Japanese millet	30	0·52	0·31	0·27	*1·62	0·59	0·52

*Two-year average.

In this experiment a number of annual hay crops are compared. Millets frequently attract attention but their yield is not in keeping with their mid-summer appearance. Spring rye is not high in yield and the palatability of the feed is not attractive to stock. Feeder barley, an early, beardless variety, ranks high in this test. While Banner oats seeded alone is practically equal in yield when compared with Banner oats and Mackay peas sown together, the increased palatability and higher feeding value give preference to the mixture.

TABLE NO. 67—VARIETIES OF PEAS FOR HAY

(Project Ag. 247)

Name of variety	Stage of maturity when cut	Average length of vine	Yield per acre Three-year average		
			Green weight	Cured hay	Dry matter
		inches	tons	tons	tons
Arthur Ott. 18	Pods formed	38	8·47	2·13	1·87
Mackay Ott. 25	"	41	8·15	1·98	1·74
Solo	"	36	7·99	1·77	1·56
Chancellor Ott. 26	"	37	7·94	1·58	1·39

Field peas, when sown alone for an annual hay crop, yield less than coarse grains used for this purpose. Unless peas make vigorous growth early in the season, weeds greatly reduce their yield. Difficulty is experienced in cutting and curing with machinery usually available on the average farm. Results at this Station indicate that peas for annual hay should be sown with oats.

BIENNIAL AND PERENNIAL HAY CROPS

Biennial and perennial hay crops possess advantages over annual hay crops in that they store up plant food in the soil, add binding fibre and assist in fighting weeds. On the other hand annual hay crops possess the advantage of greater dependability. Previous experiments at this Station with biennial and perennial hay crops have shown that Arctic sweet clover and western rye grass are the most dependable and satisfactory for this area, our work is therefore, concentrated on these two crops.

TABLE 68.—METHODS OF SEEDING SWEET CLOVER

(Project No. Ag. 162)

Source	Depth of seeding	Seed treatment	Yield per acre 2-year average 1928-29		
			Green weight	Cured hay	Dry matter
			tons	tons	tons
Commercial	1½ inches deep	Scarified	4·39	1·15	1·01
Scott	1½ "	"	5·67	1·51	1·33
Scott	1¾ "	"	5·27	1·39	1·22
Scott	2¼ "	"	5·93	1·49	1·31
Scott	1½ "	Unscarified	5·50	1·49	1·31
Scott	1½ "	With pods on	5·04	1·48	1·30

Points covered in this experiment are a subject of frequent inquiry. It is interesting to note that unscarified seed has produced yields practically equal to that from scarified seed. Even seeding sweet clover with pods or hull on has had practically no effect on the yield but the crop was about a week later in blooming. Depth of seeding has had practically no effect on yield. Our results indicate that home grown sweet clover seed is preferable to commercial.

TABLE 69.—WESTERN RYE GRASS—TEST OF STRAINS FOR YIELD

(Project Ag. 221)

Strain No.	Three-year average yield per acre 1927-29		
	Green weight	Cured hay	Dry matter
	tons	tons	tons
28	3·98	1·73	1·52
77	3·88	1·57	1·38
8	3·47	1·57	1·38
7	3·48	1·53	1·35
114	3·51	1·49	1·31
Commercial	3·39	1·49	1·31
86	3·42	1·48	1·30
97	3·59	1·47	1·29
9	3·32	1·45	1·28
39	3·19	1·45	1·28
99	3·37	1·44	1·27
87	3·41	1·43	1·26
15	3·36	1·43	1·26
26	3·20	1·43	1·26
16	3·16	1·42	1·25

At this Station, fifty-nine strains of western rye grass are under test for qualities required in a good hay grass. A three-year average is shown for fourteen strains and commercial seed. None of these numbered sorts are available commercially and it will be some years before this work is concluded.

POULTRY

The poultry on hand December 31, 1929, consisted of 377 Barred Plymouth Rocks and 9 Bronze turkeys.

Seventy-eight Barred Rock females completed their first laying year in the autumn of 1929, showing an average record of 216 eggs per bird. The average of the six highest records is 271, and the highest individual record 288 eggs. With the housing facilities and equipment provided at present it is possible to raise from 1,000 to 1,100 chicks each season, but the present equipment does not warrant the hatching of day-old chicks for sale. The successful hatching season of 1929 is indicated by the fact that no other Farm or Station in Canada showed a lower egg requirement per chick at three weeks of age. Three Stations, including Scott, showed 1.6 eggs required per chick raised to three weeks. Hatching eggs, yearling hens, pullets and cockerels are sold to poultry breeders. Blood samples are taken from each bird during the winter when the flock is smallest and these samples are used to detect and control Pullorum disease (bacillary white diarrhœa), which is carried apparently dormant in the adult.

FEEDING

In view of the frequent inquiries concerning the feeding of growing chicks and laying stock, it is considered well worth while to outline the feeding practices followed at this Station.

Feeding of Growing Chicks.—The chicks are not removed from the incubator until the twenty-second day and no food is given for forty-eight hours after coming from the incubator. The first food mixture consists of equal parts of finely cracked wheat, corn, and hulless oats fed dry on a clean board or heavy paper. One ounce of food for fifty chicks is fed five times per day, and if any feed is left after a five-minute period it is removed. After the first week a dry mash is used to replace one of the five feeds each day. This mash is left before the chicks longer each day until it can be placed in a hopper or self-feeder at the age of about three weeks. This mash is made up of one part each of bran, shorts, cornmeal and oat chop (sifted or hulless), one-half part beef scrap and one-quarter part bone meal. As soon as the chicks are eating well from the hopper the cracked grain is gradually increased in quantity and fed less frequently until they are receiving it only morning and evening in the litter outside.

Until the chicks are able to get greenfeed outside, it is supplied to them in the form of sprouts from oats for the laying stock. In sprouting oats, the sprouts are allowed to become two or three inches high and are then cut off with large shears and chopped fine. Any changes necessary in feeding are made gradually.

If milk is available it may be given separately and used to replace the beef scrap mentioned, but should be either sweet or sour every day rather than changing from sweet to sour frequently.

Fuel for Brooder Stoves.—Nothing but hard coal burning brooder stoves have been used at this Station, and on account of the high price of hard coal other fuels have been tried. Petroleum coke was used for most of the stoves in 1929 with very good success. It burns more readily, which necessitates adequate checks in pipe or other draft controls. It comes in irregular sized lumps and must be broken, but 75 pounds seems to produce the same heat as 100 pounds of hard coal, and the coke can usually be purchased from $3 to $5 per ton cheaper.

FEED FOR LAYING STOCK.—The following plan of feeding has given good results at this Station: *Dry mash* (kept before the birds winter and summer) equal parts by weight of shorts, bran, barley chop, oat chop, and beef scrap. To each 100 pounds of the mixture one-quarter of a pound of salt and 2½ pounds of fine charcoal are added. The beef scrap may be omitted providing plenty of milk is supplied daily. During extremely cold weather some of the mash is moistened with hot water until it is in a crumbly condition then fed warm in a trough. After five minutes, any that is left is removed.

It is considered that the fertility of the eggs and the vitality of the chicks may be increased by feeding 1 per cent of cod liver oil with the dry mash during the winter and hatching season.

Scratch Grain.—This is made up of four parts of wheat or wheat screenings to one part oats and one part barley. This is fed in the evening at the rate of 16 pounds per 100 birds.

Green Feed.—When fresh green feed is not available a mangel or cabbage is hung to the wall inside the house until freezing weather comes, after which sprouted oats are used for green feed at the rate of 8 to 10 pounds per 100 birds, given about 10 a.m. each day. A simple method of sprouting oats is to have a water-tight container large enough to hold sufficient oats for one day's feed and five or six similar containers having drain holes in the bottom. These are placed in a warm room where there is no danger of freezing at night. A new lot is soaked each day as the previously soaked lot is emptied into the next container. Thus all oats are moved daily to prevent moulding and each container holds one day's feed. Water is added to each lot daily to assure sufficient moisture for good germination. The last lot is nicely sprouted for each day's feed.

INCUBATORS

Three makes of incubators were used in 1929 and the table submitted shows the results obtained:—

TABLE 70.—HATCHING RESULTS FROM DIFFERENT MAKES OF INCUBATORS

Incubator	Total eggs set	Per cent fertile	Chicks hatched	Per cent total eggs hatched	Per cent fertile eggs hatched	Per cent chicks hatched alive when banded	Total eggs required for one chick hatched	Total fertile eggs for one chick hatched	Total eggs required for one chick when wing banded
Buckeye.....	1,041	92·89	669	64·26	69·18	92·37	1·55	1·44	1·08
Prairie State.	249	98·39	186	74·69	75·91	93·54	1·33	1·31	1·06
Imperial.....	498	96·58	333	66·86	69·23	90·69	1·49	1·44	1·10

The results shown in the table indicate that the three incubators under test were all quite efficient.

TABLE 71—CASH STATEMENT FOR 1929
Barred Plymouth Rocks

	Expenditures	Receipts
	$	$
3,504 dozen eggs at an average price of 37·7cents per dozen		1,321 00
Adult breeding stock and dressed fowl		147 40
Young stock and dressed chicken		846 30
—Feed for 1929 to all stock—		
7,020 pounds oats at an average price of 1·9 cents per pound	132 94	
2,475 pounds barley at an average price of 1·6 cents per pound	40 19	
3,200 pounds bran at an average price of 1·8 cents per pound	57 15	
3,600 pounds shorts at an average price of 1·7 cents per pound	60 80	
10 gallons cod liver oil at $2.25 per gallon	22 50	
200 pounds fish meal at an average price of 5·3 cents per pound	10 60	
200 pounds skim milk powder at 7·8 cents per pound	15 60	
150 pounds salt at 2·1 cents per pound	3 15	
4,570 pounds frozen wheat at 1·2 cents per pound	55 64	
900 pounds corn at 2·8 cents per pound	25 50	
900 pounds grit at 1·9 cents per pound	17 10	
1,000 pounds oyster shell at 1·9 cents per pound	19 40	
2,000 pounds beef scrap at 4·5 cents per pound	89 30	
800 pounds charcoal at 4·2 cents per pound	33 50	
300 pounds bone meal at 2·5 cents per pound	7 60	
Fuel for incubators and brooders	38 50	
Returns less cost of all feed	1,685 23	
	2,314 70	2,314 70

The stock on hand January 1 consisted of 329 adult birds and at December 31, 377 birds. Labour and cost or rent of equipment has not been considered for the reason that in experimental work these items are not comparable to average conditions. In considering the net returns and the number of birds on January 1, the average return per bird excluding labour and equipment is 50¼ cents.

EXPERIMENTAL FEEDING FOR WINTER EGG PRODUCTION

The following experiments cover a period of six months ending in May each year. Some have been conducted twice and others three times to verify results.

COMMERCIAL VS. HOME-MADE MASH

Radio laying mash has been compared for three seasons with the standard home-made mash described under methods of feeding in this report.

TABLE 72.—COMMERCIAL VS. HOME-MADE MASH (3-YEAR AVERAGE)

Data per bird	Cost of feed	Eggs laid	Value of eggs	Feed cost per dozen	Returns over cost of feed
	$ cts.		$ cts.	cts.	$ cts.
Commercial mash	1 25	90	2 55	17	1 30
Home-made mash	0 99	90	2 48	13	1 69

The commercial mash was slightly higher in price and the lot getting the home-made mash laid a few more eggs when the price was high, which accounts for a greater return for the same number of eggs. The average returns for three years above cost of feed show 39 cents per bird in favour of the home-made mash.

HOME-MADE VS. HOME-GROWN MASH

The home-made mash is the standard mash recommended for general use. The home-grown mash contains wheat chop to replace the bran and shorts by weight as used in the standard mash, thus all except beef scrap and charcoal is produced on the farm.

TABLE 73.—HOME-MADE VS. HOME-GROWN MASH (2-YEAR AVERAGE)

Data per bird	Total cost of feed	Eggs laid	Value of eggs	Feed cost per dozen	Returns over cost of feed
	$ cts.		$ cts.	cts.	$ cts.
Home-made mash	1 01	99	2 65	12	1 64
Home-grown mash	1 15	105	2 80	12	1 65

The two-year average shows the two mixtures to be approximately equal in value. In this case the home-grown mash produced six more eggs per bird, but this is offset by the slightly higher price of wheat as compared with the bran and shorts which it was replacing. A third test is being conducted during the winter of 1929-30.

FISH MEAL VS. BEEF SCRAP

The protein content of the two products in question was practically the same, hence the ration was identical in every way except that in one case fish meal was used to replace the beef scrap pound for pound.

TABLE 74.—FISH MEAL VS. BEEF SCRAP (2-YEAR AVERAGE)

Data per bird	Total cost of feed	Eggs laid	Value of eggs	Feed cost per dozen	Return over cost of feed
	$ cts.		$ cts.	cts.	$ cts.
Beef scrap	1 01	99	2 65	12	1 64
Fish meal	1 12	104	2 88	13	1 76

Fish meal, at a slightly greater cost, has increased the returns by 12 cents per bird on a two-year average. A third test is under way during 1929-30.

HULLESS VS. COMMON OATS

With a view to ascertaining the relative value of hulless and common oats for laying stock a test has been conducted for three seasons by replacing the common oats in the standard mash and scratch grain pound for pound with hulless oats.

TABLE 75.—HULLESS VS. COMMON OATS (3-YEAR AVERAGE)

Data per bird	Total cost of feed	Eggs laid	Value of eggs	Feed cost per dozen	Returns over cost of feed
	$ cts.		$ cts.	cts.	$ cts.
Hulless oats	1 07	94	2 64	14	1 57
Common oats	1 08	89	2 42	14	1 34

The hulless oats have produced five eggs per bird more and given greater return of 23 cents per bird on a three-year average. Hulless oats fed in these combinations have been worth approximately twice as much as common oats

because this extra return of 23 cents per bird resulted from feeding approximately 10 pounds of oats per bird as combined in the mash and scratch grain for the period of six months.

SKIM-MILK POWDER VS. BEEF SCRAP

In this test the skim-milk powder used contained 38 per cent protein as compared with 60 per cent in the beef scrap. The milk powder was increased in quantity sufficiently to make the total protein the same as in the mash fed in the check lot. This increased the bulk of the mash but compared more favourably in eggs produced than in a previous test where the protein was lacking by reason of a reduced quantity of the milk powder.

TABLE 76.—SKIM-MILK POWDER VS. BEEF SCRAP (SINGLE TEST)

Data per bird	Total cost of feed	Eggs laid	Value of eggs	Feed cost per dozen	Returns over cost of feed
	$ cts.		$ cts.	cts.	$ cts.
Beef scrap	1 14	97	2 48	14	1 34
Skim-milk powder	1 82	93	2 51	23	0 69

The price of milk powder used in this test was $13.50 per hundred, which cuts the returns to a low figure and the eggs laid were four less per bird. The test is being repeated with the price of milk powder reduced by almost half.

GOLDEN WEST SHELL-MAKER VS. OYSTER SHELL AND GRIT

This shell-maker was supplied to this Station free of charge by a firm in the United States which wishes to put the product on the Canadian market. For the purpose of this test, a price of $1.93 per hundred was placed on this product by taking the average price of the oyster shell and grit which it was used to replace.

TABLE 77.—GOLDEN WEST SHELL-MAKER VS. OYSTER SHELL AND GRIT (SINGLE TEST)

Data per bird	Total cost of feed	Eggs laid	Value of eggs	Feed cost per dozen	Returns over cost of feed
	$ cts.		$ cts.	cts.	$ cts.
Oyster shell and grit	1 14	97	2 48	14	1 34
Golden West shell-maker	1 16	101	2 74	14	1 58

In this single test the shell-maker has shown considerable value as used to replace both oyster shell and grit. The test is being repeated to verify these results.

ARTIFICIAL HEAT FOR LAYING HOUSE

In an attempt to overcome the handicap of extremely low temperatures in the laying house, a small stove has been used in one house for two winters. The temperature was seldom below freezing or above 50 degrees Fahrenheit. The first test failed to show sufficient increase in egg production to warrant the practice, but in the second test the results were in favour of the heated pen. The average for two years is shown in the table.

TABLE 78.—ARTIFICIAL HEAT FOR LAYING HOUSE (2-YEAR AVERAGE)

Data per bird	Total cost of feed and fuel	Eggs laid	Value of eggs	Feed and fuel cost per dozen	Returns over cost of feed and fuel
	$ cts.		$ cts.	cts.	$ cts.
Cold house	1 08	92	2 41	14	1 33
Heated house	1 18	97	2 77	15	1 59

After deducting the cost of all fuel, the two-year average shows the heated house to return a profit of 26 cents per bird for the period of six months. The test is being repeated during the winter of 1929-30 to verify results.

TURKEYS

A small flock of Bronze turkeys was started from eggs in 1929 for the purpose of supplying first hand information and good breeding stock to turkey breeders residing in the territory served by this Station. On account of disease complications often arising when the turkeys and chickens are allowed to run on the same land, the turkeys are confined to yards where chickens have never been. In addition to this precaution, the turkeys will be moved to new land each year and not be returned to the same land again for at least three seasons. A five-foot woven wire fence with barbed wire over the gate and braces was sufficient to keep the turkeys in their yard during the past season. A high fence seems unnecessary if there is no place for the birds to perch on the top.

The poults were hatched in an incubator and rearer by use of a coal burning brooder. They were all hatched on May 14 and at the age of 5½ months several of the males weighed 27 pounds each and several of the females weighed 16 pounds each. The first feed mixture for the poults consisted of shorts containing 5 per cent bone meal and 10 per cent fine gravel and grit, moistened with thick, sour, skim-milk one day and boiled eggs the next to which was added cut dandelion leaves, the most convenient green feed available at the time. Onion tops or lettuce are also good for green feed. The first feed was withheld until about 50 hours after hatching following which four feeds per day were given on a clean board or heavy paper. Any feed remaining after a five-minute period was removed. At two weeks of age a dry mash was placed before the poults in a hopper and the moistened feed previously mentioned was given only three times a day.

The mash consisted of the following: shorts, 50 pounds; sifted oat chop, 30 pounds; corn meal, 70 pounds; grit and oyster shell, 10 pounds; bone meal, 5 pounds; cod liver oil, 1½ pounds.

As soon as green feed was available for them outside the cut dandelions were discontinued. At three months, whole grain was given twice daily. A mixture of oats and rape seeded early in the season provides a good pasture and where it is necessary to provide shade, a few rows of sunflowers usually prove valuable for the purpose.

APICULTURE

WINTERING BEES

Fiften colonies were wintered in packing cases outside, nine colonies in the cellar and four in a cavity burrowed into a straw pile closed from the outside. The only loss was one colony in the straw pile which apparently perished from the cold. Two colonies were in double walled hives and two in the single wall hives with no protection other than that afforded by the straw pile. It was a

colony in a single wall hive which perished. If a satisfactory plan can be worked out for wintering in a straw pile, it may be useful to bee-keepers who do not have a suitable cellar or wintering cases. The trial is being repeated during 1929-30. Bees in the cellar passed the winter in good condition. The temperature in the cellar was seldom below 40 or above 50 degrees Fahrenheit and a heavy curtain was hung around the hives to keep them in continual darkness. In the wintering cases no difference was noted in colonies insulated by 6 or 12 inches of shavings. There was very little snow covering, but there was an excellent protection from wind provided by thick shrubbery and trees.

Beekeepers visit the apiary.

SEASON

The first cleansing flight possible was on March 5. Bees were taken from the cellar on March 27 which is earlier than usual. All snow had disappeared by the middle of March. The crocus bloomed on the prairie on April 25 but was set back by cold, changeable weather with high winds and the bees were very slow in brood raising which is unusual with such an early spring. The summer was dry and windy and there was a scarcity of nectar in all flowers. Sweet clover which is the foremost nectar plant in this district, attracted very few bees. As a result of the unfavourable season, the greatest quantity of honey extracted from any one colony was 52 pounds and the greatest production for one day was 6¼ pounds on July 23. Extracting was begun on September 14 and feeding for winter on September 18.

FEEDING FOR WINTER

Sugar syrup made by dissolving two parts of granulated sugar in one part of water is used for winter stores in preference to honey. As soon as the honey is taken away the syrup is fed warm from ten-pound honey pails with finely perforated lids inverted on the top of the frames of the brood chamber. The pail is protected by an empty super with the hive cover on the top. Entrances to hives are restricted to avoid robbing and feeding is continued until each colony weighs at least 75 pounds with bottom board and no cover. Before feeding is started, weak colonies are united until all consist of at least eight frames of bees as it is considered unwise to attempt to winter weak colonies. Any young queens which seem to be worth wintering are placed two in a hive with a division board in the center and each queen is allowed five good frames of bees.

PACKAGE BEES

DATES OF ARRIVAL.—Two 2-pound packages and two 3-pound packages were received from the Southern States on the following dates: May 8, May 18, May 28, and June 7. The four colonies received on May 8 gave a return of 117 pounds of extracted honey, the four colonies received on the 18th, 62 pounds, and the four overwintered colonies used as a check produced 74 pounds. The later shipments of package bees gave no surplus. Three years' results indicate that about May 15 is the most profitable time to import bees from the south.

PACKAGE BEES FOR STRENGTHENING COLONIES

Two colonies were reduced until there were only sufficient bees to cover 2½ frames. Two colonies were left strong enough to cover three frames and two covered 3½ frames. One colony from each pair was left untouched to serve as checks on the colonies of corresponding strengths. To each of the other colonies a two-pound package of bees was added in May.

For a three-year period, including three separate tests, the total quantity of honey extracted was as follows:—

The 2½ frame colonies strengthened by adding a two-pound package of bees—132 pounds of honey, the 2½ frame colonies not strengthened—61 pounds. The three frame colonies strengthened—240 pounds, the three frame colonies not strengthened—56 pounds. The 3½ frame colonies strengthened—169 pounds, the 3½ frame colonies not strengthened—95 pounds.

Irregular variations in honey produced are often due to the variations in the vigour of the queens but the total yield for three tests is in every case in favour of strengthening weak colonies and as six colonies were used each season for three years (18 colonies in all) the main differences must be due to the strength of the colony at the beginning of the season.

For methods of releasing package bees, for methods of detecting preparations for swarming and treatments for swarming, the reader is referred to the annual Report from this Station for 1928 as the same methods were found equally satisfactory during the season of 1929. The value of these methods is indicated by the fact that no colony at this Station has cast a swarm during the past five years previous to which these methods were not employed.

QUEEN RAISING

Queens were again successfully raised for replacements at this Station in 1929 and several were supplied to bee-keepers in the district. However, it is considered that the average bee-keeper with only a few colonies should not attempt to raise queens.

EXTENSION AND PUBLICITY

In 1929 a total of 3,549 letters were received and 5,658 sent out. This did not include distribution of our annual report or other literature. In order of numbers, inquiries by letter on farm subjects were as follows: Field crops, horticulture, live stock, farm machinery and bees with relatively small numbers on other subjects. March and April had the highest totals for letters received with 480 and 448 respectively, but during the summer months only slightly over 200 were received each month because many persons call at the Station for their information.

When weather permitted, enquiring visitors were present daily at the Station, particularly from spring till fall. Organized parties visiting the Station in 1929 were eight groups from ten subdistricts in district twelve of the Saskatchewan Wheat Pool, North Battleford Agricultural Society, Paynton Agricultural Society, Registered Seed Growers and beekeepers. For organized parties interested in

field crops a yield estimating competition provided an attractive feature. While casual visitors are welcome, organized field days arranged in advance with hours set apart to permit the staff to arrange their work, and also give visitors the proper attention, are more satisfactory for all concerned.

An educational exhibit from this Station was displayed at fairs held in Bounty, Delisle, Zealandia, Biggar and Landis. Two representatives were in attendance to discuss results of experimental work and farm problems. The

Farmers estimating yields of grain.

total attendance at these fairs was estimated at 4,650 persons. Assistance was given in judging at ten fairs. Thirty-three local flocks were culled by the poultryman. Five agricultural gatherings were addressed by members of the staff.

The first business of the Station staff is experimental work. While we are always willing to asisst in extension activities away from the Station, when time and circumstances permit, this must be considered subservient to our main work.

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