DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

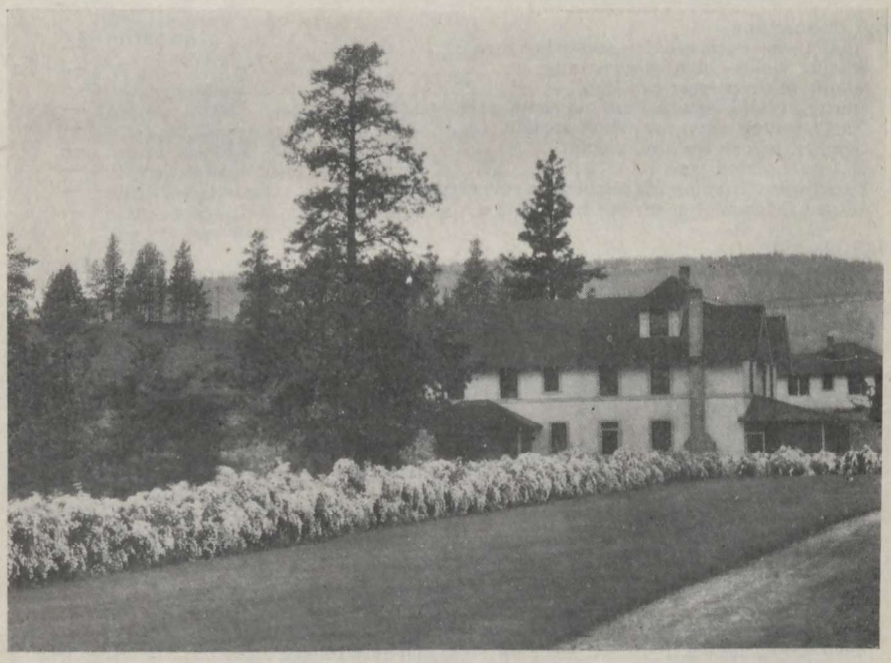
EXPERIMENTAL STATION

SUMMERLAND, B.C.

REPORT OF THE SUPERINTENDENT

W. T. HUNTER

FOR THE YEAR 1924



Spiraea Van Houttei hedge in full bloom at Summerland.

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DOMINION EXPERIMENTAL STATION, SUMMERLAND, B.C.

REPORT OF THE SUPERINTENDENT, W. T. HUNTER, B.S.A.

THE SEASON

The season of 1924, throughout the dry belt of British Columbia was a most difficult one for the farmer. The snowfall during the preceding winter had been one of the lightest on record and the ground was bare from the end of January. Consequently, by the time the ground was ready for seeding the natural moisture had been seriously depleted. Work on the land was started on February 13. Spring and summer rains did nothing to help the situation, the precipitation for the six months March to July reaching 1.69 inches only. The total precipitation for the year was 6·95 inches, the lowest recorded on this Station, being 2.90 inches below the average for the nine years 1916-1924 inclusive. Under these conditions although the orchards did not suffer materially, small seeds and grains were very hard to start and maintain and hay crops were reduced. The summer was hot and dry throughout and irrigation water practically failed on this Station, as well as over the entire valley about the middle of July. Autumn rains were about up to the average.

There was a sudden and severe drop in the temperature about the middle of December—9°F. being recorded on December 17. The ground was bare of snow at the time and the damage both on this Station and throughout the whole valley, was heavy, especially to stone fruits. December and January gave heavy snowfalls but again the ground was bare by the end of January, 1925. No very severe weather was experienced after the new year. Operations on the land were started on February 24, ten days later than the previous year.

TABLE 1.—METEOROLOGICAL RECORDS AT SUMMERLAND, B.C., 1924

Month	Temperature F.					Precipitation			Total sunshine	Total wind	Evaporation
	Highest	Date	Lowest	Date	Mean	Rainfall	Snowfall	Total Precipitation			
						inches	inches	inches	hours	miles	inches
January	51·0	31st	− 6·0	1st	24·0	0·0	6·6	0·66	38·8	6,005	.....
February	55·0	12th	23·0	9th	38·88	0·17	0·7	0·24	85·9	6,939	.....
March	59·0	18th	23·0	30th	39·14	0·05	0·6	0·11	165·1	5,649	.....
April	74·0	29th	27·0	24th	47·87	0·03	0·0	0·03	176·4	7,140	1·04 (7 days)
May	90·0	15th	38·0	26th	61·64	0·08	0·0	0·08	313·2	6,814	5·85
June	96·0	30th	46·0	20th	64·26	0·40	0·0	0·40	257·1	6,511	5·58
July	100·0	2nd	48·0	16th	71·19	0·35	0·0	0·35	318·2	7,088	7·94
August	94·0	11th	45·0	30th	68·40	0·72	0·0	0·72	241·4	6,039	5·50
September	89·0	7th	39·0	20th	61·61	0·55	0·0	0·65	219·6	7,148	3·58 (25 days)
October	67·0	16th	34·0	8th	49·21	0·97	0·0	0·97	122·1	6,747	.....
November	54·0	2nd	12·0	12th	34·46	0·84	1·5	0·99	74·7	7,105	.....
December	58·0	11th	−9·0	17th	21·55	0·16	15·9	1·75	43·4	6,917	.....
Totals	.....	.....	.....	.....	.....	4·42	25·3	6·95	2,055·9	80,102	.....

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TABLE 2—PRECIPITATION AT SUMMERLAND

—	1916	1917	1918	1919	1920	1921	1922	1923	1924	Average nine years
January	1·00	0·34	1·10	0·82	1·64	1·01	0·40	1·07	0·66	0·89
February	1·70	0·58	0·46	1·16	0·03	0·11	0·56	0·26	0·24	0·57
March	0·35	0·39	0·30	0·86	0·46	0·75	1·62	0·07	0·11	0·54
April	0·59	0·98	0·08	0·54	1·63	1·13	0·75	1·29	0·03	0·78
May	0·42	1·84	0·28	0·71	0·06	1·30	0·26	0·93	0·08	0·65
June	1·55	1·25	0·19	0·58	0·98	1·90	0·20	3·37	0·40	1·16
July	1·79	0·33	1·16	0·34	0·84	0·34	0·15	1·24	0·35	0·73
August	0·16	0·18	1·62	0·34	0·18	0·98	1·56	1·29	0·72	0·78
September	0·65	0·89	0·22	1·00	1·51	0·39	1·03	0·56	0·65	0·77
October	0·14	0·08	0·94	0·66	1·66	0·25	1·50	0·81	0·97	0·78
November	0·56	0·10	1·01	2·09	0·70	1·61	0·42	0·49	0·99	0·88
December	1·08	3·22	0·60	0·17	0·54	1·51	0·99	1·98	1·75	1·32
Total	9·99	10·18	7·96	9·27	10·23	11·28	9·44	13·36	6·95	9·85

TABLE 3—EXTREME HIGHEST, EXTREME LOWEST AND MEAN TEMPERATURES AT SUMMERLAND, B.C., 1916-24

Month	1924			1923			1922			1921			1920		
	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean
January	51·0	− 6·0	24·00	44·0	2·0	29·84	37·0	2·0	20·88	54·0	12·0	29·05	57·0	5·0	24·68
February	55·0	23·0	38·88	46·0	− 7·0	24·93	43·0	− 1·0	20·62	50·0	10·0	21·14	46·0	18·0	30·70
March	59·0	23·0	39·14	63·0	19·0	39·08	50·0	12·0	34·15	62·0	19·0	38·97	57·0	18·0	38·11
April	74·0	27·0	47·87	76·0	32·0	48·30	68·0	26·0	45·08	69·0	26·0	44·85	72·0	19·0	43·70
May	90·0	38·0	61·64	78·0	31·0	55·29	85·0	29·0	54·37	82·0	34·0	56·15	77·0	33·0	53·51
June	96·0	46·0	64·26	92·0	44·0	62·50	94·0	47·0	67·47	86·0	43·0	63·60	90·0	40·00	59·70
July	100·0	48·0	71·19	96·0	50·0	70·83	98·0	48·0	70·75	90·0	47·0	68·45	96·0	52·0	72·14
August	94·0	45·0	68·40	90·0	53·0	70·50	91·0	50·0	67·83	92·0	47·0	67·92	98·0	44·0	71·03
September	89·0	39·0	61·61	81·0	37·0	60·58	82·0	42·0	60·03	72·0	37·0	55·21	82·0	40·0	57·60
October	67·0	34·0	49·21	74·0	26·0	49·11	62·0	31·0	48·89	70·0	26·0	48·95	61·0	25·0	44·90
November	54·0	12·0	34·46	56·0	28·0	39·35	46·0	25·0	34·46	55·0	2·0	34·86	52·0	19·0	38·30
December	58·0	− 9·0	21·55	47·0	− 7·0	30·61	49·0	− 5·0	22·09	49·0	− 3·0	24·21	45·0	20·0	33·60

Month	1919			1918			1917			1916		
	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean	Highest	Lowest	Mean
January	47·0	11·0	31·01	44·0	− 2·0	29·47	47·0	−10·0	23·39	47·50	−11·0	11·14
February	43·0	3·0	28·30	48·0	4·0	27·87	43·0	− 2·0	24·29	48·0	−11·0	24·54
March	59·0	8·0	35·70	64·0	11·0	38·74	48·0	9·0	33·17	60·0	20·0	40·01
April	74·0	28·0	48·06	81·0	25·0	48·48	62·0	21·0	44·68	72·5	30·0	48·93
May	78·0	33·0	55·89	79·0	31·0	54·22	76·0	33·0	54·85	82·0	31·0	55·03
June	91·0	37·0	60·14	94·0	37·0	65·16	88·0	42·0	59·63	95·0	39·0	64·41
July	100·0	46·0	69·77	100·0	48·0	68·69	98·0	46·0	70·72	87·0	45·0	65·26
August	93·0	49·0	68·83	88·0	44·0	64·73	96·0	50·0	69·75	93·0	43·0	68·90
September	77·0	34·0	57·41	83·0	43·0	63·34	82·0	41·0	59·73	87·0	38·0	59·53
October	69·0	20·0	43·66	68·0	34·0	51·01	81·0	27·0	50·02	69·0	28·0	46·60
November	53·0	9·0	32·41	58·0	19·0	38·44	52·0	26·0	41·26	53·0	11·0	32·31
December	51·0	− 5·0	23·95	48·0	16·0	31·64	53·0	2·0	28·95	45·0	2·0	23·61

ANIMAL HUSBANDRY

The live stock work at this Station received considerably more attention during this year than in previous years. Up until the present very little had been attempted along breeding lines, other than limited work with sheep and hogs. This was due principally to lack of suitable accommodation. However, the disposal each season of a considerable tonnage of alfalfa, silage and roots has always been a problem at this Station, and there has been a constant demand for manure. As a result it was decided to commence investigation in this division which would prove of value to the district served by the Station, and at the same time necessitate the carrying of sufficient live stock

to use the feeds accumulated each season and also provide manure. Such a programme has been assisted materially by the provision of a horse barn, which will hold fifteen head, with sufficient storage overhead for feeds, and by the erection of a dairy barn. This latter building is in course of construction, and when completed will accommodate up to twenty head, with feed-room annex, and hay-loft room overhead.

However, live stock work will never be a dominant feature of the work of this Station, which is essentially for horticultural work, and the amount of stock carried will therefore always be regulated by the amount of feed available, and to some extent by the nature of the experimental work undertaken. Jersey cattle, Berkshire swine, and Cheviot sheep are established at present.

BEEF CATTLE

PROJECT A. 175—VALUE OF MEAL FOR STEER FEEDING

PROJECT A. 193—FEEDING GRAIN TO STEERS EARLY V. LATE IN FEEDING PERIOD

These projects, which embraced moderate grain feeding from the commencement of a feeding test until the finish vs. moderate feeding for the latter end of the feeding period vs. no grain at all, were commenced on December 1, 1923 and concluded on March 15, 1924.

Twenty-four steers were divided into three equal lots on the former date. All pens were fed equal amounts to roots and silage and all the alfalfa hay that they would clean up. Pen 1 was started on 1 pound per head per day of a meal mixture consisting of oats and barley two parts each, bran 1 part. This was increased at the rate of 1 pound per week until a maximum of 8 pounds per head per day was fed. Pen 2 received no grain whatever. Pens 3, A and B received no grain for first half of the period, then started at 2 pounds per head and raised at the rate of 2 pounds per week until 8 pounds was reached.

The results as seen in Table No. 1 will show that Pen 2, or that pen fed no grain, made a profit over the cost of feed. Pens 1 and 3A and 3B, made a loss. (It may be explained that Pens 3A and 3B, for the purposes of the above project, are one and the same pen.) The feeding period was really too short for accurate data to be obtained as to the value of grain when fed in conjunction with good quality roughages. The steers were marketed just when they were beginning to make their best gains. However, it will be seen that the feeding of high-priced grain does not seem to be a paying proposition *when the quality and quantity of roughages are good.*

PROJECT A. 440—APPLES V. MANGELS FOR STEER FEEDING

Pen No. 3 in these feeding projects was divided at the commencement of the test into two pens of 4 steers each, Nos. 3A and 3B. One pen was fed mangels and the other a corresponding amount of cull apples. Both received grain only during the latter half of the experiment. A glance at table 4 will show that a heavier gain was made by the pen on mangels and a correspondingly better showing in the financial data of the table. However, in fairness to the test it might be explained that Pen 3B, fed apples instead of mangels, contained one steer which did very poorly and only made a gain of 102 pounds. This lowered the average very much. Further, Pen 3B had no shelter and during cold weather suffered more than the other pens. The apples were consumed with relish and in a section of the country where they can be obtained for the hauling cost only, they should provide a good succulence for steer feeding.

TABLE 4—CATTLE FEEDING EXPERIMENT EXTENDING OVER A PERIOD OF 105 DAYS, DECEMBER 1, 1923, TO MARCH 14, 1924

A total of 24 head in four separate pens fed the following rations:—
Pen No. 1, Alfalfa hay, silage, roots; grain, commencing 1 lb. per head per day, increasing 1 lb. per week, to a maximum of 8 lbs. per head per day.
Pen No. 2, Alfalfa hay, silage, roots.
Pen No. 3, Alfalfa hay, silage, roots; grain, commencing Jan. 25, 2 lbs. per head per day, increasing 2 lbs. per week to maximum of 8 lbs. per head per day.
Pen No. 4, Alfalfa hay, silage, apples; grain, commencing Jan. 25, 2 lbs. per head per day, increasing 2 lbs. per week to a maximum of 8 lbs. per head per day.
Value of feeds:—Alfalfa hay $12 per ton; silage $6 per ton; roots $4 per ton; apples no value; grain $32.50 per ton.

—		Pen 1	Pen 2	Pen 3A	Pen 3B
Number of steers		8	8	4	4
Total initial weight, Dec. 1, 1923	lb.	8,166	8,324	4,150	4,411
Average initial weight	"	1,020·7	1,029·2	1,037·5	1,102·7
Total finished weight, March 14, 1924	"	10,096	9,478	4,952	5,032
Average finished weight	"	1,262	1,184·8	1,238	1,258
Total gain	"	1,930	1,244	802	621
Average gain per steer	"	241·25	155·5	200·5	155·25
Average gain per steer per day	"	2·3	1·5	1·9	1·5
Amount grain eaten per group	"	5,152	.....	1,204	1,204
Amount alfalfa eaten per group	"	11,625	13,100	7,651	8,466
Amount silage eaten per group	"	26,436	27,184	13,940	14,029
Amount roots eaten per group	"	7,844	7,812	3,780	.....
Amount apples eaten per group	"	.....	.....	.....	3,896
Cost of feed per group for period	$	248 46	175 77	114 84	112 44
Cost of feed per head for period	$	31 06	21 97	28 71	28 11
Cost to produce 1 lb. gain	c.	12·87	14·12	14·31	18·00
Cost of group at $4.80 per cwt.	$	391 97	395 23	199 20	211 73
Cost of group plus cost of feed	$	640 43	571 00	314 04	324 17
Selling value at $6.15 per cwt.	$	620 90	582 90	304 55	309 47
Gain or loss per group	$	−19 53	+11 90	−9 49	−14 70
Gain or loss per head	$	−2 44	+1 49	−2 37	−3 67

DAIRY CATTLE

A small herd of five registered Jersey females was purchased in January of this year. These cattle were carefully chosen from different breeders' herds in the province.

Table 5 gives the R.O.P. records of the entire herd completed during the year. The average production for the 5 females, at an average age of 4 years was 8797.4 pounds of milk, testing 6.05 per cent, yielding 527.6 pounds of butterfat, over an average period of 329 days.

TABLE 5—LACTATION RECORDS COMPLETED DURING YEAR

Name of Cow	Registered No.	Age Commencement of test	Date test commenced	Date Calved following test	R.O.P. Record No.	Number days in test	Milk produced	Butterfat	Average per cent butterfat
		yrs. days				days	lbs.	lbs.	lbs.
Leonette of Avelreagh	11873	4 –	Feb. 11, 23	Mar. 2, 24	267A	305	10,999	565	5·14
St. Mawes Landseer 3rd D.	15228	3 156	Feb. 20, 23	May 29, 24	1447	365	9,279	612	6·60
Foxhall's Viola of S.C.	14881	5 –	June 8, 23	July 2, 24	362A	305	8,675	535	6·17
Calgarth Starlight	17479	2 105	June 6, 23	June 27, 24	1498	365	6,634	424	6·39
Violet's Melia Ann	11599	4 198	Aug. 26, 23	Sept. 10, 24	357A	305	8,400	502	5·98
Average	.....	4 –	.....	.....	.....	329	8,797·4	527·6	6·00

Three heifer calves and two bull calves were dropped during the year. One bull calf was disposed of to good advantage for use in a mixed herd of pure-bred Jerseys and grades. All the rest are retained in the herd at present.

In June, a herd sire, Waikiki Aviator No. 192,629 was transferred to this Station from the Sidney Experimental Station. Unfortunately this splendid individual died late in the year.

As the herd is small and is being handled in temporary quarters pending completion of the dairy barn, no experimental work is under way as yet.

HORSES

Only work horses are kept at this Station. These were augmented by the purchase, early in the year, of three young teams. Several old or worn-out horses were killed or disposed of. The horse-stable, completed in April, has made possible improved facilities for handling the horses, and the general condition of these is better than formerly.

Horse-barn at the Summerland Station

SHEEP

The Cheviot flock consists at present of twenty-four head. This pure-bred flock will be severely culled and graded, and only the best retained in future. The flock is too small to allow for experimental work at present.

SWINE

The breeding of Berkshires for bacon type was continued during the year. Some progress was made, but results from the senior boar, " L.E.S. Courier 4 ", have been slightly disappointing, as his progeny show little or no improvement in type over that of their dams. His successor " Ottawa Model 92 ", appears to be more promising as a transmitter of bacon type. Two litters per sow were raised this year, six sows farrowing in the spring and eight farrowing in September.

An experiment is being planned with the litters farrowed this fall to determine the relative value of roots versus cull apples as hog feed; also to determine the value of alfalfa hay in the rations of fall litters. These projects will be reported in the report for the year 1925.

BEES

The season 1924 was average in the South Okanagan Valley with regard to honey production. The winter of 1923-24 was short, and the spring earlier than usual, with the result that the bees made an earlier start with brood rearing than is usual in this district.

The principal sources of nectar were alfalfa, Dutch, alsike and sweet clovers, although some of the minor plants, blooming only for short periods, helped to increase the honey flow.

Six colonies out of eight survived the winter of 1923-24, one dying from dampness, and the other from lack of stores. During the spring this number was increased to eleven by artificial swarming. One colony created on May 10 yielded over 90 pounds of honey, besides about 30 pounds retained in the hive for winter consumption.

Four new queens were received from Ottawa in August, two being successfully introduced after the old queens had been destroyed. All colonies were re-queened before going into winter quarters, nine of these queens being bred on the Station.

WINTERING BEES IN FOUR-COLONY CASE—PROJECT AP. 8

One death occurred under this method of wintering, occasioned through lack of stores. The average number of combs covered by bees in the other three hives on May 2nd was 9 frames. The average weight of stores was 11.6 pounds.

WINTERING BEES IN SINGLE COLONY CASE—PROJECT AP. 10

One colony was lost during the winter, owing to the cover blowing off during a rainstorm. The remaining three colonies were removed on May 2nd, in good shape, the average number of frames covered by bees on this date being 10.6, whilst the stores averaged approximately 28.3 pounds per hive.

RETURNS FROM APIARY—PROJECT AP. 20

The total honey flow extracted amounted to 715 pounds, or 119.1 pounds per colony' spring count. The greatest yield for one hive was 123.5 pounds, with 90.5 from a nucleus. The value of this honey at the local market price of 25 cents per pound was $178.75. The value of the colony increase at $7 a colony was $21, which makes a return of $189.75, after deducting $10, the cost of 100 pounds of sugar used for fall feeding.

CEREALS

Inadequate soil moisture and cold winds at seeding time were very unfavourable for uniform germination and early development of spring-seeded cereals. However, the season on the whole was suitable for the production of some excellent crops. The lack of sufficient soil moisture for the winter wheats retarded their growth until the arrival of the late autumn rains. Consequently, growth was very short by the time winter set in. However, these winter wheats give promise of some interesting results for next season.

BARLEY, OATS, SPRING AND WINTER WHEAT—TESTS OF VARIETIES OF STRAINS—PROJECT NOS. CE 1, 4, 5, 6

Previous experiments with cereals at this Station consisted entirely of testing varieties of wheat, barley and oats in large plots, but with inadequate land and variable soil, these large plots were not conducive to best results. To somewhat overcome this difficulty of insufficient and variable soil and at

the same time make provision for the testing of many more varieties and strains, the Rod-row system of plots was started in 1924. By this system, 12 strains of spring wheat, 16 of winter wheat, 15 of oats and 15 of barley are under test in plots replicated four times.

FIELD BEANS—TEST OF VARIETIES OR STRAINS—PROJECT NO. CE. 8

Sixteen varieties of field beans were tested in duplicate 1/165 acre plots on light loam soil which had grown grain the previous year. They were planted on May 10th and harvested during early August. Adequate soil moisture and a warm soil at planting time gave excellent germination of all varieties. Development was good throughout the season. Irrigation was timely and sufficient.

Norwegian, White Marrowfat, White Navy and White Wonder have been fairly consistent each year in highest yields of the varieties under test during the five-year period. It is doubtful whether the Norwegian would ever be a popular bean with the "trade," owing to its brown colour. Being a legume and a hoed crop, beans help to enrich and clean the soil. Under irrigation, an even distribution of moisture and a warm soil is essential at planting time to secure quick, uniform germination and early development that is so necessary in the successful culture of this crop. To help the small farms of the Okanagan valley to be more self-sustaining, a small patch of field beans, at least enough to supply the family table, should be planted each year.

TABLE 6—FIVE-YEAR AVERAGE YIELD OF A NUMBER OF VARIETIES OF FIELD BEANS THAT HAVE BEEN GROWN AT THE SUMMERLAND STATION

Variety	Average yield for five years 1920–24 in pounds per acre
	pounds
Norwegian	929
White Marrowfat	928
White Navy	884
White Wonder	851
Yellow Eye	850
Pierce's Improved Tree	814
New Prize Winner	813
White Pea	789
Robust Navy Pea	752
Large White, Ottawa 713	701
V. I. S. 3	693
Beauty, Ottawa 712	603
Average—12 varieties—5 years	801

FIELD HUSBANDRY

Alfalfas, clovers and grasses came through the winter 1923-24 in excellent condition. Irrigation water was plentiful for field crops until near the end of June after which time no water was available This shortage of water for field crops throughout the latter part of the growing season materially reduced yields.

ROTATION—SEVEN YEARS

Horticultural expansion in 1924 necessitated a considerable reduction of land used for experiments in field husbandry. Consequently, the seven-year rotation in practice at this Station had to be abandoned. This rotation con-

sisted of one year hoed-crop—North Western Dent Corn and Russian Mammoth sunflowers for ensilage—one year in Marquis Spring Wheat and five years in alfalfa. In the third year of this rotation, Turkestan alfalfa was seeded on a well-prepared and firm seed-bed without a nurse-crop and at the rate of 12 pounds of seed per acre. In the fifth year of alfalfa, the third cutting was ploughed under. During the winter manure was applied at the rate of 10 tons per acre and in the spring ploughed in preparation for hoed-crop. This rotation gave excellent results, particularly in improving the physical condition and nitrogen content of the soil. The growing of alfalfa for five years in the seven-year rotation provided an economical and practical method of increasing the two most important constituents needed at the present time in the semi-arid irrigated soils of the southern interior of British Columbia—humus and nitrogen. The results of this rotation in average yields per acre were: alfalfa, 3 tons, 717 pounds; North Western Dent corn, 11 tons, 840 pounds; sunflowers, Russian Mammoth, 12 tons, 843 pounds, and Marquis wheat, 25 bushels and 24 pounds.

ALFALFA—YIELDS OF HAY. EIGHT-YEAR AVERAGE

Insufficient and untimely irrigations have considerably reduced the yields of alfalfa given herewith. The average type of soil is gravelly loam. The general topography is high, slightly rolling and with all aspects. The average results for eight years are tabulated. (Table 7.)

TABLE 7—ALFALFA—AVERAGE YIELD OF HAY—1917-24

Year	Average yield per acre	Precipitation			Irrigation	
		Rainfall	Snowfall	Total	Rate of application in acre-inches	Acre-inches of water per ton of hay
	tons lbs.	inches	inches	inches	acre-inches	acre-inches
1917	3 1,115	5·97	42·15	10·18	36·36	10·22
1918	4 1,830	5·74	22·20	7·96	41·80	8·50
1919	2 1,507	4·81	44·56	9·27	21·65	7·86
1920	2 1,616	8·34	18·90	10·23	21·49	7·65
1921	4 264	8·51	27·70	11·28	11·22	2·71
1922	2 412	6·12	33·20	9·44	2·43	1·10
1923	3 282	11·37	19·90	13·36	31·00	9·86
1924	2 1,082	4·42	25·30	6·95	34·50	13·57
Average—8 years	3 513	6·91	29·24	9·83	25·06	7·68

ALFALFA

Inoculation is never harmful, usually helps and is often essential, especially on soils that have not previously grown sweet clover or alfalfa. Farmers requiring nitro-culture may obtain same free of charge with full directions for using from the Division of Bacteriology, Central Experimental Farm, Ottawa. The number of pounds of seed to be inoculated and the approximate time of seeding should be sent with the application. Inoculation may also be accomplished by taking soil, when the sun is not shining, from a well established field of either sweet clover or alfalfa and scattering it on the field that is to be seeded at the rate of approximately 500 pounds per acre and disced into the soil.

Land preparation should be very thorough for a long-term crop such as alfalfa. Where irrigation is a factor to be considered, it is particularly important that the land be thoroughly and suitably levelled so as to provide for the economical distribution of water. It is also very important that the land be reasonably clean of weed seeds because the alfalfa plant in its early stages of development is poorly adapted to compete with weeds. If irrigated lands to be seeded are known to be dirty with weed seeds, it is well to delay seeding until

the weed seeds are germinated and destroyed. This method of cleaning the land of weeds is practical and feasible under irrigation, but not when alfalfa is being established on non-irrigated lands or where a deficiency of irrigation water is likely to occur. The seed-bed must be firm, particularly so on light dry soils, so as to bring the seeds and small particles of soil in close contact and to ensure good germination and early development—neglect of this one important factor—a firm seed-bed, invariably results in failure of the seed to germinate. The best time to seed will vary with the variable soils and climatic conditions existing throughout the interior of British Columbia. Each farmer should endeavour to study his own particular opportune time for seeding—such time to be guided by suitable moisture conditions rather than temperature. In other words, if the soil in the spring has adequate moisture for good germination and is in a workable condition, it should be an opportune time to seed and no delay should be occasioned by anticipating probable frosts, for the young alfalfa plant can withstand practically any reasonably amount of frost that might be expected at that time of year. At this Station, excellent results have been obtained by seeding in late autumn—late enough so that germination did not take place until early the following spring. This method of seeding is especially worthy of consideration on light dry soils under inadequate soil moisture conditions.

Rate of seeding should be approximately from 10-12 pounds per acre and, if possible, seeded with a grain drill and through the tubes to a depth that will ensure the seed from drying out—in other words, to a depth where there is moisture—this may be from 1 to almost 3 inches in depth and especially applies to light dry soils, even under irrigation. During the first year of establishment, young alfalfa plants should not be clipped unless in danger of being smothered with weeds, and should not be allowed to produce seed or pastured by stock, especially by horses or sheep. Old established alfalfa fields, particularly fields that are more economical to be left to permanent alfalfa, that are in need of thickening up or eradicating of weeds, may be disced and reseeded in the early spring at the rate of about 5 pounds of seed per acre. This practice will also apply to young alfalfa fields that failed to produce a satisfactory stand.

COMPARISON OF SOME ENSILAGE CROPS

Five varieties of corn, three mixtures of corn with soy bean, and one of peas, oats and vetches, sorghum, sudan grass and sunflowers were tested in 1924 under field conditions for ensilage. The test was conducted on loam to gravelly loam soil with a southeastern exposure which had grown alfalfa the previous eight years. The land was fall ploughed in 1923 and in the following spring manured at the rate of fifteen tons per acre, disked, ploughed and worked down. Just previous to seeding, a very thorough irrigation was applied, after which the land was disked with the object of distributing more evenly the soil mixture than was possible by irrigation. This proved to be a very sound irrigation practice. Seeding was done on May 22 with a grain drill with holes blocked to permit of seeding in rows three feet apart. The rate of seeding was: corn varieties and sunflowers, 2 bushels, pea rate; peas, oats and vetch mixture, 2.5 bushels, pea rate; and sorghum, sudan grass and mixtures of these crops, 1 bushel, wheat rate. By rate is meant the grain name rate as stamped on drill. Excellent germination and development was made until the end of June, after which the crop suffered through insufficient and untimely irrigation which very materially lowered the yields.

The rate of application in acre-inches for all varieties was as follows: May, 7 acre-inches; June, 6 acre-inches; total for the season, 13 acre-inches. The peas, oats and vetches were harvested on July 30 and the remainder of the crops under test during the week of August 26 with the following results.

In order of well-developed ears the varieties of corn were as follows: Wisconsin No. 7, Leaming, Golden Glow, Hybrid and North Western Dent. Wisconsin No. 7 was also outstanding in yield of grain and dry matter per acre. The stage of maturity and results obtained indicate a wide range of ensilage corn varieties from which to select for the variable soil and climatic conditions throughout the Okanagan valley.

The stage of maturity of soy beans in the mixtures was late blossom to early pod. Soy bean with sorghum as against pure sorghum gave an increased yield of 3,445 pounds of green matter and 492 pounds of dry matter per acre, and soy bean with sudan grass an increased yield of 3,751 pounds of green matter and 832 pounds of dry matter per acre. Although these figures represent only one year's results, they give promise of the value of adding a suitable legume to the non-legume ensilage crop. There is also an additional value to be considered in the influence of legumes in improving soil fertility. Sorghum and Sudan grass gave very fair yields. These give promise of withstanding a fair amount of drought, as compared with corn and much more than sunflowers. The lowest yielding variety of corn under test gave an increase of 423 pounds of dry matter per acre over sunflowers. The sunflower crop for ensilage is worthy of consideration in districts where soil mixture is plentiful and where corn cannot be successfully grown. It is more frost-resistant than corn, and therefore can be grown at higher and lower levels and seeded earlier and cut later. The proportions of grain that make up a peas, oats and vetch mixture require to be modified according to districts. On the hot, dry soils of the more southern districts, peas do not thrive, consequently their portion of the mixture should be considerably reduced and more vetches used. The outstanding cultural factor of interest and economic importance in the early development of these crops was the irrigation applied to land just previous to seeding. This irrigation sustained the crops in thrifty condition for over a month and gave results that could not have been obtained with the same amount of irrigation and labour applied after seeding. If irrigated land to be seeded does not contain adequate moisture for quick and even germination and early development, and water is available, it will pay well to delay seeding, if need be, for a week, and thoroughly irrigate, and after irrigation to thoroughly distribute through the soil by disking and harrowing the moisture applied.

The beneficial influence on the soil through the growing of alfalfa for a number of years was very marked. The physical condition of the soil was considerably improved and more retentive of moisture—an important factor in the economical management of soils under irrigation.

TABLE 8—COMPARISON OF ENSILAGE CROPS, 1924

Crops	Height of plants in inches	Stage of maturity when cut	Yield per acre green weight		Per cent dry matter	Yield per acre dry matter	
	inches		tons	lbs.	%	tons	lbs.
Wisconsin No. 7 Corn	105	Late milk to early dough	12	1,036	18·71	2	684
Hybrid Corn	108	Early dough	10	1,372	17·56	1	1,753
Golden Glow Corn	110	Late milk to early dough	9	1,012	18·99	1	1,610
North Western Dent	92	Late milk to early dough	8	1,672	20·42	1	1,609
Leaming	113	Late milk	8	1,524	19·13	1	1,352
Sorghum and Soy Bean, S.D.	105	Late dough to ripe	6	1,836	22·66	1	1,135
Hybrid Corn and Soy Bean, S.D.	105	Early dough	7	1,879	19·13	1	1,038
Sunflowers	85	Early dough	8	226	18·05	1	929
Sorghum	100	Late dough to ripe	5	391	25·44	1	643
Sudan Grass and Soy Bean, S.D.	80	Late dough to ripe	5	345	25·35	1	622
Sudan Grass	76	Late dough to ripe	3	594	27·15		1,790
P. O. V. mixture	38	Oats milk P. & V. early pod	1	789	40·00		1,116

MISCELLANEOUS CROP YIELDS

Some miscellaneous yields per acre were: hay mixture consisting of orchard grass, red top, tall oat grass, meadow fescue, timothy, Italian rye grass, red clover and alsike—3 tons, 190 pounds—sandy soil.

Average yield per acre of well-matured corn on the cob in bushels: Leaming 69, Golden Glow 67, Wisconsin No. 7 66, and North Western Dent 60—gravelly silt loam soil—rate 70 pounds per bushel.

NEW WORK IN PROGRESS

On September 22, 1924, some soiling crops and mixtures of these crops were seeded with the object in view to determine their suitability as crops for a soiling chart that will be a guide in helping to supply economical fodder for dairy cows, where pasturage is very limited as is the case in the fruit growing areas of the Okanagan Valley.

The dry season and shortage of water delayed germination until the necessary moisture was supplied with autumn rains. Consequently, only a fair amount of growth was made in 1924. The crops seeded were as follows: winter rye—winter wheat—winter rye and winter wheat—winter wheat and spring vetch—winter wheat, spring vetch and hairy vetch—winter wheat and hairy vetch—winter rye and hairy vetch—winter rye and spring vetch.

FIBRE PLANTS

Autumn and spring seeding of hemp for seed production experiments to date have not produced hemp seed in commercial quantities. Further tests are under way for economical hemp seed production. Project Nos. E. 72 and E. 74.

FORAGE CROPS

Plots of alfalfas, clovers and grasses came through the winter in excellent condition. Irrigation was plentiful for forage-crop work until near the end of June after which time no water was available. The shortage of irrigation water throughout the balance of the growing season materially reduced yields of all forage crops. All forage crops received irrigation. However, the amount of water that some plots received could not be recorded owing to insufficient measuring boxes.

In the following tables of results in forage-crop work, yields in green and dry matter and air-dried are recorded. The air-dried yields are the yields of field-cured hay. The method of determining the green and dry matter per acre was as follows: each plot was weighed immediately after cutting, which gave the yield in green weight. From each plot a representative sample weighing approximately 50 pounds was taken and passed through an ensilage cutter and thoroughly mixed. Duplicate samples each weighing exactly 2 pounds were taken for the determinaton of the absolute dry matter. These samples were air-dried in the sun and the drying process continued in a heated room until no further shrinkage was observed. The samples were then placed in an electric oven and dried to constant weight.

ENSILAGE CROPS

CORN, VARIETY TESTS FOR ENSILAGE PURPOSES—PROJECT NO. AG. 1

Twenty-two varieties of Indian corn were tested in duplicate one-hundred-and-eighth acre plots on gravelly loam soil which had grown potatoes the previous year. The land was fall ploughed in 1923 and prepared for seeding the following spring. Varieties were seeded May 2nd in rows three feet apart, and

on June 12th the plants were thinned to 8 inches apart in the rows. Development was excellent of all varieties until the end of June after which time no irrigation was available. Consequently, all varieties suffered considerably and failed to properly mature. Irrigation rate of application in acre-inches—May, 2.92. The varieties tested were harvested August 21 and the results obtained may be seen in table 9.

TABLE 9—VARIETY TEST OF CORN

Name	Source	Average yield per acre green		Per cent dry matter	Dry matter per acre	
		tons	lbs.	%	tons	lbs.
Compton's Early	J. O. Duke	7	634	35·56	2	1,204
Wisconsin 7	John Parks	8	1,982	26·04	2	682
Leaming	J. O. Duke	7	904	28·01	2	175
*Burr Leaming	Carter	7	1,066	26·18	1	1,948
Disco Longfellow	Dakota Imp. Seed Co	7	1,282	25·38	1	1,878
Wisconsin 7	J. O. Duke	7	526	26·35	1	1,827
Hybrid	Wimple	8	254	23·02	1	1,741
Golden Glow	J. O. Duke	7	1,444	23·98	1	1,703
Longfellow	J. O. Duke	7	94	25·08	1	1,535
Leaming	John Parks	7	310	24·36	1	1,486
Yellow Dent	Wimple	6	1,986	23·80	1	1,329
North Western Dent	(Dakota grown) McKenzie	5	1,880	27·75	1	1,297
Disco 90 Day White Dent	Dakota Imp. Seed Co	6	42	27·32	1	1,290
Disco Pride Yellow Dent	Dakota Imp. Seed Co	6	258	25·77	1	1,159
North Western Dent	Exp. Farm, Brandon	4	802	32·22	1	836
*North Dakota	Steele Briggs Seed Co	5	1,070	23·90	1	646
North Western Dent	(Nebraska grown) McKenzie	4	964	25·58	1	293
Disco North Western Dent	Dakota Imp. Seed Co	4	1,180	22·66	1	80
Quebec 28	Macdonald College	3	1,290	28·42	1	72
*White Cal. Yellow Dent	Steele Briggs Seed Co	5	692	18·94	1	25
Twitchells Pride	Fredericton	3	1,992	24·23		1,936
Amber Flint	Wimple	3	1,074	26·40		1,867
Average—22 varieties		6	442	25·95	1	1,227

* Seeded May 10.

The effect of no irrigation for the corn varieties after the middle of May is very obvious by the very low yields recorded. The lowest-yielding variety in the corn variety tests in 1923 recorded considerably higher yields in green and dry matter per acre than the highest-yielding varieties this year—1924. Observations on the stage of maturity were not recorded, as all varieties at harvest time were stunted in growth and immature. Of the varieties tested, Compton's Early has given highest yields over a number of years. This variety recorded highest yield green weight in the 4 year average of 6 varieties—1921-24, second highest yield green and dry weight of 14 varieties—1923-24, fourth highest yield green and dry weight of 16 varieties—1923 and highest yield green and dry weight of 22 varieties—1924. A comparison of results in 1923-24 show considerable variation in yields of corn sold under the same name but obtained from different sources; also, that the varieties which gave the highest yields of green matter did not always produce the highest amounts of dry matter per acre. The results indicate that the source of seed is a very important factor for growers to consider when purchasing seed corn—in fact, the source of seed may be of more economic importance than the variety. Under field conditions at this Station, the following varieties have matured and given excellent results for both ensilage and seed:—North Western Dent, Leaming, Golden Glow and Wisconsin 7. In the more northern districts of the interior of British Columbia where the season is shorter and frosts are likely to occur during the growing season, early maturing varieties should be considered. The object of each

farmer producing corn for ensilage should be to produce the highest-yielding corn that will mature for his particular soil and climatic conditions.

Fourteen varieties of corn have been grown for two years—1923 and 1924. The average yields green and dry weight per acre are given in table 10.

Six varieties of Indian corn have been grown for four years, 1921 to 24. The average yield green weight per acre is given in table 11.

TABLE 10—VARIETY TESTS, 1923-24

Variety	Source	Average yield per acre, green		Per cent dry matter		Dry matter per acre	
		1924	1923-24	1924	1923-24	1924	1923-24
		tons lbs.	tons lbs.	%	%	tons lbs.	tons lbs.
Disco Pride Yellow Dent	Dakota Imp. Seed Co.	6 285	13 1,249	25·77	33·82	1 1,159	5 422
Compton's Early	J. O. Duke	7 634	14 602	35·36	29·18	2 1,204	3 1,452
North Western Dent.	(Dakota grown) McKenzie	5 1,880	12 1,960	27·75	27·00	1 1,297	3 903
Disco Longfellow	Dakota Imp. Seed Co.	7 1,282	12 471	25·38	27·22	1 1,878	3 830
Wisconsin 7	John Parks	8 1,982	13 151	26·04	25·83	2 682	3 737
Golden Glow	J. O. Duke	7 1,444	12 1,542	23·98	24·95	1 1,703	3 472
Leaming	John Parks	7 310	12 1,470	24·36	24·83	1 1,486	3 378
Disco 90 Day White Dent	Dakota Imp. Seed Co.	6 42	12 1,986	27·32	25·37	1 1,290	3 323
Leaming	J. O. Duke	7 904	11 698	28·01	26·81	2 175	2 1,993
North Dakota	Steele Briggs Seed Co.	5 1,070	11 365	23·90	25·70	1 646	2 1,951
Wisconsin 7	J. O. Duke	7 526	10 793	26·35	26·45	1 1,827	2 1,507
Longfellow	J. O. Duke	7 94	9 1,917	25·08	26·13	1 1,535	2 1,265
Twitchell's Pride	Fredericton	3 1,992	10 1,783	24·23	23·36	1,936	2 970
North Western Dent.	(Nebraska grown) McKenzie	4 964	11 533	25·58	25·44	1 293	2 715
Average—14 varieties		6 1,243	12 251	26·36	26·59	1 1,508	3 423

TABLE 11—VARIETY TEST OF CORN, 1921-24

Variety	Average yield per acre—green, 1921-24	
	tons	lbs.
Compton's Early	17	971
Longfellow	14	928
Leaming	14	837
Wisconsin 7	14	341
North Western Dent	14	78
North Dakota	13	341
Average—6 varieties—4 years	14	1,396

SUNFLOWERS—VARIETY TESTS FOR YIELD AND PURITY—PROJECT NO. AG. 76

Ten varieties of sunflowers were tested in duplicate $\frac{1}{108}$-acre plots on gravelly, loam soil which had grown potatoes the previous year. The land was fall ploughed in 1923 and prepared for seeding the following spring. All varieties were seeded on April 26th in rows 3 feet apart and on June 13th thinned to 10 inches apart in the rows. Germination was very irregular and all varieties suffered considerably from shortage of irrigation and loss of leaves. Irrigation, rate of application in acre-inches—May, 2.92. All varieties were harvested August 1. Results are shown in table 12.

Four varieties of sunflowers have been grown for two years 1923-24. The average yields in green and dry weight per acre are given in table 13.

Four varieties of sunflowers have been grown for two years—1923-24. The average yields green weight per acre are given in table 14.

Three varieties of sunflowers have been grown for three years—1922-24. The average yields green weight per acre are given in table 15.

TABLE 12—1924

Variety	Source of seed	Average height of plant	Average stage of maturity	Average yield per acre, green	Per cent dry matter	Dry matter per acre
		inches		tons lbs.	per cent	tons lbs.
Russian Mammoth	McDonald & Sons, Ottawa.	60	Few heads in bloom	13 544	22·81	3 55
Mixed Mennonite	Rosthern	55	Ripe July 25	5 1,268	23·49	2 647
Manchurian	A. E. McKenzie Seed Co., Brandon	62	Early flowering to late dough to ripe.	9 526	25·08	2 646
Early Ottawa	Experimental Farm, Ottawa.	64	Early flowering to late dough.	9 418	25·04	2 612
Manchurian	C.P.R.	65	Early flowering to early dough.	8 1,985	25·34	2 557
Mixed	C.P.R.	63	Early flowering to early dough.	9 526	21·80	2 39
Mammoth Russian	C.P.R.	60	Late dough	9 1,393	19·27	1 1,739
Black	C.P.R.	62	Milk to ripe	8 468	21·20	1 1,491
Russian Giant	Dakota Imp. Seed Co.	68	Few heads in bloom	12 160	24·09	1 929
Manteca	C.P.R.	57	Early dough	5 617	23·68	1 514
Average		62		8 1,990	23·18	2 123

TABLE 13—SUNFLOWERS—TEST OF VARIETIES, AVERAGE OF TWO YEARS, 1923-24, GREEN AND DRY WEIGHT

Variety	Source of seed	Average height in inches	Average yield per acre, green	Per cent dry matter	Dry matter per acre
		inches	tons lbs.	per cent	tons lbs.
Mammoth Russian	K. McKenzie & Son	102	33 198	19·83	5 1,945
Mixed Mennonite	Rosthern	69	12 1,681	22·29	3 653
Manchurian	A. E. McKenzie	73	15 163	21·74	3 168
Early Ottawa	Experimental Farm, Ottawa	76	14 1,771	21·57	3 28
Average of 4 varieties		80	18 1,953	21·36	3 1,698

TABLE 14—SUNFLOWERS—TEST OF VARIETIES—AVERAGE OF TWO YEARS, 1923-24, GREEN WEIGHT

Variety	Source of seed	Average yield per acre, green, 1922-24
		tons lbs.
Manteca	C.P.R.	32 158
Black	C.P.R.	26 1,884
Mixed	C.P.R.	15 163
Manchurian	A. E. McKenzie.	15 163
Average of 4 varieties		22 592

TABLE 15—SUNFLOWERS—TEST OF VARIETIES—AVERAGE OF THREE YEARS, 1922-24, GREEN WEIGHT

Variety	Source of seed	Average yield per acre, green, 1922-24	
		tons	lbs.
Mammoth Russian	K. McDonald & Son	28	269
Early Ottawa	Experimental Farm, Ottawa.	13	434
Mennonite Mixed	Rosthern	10	1,521
Average of 3 varieties		17	741

Of a number of varieties of sunflowers tested over a period of several years, the Russian Mammoth records the highest yields in green and dry matter per acre. In comparing sunflowers with corn for ensilage, sunflowers are more frost resistant and therefore may be seeded earlier and cut later in the season. Consequently, they may be more economical to grow than corn in districts where the season is short and frosts occur during the growing season and where corn is not likely to thrive or mature. Where corn can be economically grown, it is without a peer as an ensilage crop. As compared with sunflowers, it is more palatable, more nutritious, more drought resistant and more economical to harvest. However, the sunflower crop for ensilage has a place in British Columbia agriculture, and that place is in those districts where corn or other more desirable ensilage crops cannot be economically grown.

ANNUAL HAY CROPS

MILLETS—VARIETY TESTS—PROJECT NO. AG. 251

Seven varieties of millets were tested in duplicate $\frac{1}{100}$-acre plots on gravelly, silt loam soil which had grown corn the previous year. The land was fall ploughed in 1923 and in the following spring prepared for seeding. The condition of the top-soil at seeding time was very dry and powdery. The sub-soil moisture was fairly plentiful. All varieties were sown broadcast May 8, at the rate of 30 pounds of seed per acre. Irrigation was untimely during June. The rate of application in acre-inches was as follows: May, 0·88; June, 2; total for the season, 2.88 acre-inches.

The yields of the varieties tested are given in table 16:

TABLE 16—MILLETS—TEST OF VARIETIES, 1924

Variety	Per cent dry matter	Average yield per acre				Remarks, Quality
		Green		Dry		
	per cent	tons	lbs.	tons	lbs.	
Early Fortune	25·53	7	750	2	61	Fair, leafy.
Golden	22·60	8	950	1	1,831	Excellent, very leafy.
Siberian	27·25	6	1,800	1	1,750	Good, leafy.
Common	29·71	5	1,750	1	1,431	Good.
Hungarian	23·36	6	650	1	955	Fair but wiry.
Hog	24·94	3	1,850	–	1,958	Fair.
Japanese	29·15	3	700	–	1,953	Poor.
Average	26·36	6	64	1	1,134	

Early Fortune Millet was ripe when cut, which somewhat accounts for its yielding highest in dry weight. Golden Millet was undoubtedly the best of the varieties of millets under test this year. It produced a thick, leafy, uniform stand of excellent quality and yielded highest in green weight. Japanese millet was very low in quality and yield.

Millets are termed " catch-crops " and are especially worthy of consideration to the farmer who has a weed-infested piece of land that he desires to clean of weeds during April, May and June before seeding to some crop which at that late date, approximately the end of June, will produce a fair amount of roughage, or to seed an odd piece of land that may be in need of crop at that time. Tests at this Station show that with fair growing conditions, millets require approximately 65 days to mature for hay purposes and should be harvested when well headed and much care exercised to not allow them to become too mature. Under existing soil and moisture conditions at this Station, a difference of a day in the proper time to cut will often determine the quality of the fodder produced. Millets should not be considered for seeding on dry non-irrigated soils.

ANNUAL HAY CROPS—MIXTURES—TESTS FOR YIELD AND SUITABILITY PROJECT NO. 241 B, C AND D

A number of mixtures were tested in quadruple $\frac{1}{100}$-acre plots on gravelly loam soil which had grown barley the previous year. The land was fall ploughed in 1923 and prepared for the germination of weed seeds during April and early May. Previous to seeding, the land was cultivated with a duck-tooth cultivator and harrowed. The plots were seeded broadcast May 7, then packed and harrowed. The condition of the soil at seeding time was very dry down to a depth of four inches. Sub-soil moisture was plentiful. Irrigation was applied May 8, the day after seeding. Timely and thorough irrigations were applied during the months of May and June, after which no water was available. The rate of application in acre-inches for all varieties was as follows May, 7·3; June, 11·1; total for the season, 18·4 acre-inches.

Table 17 gives the mixture sown, rates of seedings and yields per acre:

TABLE 17—MIXTURES FOR ANNUAL HAY, 1924

Varieties and mixtures sown	Rate of seeding per acre	Per cent dry matter	Average yield per acre	
			Green	Dry
	lbs.	per cent	tons lbs.	tons lbs.
Hubam clover	15	38·18	4 1,850	1 1,761
Spring rye	80			
Hubam clover	15	27·18	5 1,450	1 1,112
Banner oats	80			
Hubam clover	15	22·22	6 100	1 666
Common millet	20			
Hubam clover	15	22·41	6 1,800	1 1,092
Japanese millet	20			
Average, Hubam as base	.....	27·50	5 1,800	1 1,158
White sweet clover	15	26·19	6 750	1 1,339
Banner oats	80			
White sweet clover	15	37·21	4 250	1 1,070
Spring rye	80			
White sweet clover	15	33·33	4 550	1 850
Common millet	20			
White sweet clover	15	25·99	3 1,000	- 1,819
Japanese millet	20			
Average, White sweet clover as the base	.....	30·68	4 1,137	1 770
Spring vetch	45	35·50	2 500	- 1,597
Gold Rain oats	80			
Spring vetch	45			
Golden vine pea	45	40·21	3 300	1 533
Banner oats	80			
Sorghum	50	17·45	4 150	- 1,422
Cow peas	25			
Sorghum	20	19·29	6 900	1 488
Sudan grass	17			
Hubam clover	20	35·48	1 1,800	- 1,348
White sweet clover	20	31·62	1 1,550	- 1,122
Blue Bell pea	180	25·80	1 500	- 645
Spring vetch	50	23·21	3 900	- 1,532
Sudan grass	35	27·84	2 400	- 1,225
Spring rye	90	55·28	3 300	1 1,483
Sugar cane	40	18·47	2 700	- 868
Emmer	100	45·47	2 833	1 197
Gold barley	100	38·41	2 1,233	1 10

Some desirable characteristics of an annual hay crop are: wide range of adaptability to soil and climatic conditions; ability to grow fast and compete with weeds, especially in the early stages of growth; easy to harvest and cure and the production of economical yields of palatable and nutritious fodder. Of the annual hay crops under test this year, the most promising from the standpoint of yield and palatability were Gold Rain oat and a mixture of Sorghum and Sudan Grass. Sorghum and cow peas also give promise as an annual hay. Suitable varieties of oats and legumes in combinations or mixtures such as peas, oats and vetches give much promise, especially if the amount of peas and vetches in mixture is regulated to suit the soil and climatic conditions under which they may be grown. Tests at this Station indicate that under hot, dry climatic conditions, even under irrigation, that it is more economical to reduce the amount of peas and increase the amount of vetches used in a pea, oat and vetch mixture. In mixtures where crimson clover was used, there was not sufficient growth of clover to harvest. Spring rye made fast growth, it was able to compete with weeds, but was wiry and somewhat unpalatable. The early development of cow peas and soy beans was slow. Consequently, they were not very successful in their ability to compete with weeds. They gave a poor stand. Gold barley and Emmer gave fair stands of good quality but as annual hays, their beards were very undesirable. Peas of all varieties gave poor stands. Teff grass produced a stand of excellent quality but not in sufficient quantity to harvest. It gives promise, however, of being a suitable grass for annual hay under somewhat limited moisture conditions. Hubam clover gave an earlier and a better stand than white sweet clover, but not as good in quality. These remarks are based on some of the crops tested as annual hays this year and only represent one year's results under very unfavourable growing conditions.

OATS FOR ANNUAL HAY CROP—VARIETY TESTS FOR YIELD AND SUITABILITY—PROJECT NO. 241a

Six varieties of oats were tested under the same conditions as the mixtures to determine their suitability for hay. Table 18 gives the varieties tested and the yields per acre.

A comparison of the yields of varieties of oats under test for annual hay indicate that the variety used is of much importance.

TABLE 18—OATS—FOR ANNUAL HAY, 1924

Variety	Rate of seeding per acre	Per cent dry matter	Average yield per acre			
			Green		Dry	
	lbs.	per cent	tons	lbs.	tons	lbs.
Gold Rain	100	45·12	3	1,050	1	1,181
Victory	100	41·11	3	33	1	480
Daubeney, Ottawa 47	100	49·89	2	533	1	261
Liberty, Ottawa 480	100	48·35	2	100	-	1,934
Banner, Ottawa 49	100	39·16	2	750	-	1,860
Abundance	100	44·41	2	133	-	1,835
Average of 6 varieties	.....	44·67	2	1,100	1	258

GRASSES, ALFALFAS, CLOVERS, AND HAY MIXTURES OTHER THAN ANNUALS

ALFALFA, VARIETY TESTS FOR HARDINESS YIELD AND SUITABILITY—PROJECT NO. AG. 126

Twelve varieties of alfalfa from different sources were sown in the spring of 1923 in duplicate $\frac{1}{100}$-acre plots on gravelly loam soil which had grown sunflowers the previous year. All varieties were seeded broadcast at the rate of

12 pounds of seed per acre and without a nurse-crop. During the year of establishment all varieties produced a ton and a half of field-cured hay with the exception of the Siberian varieties which produced between six and seven hundred pounds. Irrigation in 1924 was timely and sufficient to produce two cuttings. The varieties tested and the results obtained in yields of green and dry matter per acre are given in Table 19.

TABLE 19—ALFALFA—TEST OF VARIETIES, 1924

Name	Source of Seed	Average yield per acre— Green weight			Per cent dry matter			Total dry matter per acre
		First cut	Second cut	Total	First cut	Second cut	Average	
		tons lbs.	tons lbs.	tons lbs.	%	%	%	tons lbs.
Grimm	Brooks, Alta	11 260	8 500	19 750	23·25	24·13	23·69	4 1,180
Turkestan	Steele Briggs	13 600	6 850	19 1,450	23·28	22·33	22·80	4 995
Grimm	Cap Rouge	10 500	9 950	19 1,450	23·18	20·89	22·03	4 691
Variegated	Steele Briggs Seed Co	12 900	5 300	17 1,200	17·28	32·00	24·64	4 673
Cossack	D.I.S.C	9 900	5 1,800	15 700	23·76	28·57	26·16	4 31
Cossack	Paramount Farm, Rife, Alta	7 1,167	6 1,833	14 1,000	24·49	26·59	25·54	3 1,407
Siberian (Medicago falcata)	" "	11 1,300	3 350	14 1,650	20·23	27·65	23·94	3 1,098
Shoobut	S. Argentine	8 1,000	5 1,600	14 600	22·20	25·62	23·91	3 838
Grimm	Lyman	5 350	6 850	11 1,200	28·43	27·62	28·02	3 501
Sample	McCannus, Ida, Ont	5 1,300	5 1,750	11 1,030	23·07	25·85	24·46	2 1,633
Siberian	Nelson, B.C	5 ..	3 1,800	8 1,800	24·39	32·94	28·66	2 1,101
Siberian (Medicago falcata)	.....	5 1,550	2 100	7 1,650	25·08	29·38	27·23	2 261
Average of 12 varieties—1924		8 1,651	5 1,557	14 1,189	23·22	26·96	25·09	3 1,201

Of the twelve varieties under test those that gave the highest yield of green matter did not always produce the highest yield of dry matter per acre. However, the results show a fairly close correlation between yield of green and dry matter per acre. The results indicate that the source of seed, especially Northern-grown seed of a hardy variety that the source of seed, especially omical production of alfalfa. The Siberian varieties were very outstanding in withstanding drought. These hardy Siberian varieties give much promise, especially for pasture and pasture mixtures in districts where soil moisture is inadequate.

Two varieties of alfalfa were sown in the spring of 1923 in duplicate $\frac{1}{100}$-acre plots on heavy loam soil which had grown grain the previous year. Irrigation—rate of application in acre-inches was as follows: May 9; June 3: total for season, 12 acre-inches. Table 20 gives the yields in green and dry matter per acre.

TABLE 20—ALFALFA—TEST OF VARIETIES, 1924

Name	Source	Average yield per acre—green			Percentage dry matter			Dry matter per acre
		First cut	Second cut	Total	First cut	Second cut	Average	
		tons lbs.	tons lbs.	tons lbs.	%	%	%	tons lbs.
Grimm	Stewart, Calgary	6 1,600	6 1,500	13 1,100	28·58	29·25	29·05	3 1,872
Turkestan	Commercial	7 1,300	4 1,100	12 400	24·45	24·42	24·93	3 83
Average of 2	varietiss	7 450	5 1,300	12 1,750	26·51	27·47	26·99	3 977

As in the previous alfalfa table Alberta-grown Grimm stands first in yield per acre. The results indicate the importance of using home-grown seed of a hardy variety.

Three varieties of alfalfa were sown in the spring of 1922 in single one-fourteenth-acre plots on drifting sandy soil which had grown hemp the two previous years. The varieties sown and the yields of field-cured hay obtained in 1923-24 are given in table 21. As in the preceding tables on alfalfa, the variety Grimm gave highest yield per acre.

TABLE 21—ALFALFA—TEST OF VARIETIES, 1924

Variety	Source	First cut		Second cut		Air—Dried			
						Total yield per acre, 1924		Average yield per acre, 1923-24	
		tons	lbs.	tons	lbs.	tons	lbs.	tons	lbs.
Grimm	Lyman	2	620	2	914	4	1,534	5	1,732
Grimm	Exp. Station, Summerland	2	1,194	1	982	4	176	5	997
Turkestan	Commercial	2	480	1	1,402	3	1,882	4	519
Average of 3 varieties		2	765	1	1,766	4	531	5	416

ALFALFA—BROADCAST VERSUS ROWS FOR HAY PRODUCTION—1924—PROJECT NO. AG. 129

Turkestan alfalfa was sown in the spring of 1921 in sextuple plots on gravelly loam soil. The plots were sown broadcast and in rows at different distances apart. Table 22 gives the average yield of field-cured hay.

TABLE 22—ALFALFA BROADCAST AND IN ROWS—AIR-DRIED WEIGHTS

Plot	First cut		Second cut		Average total yield per acre—air-dried, 1924	
	tons	lbs.	tons	lbs.	tons	lbs.
Broadcast	3	1,175	3	192	6	1,367
Rows 6" apart	3	483	2	1,367	5	1,850
Rows 12" apart	3	1,109	2	325	5	1,434
Rows 18" apart	3	175	2	1,567	5	1,742
Row 24" apart	3	542	2	617	5	1,159
Row 36" apart	2	1,675	2	958	5	630
Average	3	526	2	1,171	5	1,697

Observation at harvest time showed that the farther apart the rows were, the greater tendency for the crop to lodge, the greater difficulty to cut the crop, and the greater loss of crop through not being thoroughly cut by the mower. In districts where an abundance of weeds and inadequate soil moisture are factors to be considered during the year of establishment the row-system of seeding alfalfa for hay and pasture may give better results, but even in such cases it is very doubtful as to whether it is an economical practice to seed alfalfa in rows at a greater distance apart than 12 inches. Where conditions are favourable for obtaining a good stand of alfalfa, broadcast seeding is probably the best method.

ALFALFA—SPRING VERSUS AUTUMN SEEDING—PROJECT NO. AG. 136

Two years' tests at this Station have given excellent results with autumn seeding. Method is to seed late enough in the autumn so that germination will not take place until early the following spring. This method of autumn seeding

is worthy of consideration in districts where soil moisture and irrigation are inadequate, especially on light soils.

WHITE DUTCH CLOVERS—VARIETY TESTS FOR YIELD AND SUITABILITY—PROJECT NO. AG. 231

Six varieties of White Dutch clovers were sown in single $\frac{1}{100}$-acre plots on heavy, loam soil which had grown grain the previous year. Irrigation—rate of application in acre-inches for all varieties was as follows:—May, 9; June, 3; total for season 12 acre-inches. The varieties tested and the yield in green and dry matter per acre are given in table 23:—

TABLE 23—WHITE DUTCH CLOVERS—TEST OF VARIETIES, 1924

Name	Source	Average yield per acre—green	Percentage dry matter	Dry matter per acre
		tons lbs.	%	tons lbs.
White Dutch, Scottish	Scotland	12 ..	13·26	1 1,182
" Kentish	England	8 1,900	13·75	1 461
" Morso	Denmark	8 700	12·68	1 117
" Ladino	Idaho, U.S.A.	6 1,600	14·55	.. 1,979
" Commercial	Graham Bros.	7 400	13·59	.. 1,957
" Stryno	Denmark	4 900	18·94	.. 1,686
Average of 6 varieties		7 1,917	14·46	1 230

The two outstanding varieties for uniformity of stand, yield and drought-resistant power were Scottish and Kentish. Morso gave a very fair stand and yield but showed signs of drought injury. Ladino was the coarsest and tallest in habit of growth somewhat resembling Red Clover, but like Morso showed signs of drought injury. Commercial and Stryno did not stand up well under dry conditions. Commercial was the earliest and Morso the second earliest maturing varieties. With the exception of Commercial all varieties after cutting produced excellent stands of seed. White Clover is especially valuable in helping to form a base in grass and clover pasture mixtures.

CLOVERS—VARIETY TESTS FOR YIELD AND GENERAL SUITABILITY—PROJECT NO. AG. 146

Three varieties of clovers were sown in the spring of 1923 in duplicate $\frac{1}{100}$-acre plots under the same soil and irrigation conditions as the White Dutch clovers. The yields in green and dry matter per acre are given in table 24.

TABLE 24—CLOVERS—TEST OF VARIETIES, 1924

Name	Source	Rate of seeding per acre	Average yield per acre—green			Percentage dry matter			Dry matter per acre
			First cut	Second cut	Total	First cut	Second cut	Average	
		Pounds	tons lbs.	tons lbs.	tons lbs.	%	%	%	tons lbs.
Red Clover, Ottawa	Exp.Farm,Ottawa	14	11 600	4 400	15 1,000	18·04	20·92	19·48	3 39
Red Clover	Commercial	14	8 1,300	3 1,000	12 300	22·52	22·52	22·52	2 1,472
Alsike	"	12	3 1,200	.. ..	3 1,200	24·45	.....	.....	.. 1,760
Average	.....	.....	7 1,700	.. ..	10 833	21·67	.....	.....	2 424

Red clover, Ottawa, as compared with common red clover gave a much better and more uniform stand, greater drought-resistant power and considerably higher yields in green and dry matter per acre. Alsike suffered considerably from dry conditions.

Altaswede was sown in the spring of 1922 in a 1/14-acre plot on drifting, sandy soil which had grown hemp the two previous years. (Table 25.)

TABLE 25—CLOVER—ALTASWEDE, 1924

Variety	Rate of seeding per acre	First cut	Second cut	Total yield per acre—Air dried 1924	Average total yield per acre—Air dried 1923-24
	pounds	tons lbs.	tons lbs.	tons lbs.	tons lbs.
Altaswede	12	1 996	.. 896	1 1,892	3 216

MISCELLANEOUS LEGUMES—PROJECT NO. AG. 256

Hairy vetch was sown in the spring of 1923 in duplicate 1/100-acre plots under the same soil and irrigation conditions as the White Dutch clovers. (Table 26.)

TABLE 26—HAIRY VETCH, 1924

Name	Source	Rate of seeding per acre	Average yield per acre—green	Percentage dry matter	Dry matter per acre
		pounds	tons lbs.	%	tons lbs.
Hairy Vetch	Commercial	30	10 950	17·89	1 1,748

GRASSES—TEST OF VARIETIES, 1924—PROJECT NO. AG. 255

In the spring of 1923 a number of grasses were sown in duplicate 1/100-acre plots under the same soil and irrigation conditions as the White Dutch clovers. The plots were established under extremely unfavourable conditions and varieties of timothy, sainfoin, kidney vetch, Native bunch grass (Agropyron spicatum), meadow fescue, sheep fescue, red fescue, brome grass and Canadian and Kentucky blue grasses failed to produce stands sufficient to harvest. The varieties harvested in 1924 and the yields obtained in green and dry matter per acre are given in table 27.

TABLE 27—GRASSES—TEST OF VARIETIES, 1924

Name	Source	Rate of seeding per acre	Average yield per acre—green			Percentage dry matter			Dry matter per acre
			First cut	Second cut	Total	First cut	Second cut	Average	
		lbs.	tons lbs.	tons lbs.	tons lbs.	per cent	per cent	per cent	tons lbs.
Red Top	Commercial	14	9 1,300	.. ..	9 1,300	42·42	.....	.....	4 187
Western rye	"	15	5 750	1 500	6 1,250	42·45	41·69	42·07	2 1,574
Orchard	"	20	3 750	.. ..	3 750	40·43	.....	.....	1 729
Italian rye	"	25	1 1,850	.. 1,900	2 1,750	42·22	41·22	41·72	1 399
Meadow fescue	"	14	3 900	.. ..	3 900	32·29	.....	.....	1 228
Tall oat	"	35	2 1,450	.. ..	2 1,450	40·25	.....	.....	1 194
Perennial rye	"	35	1 1,450	.. ..	1 1,450	38·30	.....	.....	.. 1,321
Average of 7 grasses		.....	4 64	.. ..	4 693	39·77	.....	.....	1 1,519

The testing of individual grasses is necessary in order to be able to make up suitable hay and pasture mixtures for different soils and climatic conditions. This work is being continued and additional results will be available in 1925.

The development of red top was very slow and it was harvested approximately four weeks later than the other grasses. Considering the time of harvesting, western rye grass was the outstanding grass under test this year in first- and second-cut yields in green and dry matter per acre.

WESTERN RYE—VARIETY TESTS FOR YIELD AND PURITY—PROJECT NO. AG. 221

Eight strains of western rye grass were sown in the spring of 1923 in duplicate $\frac{1}{50}$-acre plots on gravelly loam soil which had grown a crop of carrots the previous year. Irrigation was timely and plentiful. The results obtained are given in table 28.

TABLE 28—WESTERN RYE—COMPARISON OF STRAINS, 1924

Strain Number	Source of seed	Average yield per acre, green	Per cent dry matter	Dry matter per acre
		tons lbs.	per cent	tons. lbs.
Western Rye 5	Experimental Farm, Ottawa	6 1,898	40·35	2 1,608
" 6	" "	6 17	44·28	2 1,321
" 18	" "	5 1,449	44·84	2 1,134
" 10	" "	5 1,449	44·25	2 1,066
" 16	" "	5 721	45·88	2 919
" 78	" "	5 455	43·84	2 583
" 11	" "	5 384	39·80	2 133
" 81	" "	4 964	45·30	2 61
Average of 8 strains Western rye		5 1,167	43·57	2 853

The results indicate that high-yielding strains of western rye grass give much promise as a suitable grass for use in hay and pasture mixtures in the interior of British Columbia.

HAY AND PASTURE MIXTURES, ALFALFA AS THE BASE—PROJECT NO. 258 B

These hay mixtures were started in 1922 to determine what grasses can be economically grown in a hay mixture with alfalfa as the base. Suitable grasses for such a mixture should be of excellent quality and especially ready to cut with alfalfa. They should also produce a second crop in time for the second cutting of alfalfa. Such a mixture helps alfalfa to stand up better, cut easier, cure faster, which is very important, particularly during unfavourable harvesting weather. It also improves the feeding value of the hay and provides for a more balanced fodder. The mixing of grasses with alfalfa might have the effect of the grasses crowding out the alfalfa and giving smaller yields than from pure alfalfa, especially in fields that are to be seeded to grasses for a period of several years. However, a comparison of results obtained for the years 1923-24 show that the mixtures compare very favourably in yields with pure alfalfa.

As previously mentioned the grasses should be ready to cut with alfalfa. This time is usually when alfalfa is showing from 5 to 10 per cent flower or when the young alfalfa shoots growing from the crown of the plants are approximately one inch high. It is more important to be guided when alfalfa is ready to cut by the height of the young shoots than by the amount of flower. If possible, alfalfa should be cut before the young shoots which are to produce the next crop are high enough to be clipped by the mower. This prevents unnecessary loss of valuable plant growth and delay in time to grow the next crop. This is very important, especially when two or more cuttings are desired in districts where the growing season and cultural conditions are not at their best for the culture of alfalfa.

Table 29, hay mixtures with alfalfa as the base, gives the results in yields of field-cured hay per acre from one-fourteenth acre plots that were seeded in the spring of 1922 on drifting sandy soil. Irrigation—rate of application in acre-inches was as follows:—May, 4.6; June, 1.8; total for season 6.4 acre-inches.

TABLE 29—HAY MIXTURES WITH ALFALFA AS THE BASE, 1924

Seeding	Rate of seeding per acre	First cut	Second cut	Air-dried: Total yield per acre 1924	Air-dried: Average yield per acre 1923-24
	lbs.	tons lbs.	tons lbs.	tons lbs.	tons lbs.
Alfalfa	6	2 1,292	1 1,248	4 540	5 257
Timothy	8				
Alfalfa	6	2 1,278	1 772	4 50	4 1,401
Western rye	8				
Alfalfa	6	3 440	1 1,556	4 1,996	4 1,933
Meadow fescue	15				
Alfalfa	6	2 1,738	1 912	4 650	4 840
Orchard grass	15				
Alfalfa	6	2 970	1 968	3 1,938	4 165
Tall oat	15				
Average of five mixtures with alfalfa as the base		2 1,544	1 1,091	4 635	4 1,319

Table 30, hay mixtures with alfalfa as the base gives the results in yields of green and dry matter per acre from duplicate $\frac{1}{100}$-acre plots that were seeded in the spring of 1923 on heavy loam soil. Irrigation—rate of application in acre-inches was as follows: May, 9; June, 3; total for the season, 12 acre-inches.

TABLE 30—COMPARISON OF HAY MIXTURES—WITH ALFALFA AS THE BASE, 1924

Name	Source	Rate of seeding per acre	Average yield per acre, green: First cut	Second cut	Total	Percentage dry matter: First cut	Second cut	Average	Dry matter per acre
		lbs.	tons lbs.	tons lbs.	tons lbs.	per cent	per cent	per cent	tons lbs.
Tall oat	Commercial	15	10 650	3 850	13 1,500	23·40	36·23	29·81	4 198
Alfalfa		6							
Meadow fescue	"	15	9 1,250	2 750	12 ..	24·36	40·48	32·42	3 1,781
Alfalfa		6							
Timothy	"	8	10 500	4 600	14 1,100	23·74	28·54	26·14	3 1,607
Alfalfa		6							
Western rye	"	8	7 1,800	3 1,100	11 900	26·63	37·16	31·89	3 1,303
Alfalfa		6							
Orchard grass	"	15	7 1,550	3 700	11 250	28·66	34·51	31·58	3 1,026
Alfalfa		6							
Average of 5 varieties			9 350	3 800	12 1,150	25·36	35·38	30·37	3 1,583

Some field notes taken on the plots when the alfalfa was ready to cut were as follows:—

ALFALFA AND WESTERN RYE.—Grass green, fine texture, about same height as alfalfa, not quite ready to cut. Second cut of Western Rye was as tall as the alfalfa and in the blossom stage. Excellent mixture.

ALFALFA AND MEADOW FESCUE.—Height of grass about the same as alfalfa, ready to cut. Second cut of Meadow Fescue very poor stand. This mixture although not as good as Western Rye is very fair.

ALFALFA AND TALL OAT.—Tall oat ready to cut. Second cut of Tall oat very poor stand. Not as suitable as Meadow Fescue.

ALFALFA AND ORCHARD GRASS.—Orchard grass matures too early for alfalfa, grass somewhat coarse, does not give promise of being a suitable mixture in the first cut. Second cut of Orchard Grass short, green and of excellent quality.

ALFALFA AND TIMOTHY.—Alfalfa much too early for timothy. Timothy in the second cut of little value.

FIELD ROOTS

MANGELS—VARIETY TEST FOR YIELD AND PURITY—PROJECT NO. AG. 21

Five varieties have been grown for five years, 1920-24. The following table gives the average yields green weight for the five year period.

TABLE 31—MANGELS

Variety	Average yield per acre—green weight—for five years, 1920-24	
	tons	lbs.
Half Sugar White	32	1,067
Mammoth Long Red	31	10
Yellow Intermediate	28	1,018
Golden Tankard	24	1,909
Yellow Globe	21	1,379
Average	27	1,477

Five-year tests in the growing of mangels under irrigation with irrigation furrows placed 36 inches apart or 18 inches from each row have given very unsatisfactory results in the early development of the mangel crop. Consequently, a test was made this spring in placing the irrigation furrow as near as possible to the mangel row during the early development of the young mangel plant. This method of irrigation was found to be a very sound irrigation practice in that it required less water and time in applying the water and produced a stronger and earlier stand of mangel plants than was possible, practical or economical under the previous system where the furrows were placed 3 feet apart. If at seeding time the soil moisture is inadequate for producing a strong and even stand of mangel plants and irrigation is available it will pay well to delay seeding until after a thorough irrigation has been applied and evenly distributed through the soil by discing and harrowing. A strong and even stand is essential for maximum yields of mangels and no amount of water and cultural care later in the season can make up the loss in decreased yields caused by an uneven stand through inadequate soil moisture at seeding time.

MANGELS, EARLY VERSUS LATE SEEDING FOR FEEDING—PROJECT NO. AG. 20

An important factor in the early development of the mangel crop in the Dry Belt is to seed early in the spring as soon as the soil is in a workable condition so as to secure good germination and early development on the natural moisture in the soil. With late seedings there is often not enough moisture in the soil to germinate the seeds until irrigation is available which is usually in late spring. Two years' tests record higher yields from the earlier seeding, also that young mangel plants were not injured when 5 degrees of frost was registered. This project is being continued.

TABLE 32—MANGELS—EARLY VERSUS LATE SEEDING, 1924

Variety	Source	Date of seeding	Average yield per acre, green weight	Per cent dry matter	Yield per acre dry matter
			tons lbs.	per cent	tons lbs.
White Intermediate	Summerland	Mar. 26	17 1,840	16·29	2 1,888
" "	"	April 7	14 1,225	13·81	2 36
Difference in favour of early seeding			3 615	2·48	1,852

CARROTS—VARIETY TESTS FOR YIELD AND PURITY—PROJECT NO. AG. 36

Three varieties have been grown for four years—1921-24. The following are the average yields—green weight.

TABLE 33—CARROTS

Variety	Source	Average yield per acre, green weight—4 years, 1921-24	
		tons	lbs.
White Intermediate	Experimental Station, Summerland	20	313
Danish Champion	Experimental Farm, Ottawa	14	1,190
White Belgian	Commercial	12	71
Average of three varieties—4 years		15	1,191

SUGAR BEETS—VARIETY TESTS FOR YIELD AND PURITY—PROJECT NO. AG. 66

Eight varieties of sugar beets for sugar content analysis were grown this year for the Dominion Chemist, who reports as follows:—

"The results give evidence of excellent quality; the sugar content is decidedly above the average and the co-efficient of purity is quite satisfactory. The roots were juicy, large and uniform, in general of good shape, though some showed forking. The yields per acre are satisfactory."

TABLE 34—SUGAR BEETS—TEST OF VARIETIES, 1924

Variety	Date		Distance		Yield per acre
	Sowing	Pulling	Between plants	Between rows	
					tons lbs.
Vilmorin's Improved	April 7	Nov. 3	9	36	16 1,180
Horning	" 7	" 3	9	36	13 1,650
Henning and Harving	" 7	" 3	9	36	12 1,830
Shreiber & Son	" 7	" 3	9	36	12 1,410
Kitchener	" 7	" 3	9	36	12 570
Dr. Brugman	" 7	" 3	9	36	11 1,870
Dippe	" 7	" 3	9	36	11 610
Sluice Bros	" 7	" 3	9	36	1 520

OTHER FORAGE CROP PROJECTS

Project No. Ag. 17.—Mangels, breeding of pure strains. Selected roots of White Intermediate mangel were grown for seed and yielded at the rate of

613 pounds per acre. Roots were also grown of this variety and selections made for seed raising in 1925.

Project No. Ag. 37.—Field carrots—breeding of desirable types: selected roots of White Intermediate carrot were grown for seed and yielded at the rate of 1,404 pounds per acre. Roots were also grown of this variety and selections made for seed raising in 1925.

Project No. Ag. 92.—*Agropyron spicatum*, breeding improved strains. This experiment was begun in 1921 and is being continued.

Project No. Ag. 111.—Alfalfa, breeding improved strains—started autumn of 1924.

Project No. Ag. 117.—Soybean, breeding improved strains. This work is being continued. The soybean gives much promise as a seed or fodder crop in the southern interior of British Columbia. At the request of farmers many small samples of the Summerland soybean have been distributed for test.

Project No. Ag. 258.—Hay and pasture mixtures—started 1924.

Project No. Ag. 258C.—Hay and pasture mixtures, Sweet clover as the base—started 1924.

Project No. Ag. 258D.—Hay and pasture mixtures, Red Clover as the base.

HORTICULTURE

A large part of the territory served by this Station is irrigated. The irrigated land is, for the most part, utilized for the production of horticultural crops. Accordingly the Station staff is devoting special attention to problems connected with the culture of fruit, flowers, and vegetables under irrigation. No effort is being spared in the endeavour to secure reliable information concerning the means whereby large yields may be secured at the lowest possible cost.

In addition to investigation of the problems of production, some study is being given to the care of the crop after it is grown. It seems certain that as the horticultural industry develops in this province the factor of storage will come to play an increasingly important part in the marketing of the crop. For this reason a number of apple storage experiments were started in 1920 and have been continued and extended each year.

The horticultural investigations now under way at the Summerland Station are too extensive to permit of the results being presented in detail in this report each year. Accordingly it has been decided to present merely an outline of the work which is in progress, stressing a few of the results which it is hoped may prove of peculiar interest to growers.

As the results from the several projects accumulate, it is proposed to publish them in the form of bulletins.

APPLES

Apples are the major horticultural crop grown in the Okanagan valley. For this reason special attention is being given to the investigation of problems connected with their production. The experiments underway include a study of methods of culture, pruning and thinning. Variety tests are being carried out on an extensive scale, and a start has been made in breeding work with a view to producing varieties particularly adapted to the territory served by this Station. An outline of the various projects follows:—

CULTURAL METHODS IN THE IRRIGATED APPLE ORCHARD

	Project
Alfalfa sod mulch in an apple orchard	H. 404
Clean cultivation in an apple orchard	H. 403
Farm rotation in an apple orchard	H. 408
Irrigation of orchards	H. 411
Methods of orchard soil management	H. 331
Red clover in an apple orchard	H. 406
Soiling crops in an apple orchard	H. 405
Vegetable intercrops in an apple orchard	H. 407

The purpose of these experiments is to secure information as to the most economical method of bringing up a young orchard, and of maintaining it after it reaches bearing age.

Twelve acres of land were set aside for these projects and the trees were planted in 1916. The orchard was divided into six blocks, each two acres in area. Each block has been brought up under a different system of culture. The methods of cultivation which have been tried out include the alfalfa sod mulch system, hairy vetch cover-crop, clean cultivation, soiling crops, and vegetable intercrops. The results for the first five years have been summarized in the 1922 report of this Station, while a detailed discussion of the relative merits of alfalfa sod mulch, vetch cover-crop and clean culture will be found in the 1923 report.

The yield during the past four years under three of the methods of culture mentioned above is shown in table 35. The figures are the average production of the five varieties: McIntosh, Grimes Golden, Delicious, Rome Beauty and Yellow Newtown.

TABLE 35—THE EFFECT OF CULTURAL METHODS ON THE YIELD OF APPLES

Method of cultivation	Yield in boxes per acre (50 trees, planted 1916)				Average for four years
	1921	1922	1923	1924	
	boxes	boxes	boxes	boxes	boxes
Hairy vetch	47·8	97·5	194·4	233·0	143·1
Clean cultivation	26·6	56·4	127·0	218·2	107·0
Alfalfa sod mulch	30·0	60·6	93·0	223·9	101·8

The work outlined for the next five years includes a further study of the effect of cultural methods on such factors as: (1) yield and quality of fruit produced; (2) growth and vigour of trees; (3) texture and fertility of soil; (4) water requirement; (5) cost of operation; (6) prevalence of orchard pests.

APPLE—BIENNIAL BEARING—PROJECT H. 531

Observations on the bearing habit of apple trees have been made each year with a view to securing information on the problem of why some varieties bear full crops every year, others every other year, and still others only once in several years.

In the spring of 1924 it was decided to attempt to induce annual bearing in a number of Wagener trees which had developed the biennial bearing habit. Recent work by other investigators suggested that this result might possibly be brought about by applying nitrate of soda in the spring of the "off" year, or by practising a "heading-in" type of pruning in the spring of the "off" year.

On March 13, 1924, nitrate of soda was applied at the rate of 5 pounds per tree to nine trees. Another nine trees were given nitrate of soda at the rate of 10 pounds per tree, while "heading-in" pruning was practised on nine additional trees. Nine trees were left untreated. The results of this experiment will be watched with interest, and if deemed advisable the treatment will be repeated in the spring of 1926, which is the next theoretical "off" year for these trees.

The apple orchard in the foreground has been under continuous clean cultivation since planted in 1916. The orchard beyond the irrigation flume has been in continuous alfalfa cover-crop. Note the injury to the trees under the clean cultivation following the severe freeze in December, 1924. Orchards under cover-crops of hairy vetch or alfalfa escaped frost injury to a great extent.

APPLE—BREEDING—PROJECT H. 22

The Okanagan valley is greatly in need of a high-quality, long-keeping winter apple which will crop well and stand the rigours of our climate.

Such varieties as the Stayman Winesap and Yellow Newtown have their place, but there is a demand for an apple with the hardiness and yielding ability of the Canada Baldwin, the storage life of the Ben Davis, and the quality of the McIntosh.

It was with the hope of producing such a variety that this project was started in 1924. In the spring of that year crosses were made using such varieties as McIntosh, Delicious, Newtown, Grimes Golden, Rome Beauty, and Winesap as both male and female parents. The seed from these controlled crosses, together with a large quantity of open-pollinated seed taken from an orchard where good commercial varieties are growing, was planted in the autumn of 1924.

It is planned to continue this work and to set aside a block of land as a testing ground where the resulting seedlings can be tried out.

APPLE FILLERS—PROJECT H. 530

The purpose of this experiment is to find out whether it is worth while to plant filler-trees.

The permanent trees in the cultural orchards were planted in 1916. They were set thirty feet apart on the square. At the same time an equal number of trees of the Jonathan, Wagener, Duchess, Cox's Orange, and Yellow Transparent varieties were planted as fillers.

By 1924 the fillers were beginning to crowd the standards. Accordingly they were removed from orchards No. 1, 2, and 3. In order that some fruit of all of the varieties planted in the cultural orchards might be available for thinning and storage experiments the filler varieties were left and the standard varieties removed from orchards No. 4 and 6. Both fillers and standards were left in orchard No. 5. Up to the time the trees were removed the fillers had not yielded sufficient fruit to pay their way. It is proposed to leave both fillers and standards in No. 5 orchard for several more years and to record the yield of fruit produced and cost of operation as against No. 3 orchard, where standards only are left, and No. 6 orchard, where filler varieties only have been allowed to remain. Nos. 3, 5, and 6 orchards are all being carried on under a system of hairy vetch cover-cropping.

JONATHAN BREAKDOWN—PROJECT H. 416

The demand for an investigation of the Jonathan breakdown problem became very insistent following the serious losses suffered with the 1922 crop.

Accordingly a co-operative experiment was undertaken in 1923 by the Horticultural Division of the Central Experimental Farm, the Dominion Fruit Branch, and the Summerland Experimental Station. The Horticultural Division sent out a technical assistant to pick the fruit and carry out the detail of the experiment. He was assisted by the Inspectors of the Fruit Branch who transported him from place to place, and helped to pick and pack the apples. The Summerland Station selected the trees and had a good deal to do with the planning of the experiment. Half of the fruit was stored in the Station storage chambers, and the storage notes on these apples were made by the Station staff. In 1924 the whole of the work was turned over to the Summerland Station.

The project was undertaken with the object of securing information as to the cause of the so-called "Jonathan Breakdown," and more particularly to find some means of preventing it.

From the statements of growers and shippers, and the published reports of investigators who had studied somewhat similar problems in the United States,

Australia, and New Zealand, it seemed possible that Jonathan breakdown might be found to be due to, or connected with, three distinct sets of conditions: the conditions surrounding the fruit during the growing period, the condition of the fruit itself at harvest time, and the storage conditions to which it was subjected after picking.

Accordingly the experiment was planned to determine the possible influence of these several conditions on the particular type of breakdown prevalent in the Okanagan Jonathan.

Under the heading of growing conditions the following were investigated: 1, climate; 2, soil; 3, cultural treatment; 4, irrigation practice; 5, methods of pruning and thinning; 6, age and vigour of tree.

With regard to the condition of the fruit at harvest time, special attention was given to such factors as: 1, maturity of fruit at picking time; 2, size of fruit; 3, colour of fruit; 4, watercore.

In the matter of storage conditions consideration was given to the possible influence of: 1, temperature; 2, humidity; 3, ventilation.

The results of the experiment are too extensive to be presented in detail here, but they may be briefly summarized.

A large number of factors seem to be involved in bringing about the condition of decay known as Jonathan Breakdown. These influences appear to be at work both in the orchard and after the fruit is harvested.

The particular type of breakdown found in the British Columbia Jonathan seems to be the result of climatic influences in that it is apparently confined to the fruit produced in the western United States and British Columbia. The fact that it is much more prevalent some years than others points to the same conclusion.

Any factors which are conducive to over-vigorous or forced growth, such as excessive pruning or thinning, constant seepage, top-grafting on a vigorous stock, light crops, young trees, etc., seem to give the fruit a tendency to develop breakdown. Large size and high colour are frequently the forerunners of breakdown, but so long as these large highly coloured apples are picked before they reach an advanced stage of maturity they rarely develop breakdown. Apples, the flesh of which shows water-soaked areas at picking time frequently develop breakdown.

Breakdown has been observed to develop more rapidly and to a slightly greater extent when apples are stored without ventilation, than when they are stored where good ventilation is provided, but there appears to be little hope of entirely preventing the occurrence of breakdown, even under the best of storage conditions, when the fruit is badly watercored, over-large and over-mature at the time it is placed in storage.

Under common storage conditions, such as exist in most apple districts in British Columbia it was found that a good deal of breakdown occurred within a month after the fruit was picked, and that very few of the apples which had not developed the trouble two months after picking ever did break down even when kept for six months.

These results suggest that breakdown can be practically eliminated from our western fruit, provided the necessary precautions are taken by growers and shippers.

If the grower conducts his orchard operations with a view to producing medium-sized rather than over-large apples, and if he gets his crop off the trees before the fruit has reached an advanced stage of maturity he will have done his share towards preventing breakdown.

The shipper, on his part, should make preparation to receive the fruit when it is ready to be picked, and should do his best to provide good ventilation in warehouses and storage rooms. He should keep the fruit cool and avoid sub-

jecting it to abrupt changes of temperature. Should any over-mature and over-large or water-cored fruit find its way into the packing house it may well be stored loose for a month or two. Then should breakdown develop the source of the fruit can be easily checked up and the loss borne by the individual grower. Once the fruit is packed it is frequently impossible to trace it back to its source and any loss must be assessed on the general pool. The loss does not stop with the general pool but affects the whole industry. When fruit of doubtful keeping quality is rushed on the market it frequently develops breakdown before it reaches the consumer, thereby causing considerable loss to all concerned and destroying the confidence of buyers. Our results suggest that by holding such fruit loose in the orchard box for a month or so the cost of repacking and endless claims for rebates may be largely avoided.

While these investigations have thrown some light on the breakdown question they have also demonstrated the complexity of the problem and the necessity for further detailed study both in the orchard and in the laboratory.

It is planned to continue these experiments with the 1925 crop. Special attention will be devoted to recording the breakdown which occurs in the fruit from a large number of individual trees growing under a wide range of conditions. In this way it is hoped to secure more information as to why a high percentage of the fruit from some trees develops breakdown, while in the fruit from other trees no breakdown develops even though the apples are picked in an advanced stage of maturity.

It is also proposed to make a more careful study of storage conditions with the hope of discovering some storage treatment which will effectively prevent the development of breakdown even in those apples which have a tendency to develop the trouble.

A picking-date project will again be carried out with a view to securing information as to the influence of seasonal conditions on the date and stage of maturity at which apples should be picked in order to prevent the development of breakdown.

If the funds and equipment become available it may be possible to undertake some laboratory work with a view to determining the fundamental cause of breakdown.

APPLE—DATES OF PICKING—PROJECT H. 414

There is urgent need of more information on the proper stage of maturity at which to pick apples so that they may reach the consumer in prime condition.

An experiment in dates of picking was started in 1920 with the varieties planted in the cultural apple orchard. This experiment has been continued and extended each year. The investigation is planned to answer such questions as: "How long do apples continue to take on colour?" "When do apples cease to increase in size?" "When does the loss in windfalls exceed the gain in tonnage due to increase in size of the apples left on the tree?" "Is it worth while to make two pickings?" "Is there a simple yet reliable field test which the grower can use to determine when his fruit is ready to harvest?"

None of these questions can be answered satisfactorily from one season's results, but after careful observations have been made over a period of years it it hoped that it may be possible to summarize the results in the form of a bulletin which will be a reliable guide to the grower.

It has been found that most varieties, when left on the tree, continue to take on colour and increase in size until quite late in the season, but this is often at the expense of keeping quality and loss through wind or frost injury. On the other hand premature harvesting results in fruit of poor quality which softens and shrivels quickly in storage.

With some varieties such as the Wealthy and Jonathan, which are slow to colour, it undoubtedly pays, under certain conditions, to make two or even more pickings; while with varieties such as the Newtown and Grimes, which have no colour requirement and which tend to drop freely, it will usually be found more economical to harvest the entire crop in one picking.

The most reliable test of maturity which we have found is the gradual change of the "ground colour" or green side of the apple from leaf green to clear yellow. Apples picked when the ground colour has changed to a pale green-yellow usually develop good quality for the variety and keep well in storage. The exact shade of green is difficult to describe but can be readily recognized by the grower after a little experience.

APPLE—PRUNING—PROJECT H. 32

A systematic pruning experiment has been carried on with the permanent trees in the cultural apple orchards since they were set out.

The object in view has been to determine the effect of various methods of pruning on the time when trees come into bearing, the size and vigour of the trees, and the yield and grade of fruit produced.

The pruning for all trees has been a moderate heading and thinning out for the first two or three years, followed by an annual thinning out. Three types of trees have been developed; the central leader, modified leader, and open centre. It has been found possible to produce a good strong framework in each type of tree. The central leader trees are, however, tending to get out of reach even at this early date, while the open centre trees are not developing as large an area of bearing surface as are the other types. The modified leader type appears to be desirable for most varieties of apples. Each variety has its own natural habit of growth and it has been found more satisfactory to guide the tree rather than to attempt to force it into assuming any stereotyped shape.

Additional pruning experiments are planned for the two acres of the Winesap and Rainier varieties set out in the spring of 1924.

APPLE STOCKS—PROJECT H. 360

Recent work which has been done at the East Malling Research Station in England has suggested the possibility and advisibility of vegetative propagation of the root stocks for our fruit trees. It has been shown that the customary practice of working our fruit trees on seedling roots results in the production of trees which vary greatly in vigour and yielding ability. Mr. Hatton, of the East Malling Station, has isolated certain strains of root stocks the use of which results in the development of trees of very uniform vigour and yielding capacity. Furthermore, it has been demonstrated that these distinct types of root stock can be propagated by layerage with comparative ease. Some of these roots have a dwarfing influence on the tree, but other strains result in the development of trees of vigour and yielding propensity equal to the best of those grown on seedling roots. The value of such stocks is obvious, both from a commercial and an experimental standpoint.

Through the courtesy of Mr. H. V. Taylor, Deputy Controller of Horticulture for Britain, arrangements have been made to test out some of the more promising of these stocks at this Station.

APPLE—STORAGE—PROJECT H. 29

Storage has come to be recognized as an essential step in the marketing of our apple crop. The holding of apples in storage brings with it new problems, many of which are difficult if not impossible for the grower to solve for himself. With this in mind the Summerland Experimental Station constructed four air-

cooled storage chambers during the winter of 1921. The investigations which are being carried on include a study of the influence of temperature, humidity, and ventilation on the storage life of apples. Various brands of oiled wrappers are being tested with a view to ascertaining their value in the prevention of scald and in prolonging the usable period of the fruit. Observations are being made concerning the effect of leaving the fruit in the orchard for a time after it is picked. A comparative test of oiled wraps, sulphite wraps, and storing loose is receiving attention, and a careful experiment is being conducted to secure information as to the effect of cultural conditions on the keeping quality of apples.

In all the storage work, great care is being taken to reduce the possibility of error to a minimum. The fruit can, in all cases, be traced back to the tree on which it grew. The date of picking and the stage of maturity at picking time is recorded for all storage samples. At stated intervals during the storage period detailed notes are made concerning storage diseases, shrivelling, firmness and flavour.

The results recorded with the 1923 crop were presented at some length in the report for that year. The results with the 1924 crop will not be completed in time to be included in this report. It is proposed to publish them under separate cover.

The plans for the future involve a continuation of the projects now under way, with additional work in cold storage.

APPLE—DEGREE OF THINNING—PROJECT H. 413

The object of this experiment is to obtain information regarding the effect of various degrees of thinning on the yield and grade of fruit produced, and on the bearing habit of the tree.

The projects includes sixty trees of each of the varieties: McIntosh, Rome Beauty, Grimes Golden, Delicious, Yellow Newtown, Cox's Orange, Wagener, Jonathan, Duchess, and Yellow Transparent.

The method of procedure followed involves thinning an equal number of trees of each variety heavily, moderately, and lightly. A number of trees are left unthinned to act as a check.

Heavy thinning consists of the removal of all but one apple to a spur, and the spacing of the remaining apples one to every eight or ten inches of bearing surface over the tree.

Moderate thinning involves the removal of all but one apple to a spur and the spacing of the fruit one to approximately every six inches of bearing wood.

In light thinning not more than two apples are permitted to remain on a spur, and the fruit is spaced one to about every four inches of bearing wood.

This experiment has been under way since the trees first began to bear fruit, and it is proposed to continue it as long as the orchard is in existence. The fruit from each tree is harvested and graded separately, and a summary of the results compiled each year.

The results to date may be briefly summarized as follows:—

Heavy and moderate thinning have reduced the percentage of cull and C grade fruit, but have also reduced the yield of the Fancy and Extra Fancy grades.

Light thinning has resulted in the production of a relative large yield of Extra Fancy and Fancy without materially increasing the percentage of cull and C grade fruit.

Unthinned trees have produced as large a quantity of marketable fruit as those which were lightly thinned, but the percentage of cull and C grade fruit has been considerably higher.

The degree of thinning has not had any appreciable influence on the percentage of loss through windfalls.

Up to the present no marked influence of degree of thinning on the bearing habit of the tree has been noted. Wageners have developed the biennial bearing habit regardless of the degree of thinning practised. It seems probable that such factors as uniform conditions of soil moisture and an adequate supply of nitrogen in the soil are of equal or greater importance than thinning in the promotion of regular bearing.

In interpreting these results it should be borne in mind that the trees in this experiment are only nine years old, are making vigorous growth, and are exceptionally well provided with healthy foliage. While light thinning may be expected to give good results under such conditions it is altogether probable that with trees which are in full bearing more severe thinning will be found advisable, especially on such varieties as Wealthy and Wagener which tend to overbear.

APPLE—TIME OF THINNING—PROJECT H. 413

This experiment was started in 1924 with the object of securing reliable data as to the most economical time to thin apples.

Two trees of each of the varieties, Rome Beauty, McIntosh, Duchess, Grimes Golden, and Jonathan, were selected for the work.

Every fortnight, from blossom time till the middle of July, ten spurs on each tree were thinned to a single apple. Each spur was numbered with a tinfoil tag.

Diameter measurements were made of each individual apple every two weeks throughout the growing season.

This experiment will necessarily require to be carried on for several years before definite recommendations can be made, but the results secured this year suggest the following:—

1. Thinning at the blossom and calyx stages appears to be impractical. Thinning previous to the "June drop" does not seem to prevent this drop from taking place.

2. On varieties such as Duchess, Yellow Transparent, and Wealthy, which tend to set several fruits to a spur, thinning can be started soon after the calyx stage.

3. With varieties like McIntosh and Grimes Golden, which frequently thin themselves to one fruit to a spur, thinning is usually more economically done immediately after the June drop.

4. Thinning can be more expeditiously done when the fruit is not larger than a walnut.

5. The size of the remaining apples is influenced even when thinning is done quite late in the season.

APPLE—TOP-GRAFTING—PROJECT H. 532

There is a growing opinion that a determined effort should be made to eliminate the scattering of odd varieties which exists in so many Okanagan orchards. Top-grafting has been frequently suggested as an economical means of effecting this desired result. There is little information available, however, regarding the best method of grafting to use under our conditions.

It was with a view to securing reliable data as to grafting practice that this project was undertaken in the spring of 1924.

In the cultural apple orchards there were fifteen trees of Wismer Dessert which had been planted for Yellow Transparent in 1916. It was decided to work these trees over to Transparent and to use three methods of grafting:

bark, cleft and inlay. Since paraffin wax has recently been advocated as a cheap and effective wax for grafting purposes it was decided to use this on all grafts.

The grafting was done between the 12th and 15th of April. At that time the bark separated easily from the wood which was conducive to good results with the bark method of grafting, but was not favourable for the cleft method, which might have been done to better advantage earlier in the season.

A hundred grafts of each type were put in. Of these 88 bark, 73 inlay, and 69 cleft grafts grew. In all cases a sufficient number of grafts lived from which to develop a good tree.

These results suggest that a good catch of grafts can be secured with any of the three methods of grafting tested. They also indicate that, when properly applied, paraffin wax has given satisfactory results. The wax must be kept at the right temperature, by means of some heating apparatus and is applied with a brush. In the above experiment a home-made coal-oil burner was used for heating the wax and only one application was made.

It is planned to duplicate this experiment in the spring of 1925, using a number of McIntosh trees which were planted for Wealthy. Careful observations will be made each year to find out whether the method of grafting has any influence on the strength and vigour of the resulting tree.

APPLE—VARIETY TEST—PROJECT H. 33

The cultural orchards were laid out so as to serve as a test of ten of the most important commercial varieties of apples grown in the Dry Belt of British Columbia. In addition to these plantings two trees each of a large number of varieties of lesser commercial importance, and two trees each of a number of seedling and cross-bred apples originated at Ottawa were planted in 1916. These plantings already exceed nineteen acres and are being added to as new and promising varieties are developed. The object of this work is to secure information regarding the yielding ability, quality, hardiness, and disease resistance of various varieties when grown under Okanagan conditions.

The yields produced since 1921 by the varieties planted as standards in the cultural orchards are shown in table 36.

TABLE 36—VARIETY APPLE YIELDS, 1921-1924

Variety	Average yield in boxes per acre (50 trees, planted 1916)				Average for four years
	1921	1922	1923	1924	
	boxes	boxes	boxes	boxes	boxes
McIntosh Red	84·7	181·3	140·2	412·2	202·1
Grimes Golden	24·5	93·7	265·1	297·3	170·1
Rome Beauty	30·0	54·1	137·2	191·2	103·1
Newtown	26·8	21·0	66·8	118·7	58·3
Delicious	7·8	7·2	81·3	105·7	50·5

The varieties of apples which it appears advisable to use in new plantings in the Okanagan are:—

Vernon and Oyama.—McIntosh, Rome Beauty.

Okanagan Centre, Kelowna, Westbank.—McIntosh, Delicious, Rome Beauty. Stayman Winesap and Yellow Newtown in favourable locations.

Summerland, Naramata, and Penticton.—Delicious, Rome Beauty, Stayman Winesap, Yellow Newtown.

Osoyoos and Keremeos.—Delicious, Rome Beauty, Yellow Newtown, Winesap.

The *Melba*, a McIntosh seedling originated at the Central Experimental Farm, Ottawa, is worthy of trial in the Okanagan Valley. A limited quantity of scion wood of this variety can be obtained from this Station during the dormant season.

SECURING SIZE IN THE WINESAP—PROJECT H. 412

This experiment was planned to throw light on the question of how the Winesap variety could be induced to produce large-sized fruit. Owing to its excellent keeping quality this variety would be a highly desirable commercial apple for the Okanagan Valley, but for the fact that, in many sections, the fruit fails to size up.

In the original planting of Winesap which was made at this Station in 1916 eighteen trees were set. These were planted thirty feet apart one way by fifteen the other. During the winter of 1923 the fillers were removed leaving ten trees thirty feet apart each way.

These trees have all received similar cultural treatment with the exception that manure and fertilizer have been applied each year according to the plan set forth in table 37.

TABLE 37—MANURE AND FERTILIZER APPLIED TO WINESAPS

Plot No.	Stable manure		Nitrate of soda	
	Pounds per tree	Time of application	Pounds per tree	Time of application
1				
2	200	Spring		
3	200	"	5	Fall
4	200	"	5	Spring
5	200	"	5	Fall
			5	Spring

Each plot contains two trees. The trunk diameter, and twig growth of the trees have been recorded each year. Records have also been made each year of the yield and average diameter of the fruit produced.

Up to the present time all trees have made good growth regardless of the fertilizer treatment received. The fruit has not set particularly well, however, and has not attained large size for the variety even though light crops were borne.

These trees are not yet old enough, nor are there a sufficient number of them in the experiment to justify definite statements, but taken in conjunction with general observations in the Valley these results suggest that factors other than soil fertility have a good deal to do with the productivity and size of the Winesap. The variety seems to thrive in certain favoured locations as far north as Summerland, but can be recommended for general planting only in the Osoyoos and Keremeos sections.

It is proposed to continue the fertilizer applications on these trees, and also to carry out further tests with a one-acre block of this variety set out in the spring of 1924.

PEARS

Pears have proved profitable in many orchards in the southern Okanagan. This fruit would undoubtedly be grown to a larger extent were it not that fire blight has, at times, caused very serious losses. With this in mind the Summerland Station is carrying on projects designed to find out the most economical and effective method of combating this disease. An outline of these projects follows.

PEAR BREEDING—PROJECT H. 43

The loss caused by fire blight in the pear orchards of the Okanagan valley has suggested the necessity for breeding experiments with this fruit. While double working may prove of some value in the control of this disease it is considered that the ultimate solution of the problem will come from the development of varieties of commercial value which are immune to blight. At the present time there are varieties which have been found to be immune to blight, but the fruit of these varieties is either worthless or of very inferior quality. It is hoped that by crossing these immune varieties with high quality pears new varieties may be developed which will be immune to blight and at the same time possess commercial value. With this end in view propagating material of a number of immune varieties was secured in 1924 from Dr. F. C. Reimer of the Rogue River Experiment Station, Oregon. It is proposed to cross these immune varieties with commercial sorts such as Bosc, Bartlett and Anjou.

PEAR VARIETY TESTS—PROJECT H. 44

The object of this experiment is to ascertain the varieties best suited to our climatic conditions.

Twelve trees each of Bartlett, Bosc and Anjou, and two trees each of a large number of varieties of lesser commercial importance were set out in 1916.

In the summer of 1921 these trees suffered very seriously from drought, and in the spring of 1922 many of them were found to be badly winter injured. The unusually severe treatment which these trees have experienced, together with the fact that they were planted here and there in the stone fruit orchard has made it seem advisable to set out a new pear orchard. Accordingly it is proposed to plant three acres of pears in the spring of 1925. It is planned to make this new planting serve as a test of such commercial varieties as Bartlett, Dr. Jules Guyot, Bosc, Anjou, Howell, Flemish Beauty and Winter Nelis. The main feature of the proposed experiment, however, is a test of the value of double working in the control of fire blight. It is planned to test the several commercial varieties on French roots against the same varieties double worked on Old Home trunks and *P. Calleryana* and *P. ussuriensis* roots.

With regard to the varieties which it seems advisable to use in new plantings in the Okanagan it may be stated that Flemish Beauty, Anjou, Howell, Bosc, Winter Nelis, Dr. Jules Guyot and Bartlett are all doing well in many orchards in the Valley.

STONE FRUITS

Stone fruits, such as cherries, plums, peaches and apricots, are grown on a large scale in the district served by this Station. Accordingly a good deal of attention is being given to a study of the culture of these fruits. The work includes variety tests and an investigation of methods of pruning and thinning. The experiments under way are indicated in the following paragraphs.

STONE FRUITS—VARIETY TESTS

Apricot, Variety Experiment	Project H. 334
Cherry, Variety Experiment	Project H. 35
Peach, Variety Experiment	Project H. 332
Plum, Variety Experiment	Project H. 48

These experiments were undertaken to ascertain the varieties best suited to our climatic conditions. A six-acre orchard of peaches, plums, apricots and cherries was planted in 1916. Twelve trees each of a number of the more popular varieties and two trees each of a number of varieties of lesser commercial promise were set in the original planting. From time to time as new varieties

have been developed they have been included in the tests. Three new cherries, the Noble, the Hinton, and the Giant, which are said to be of the Bing type and to extend the season of that variety have recently been procured from California. The Gold plum, the Amber apricot, and the Date and Yakima prunes are being given a trial. A number of new peaches originated at the Vineland Experimental Station and said to be superior in quality and to extend the season of the Elberta are being tested under Okanagan conditions.

The three acres of peaches and apricots planted in 1924 have been laid out to serve as an extensive variety test of the Elberta, J. H. Hale and Tuscan Cling peaches, and the Blenheim, Moorpark, and Tilton apricots.

The yields of a number of the more important varieties of stone fruits over a three-year period were presented in the 1923 report. It is proposed to publish the five-year average in the report for 1925.

The following varieties of stone fruits are suggested as likely to give good results in the southern Okanagan:—

Cherries.—Bing and Lambert (Black Republican and Black Tartarian as pollenizers).

Plums.—Peach, Bradshaw, Climax, Green Gage, Damson, Italian Prune.

Peaches.—J. H. Hale, Elberta, Rochester.

Apricots.—Moorpark, Blenheim, Tilton.

STONE FRUITS—PRUNING EXPERIMENTS

Apricot, Pruning Experiment.. .. .. Project H. 533
Peach, Pruning Experiment.. .. .. Project H. 534.

Experiments in the pruning of stone fruits have been carried out with the trees in the variety orchard since these were set out. The main object of this work is to determine the severity with which it is desirable to prune cherries, plums, peaches, and apricots.

In general it has been found that the cherries have required little pruning other than the thinning out of interlacing branches, while plums, peaches, and apricots have given good results where a fairly heavy pruning has been practised every other year. The essential feature seems to be that the pruning should be sufficiently severe, so that in conjunction with the other orchard practices it will result in moderately strong new growth.

These results have suggested that the type of pruning which will give the largest yields of marketable fruit at lowest cost is interrelated with and dependent upon other factors such as variety, soil fertility, and distance of planting.

In order to secure more information in this connection a three-acre orchard of peaches and apricots was set out in 1924. Three varieties of peaches, Elberta, J. H. Hale and Tuscan Cling, and three varieties of apricots, Moorpark, Blenheim, and Tilton, were used in the planting. The trees were set at two planting distances, thirty feet apart each way with a filler in the centre, and twenty feet apart each way without a filler. The orchard is divided into three blocks of one acre each. One of these blocks is being cover-cropped continuously with hairy vetch, another is being manured each year and intercropped with mangels, corn, etc., while the third is being similarly intercropped but treated with chemical fertilizers instead of manure. It is proposed to practise three distinct types of pruning, the so-called "long" and "short" systems, and an intermediate system. From this project it is hoped to secure reliable information concerning the influence of such factors as variety, distance of planting and method of culture on the pruning problem. The experiment has been designed primarily to be of assistance to growers in the Oliver and Osoyoos districts where large acreages of peaches and apricots are being planted.

CULTURAL METHODS IN THE IRRIGATED STONE FRUIT ORCHARD—PROJECT H. 409

The object of this experiment is to secure information regarding the economy of various methods of bringing up a young stone fruit orchard, and of maintaining it when it reaches bearing age.

Two orchards, each three acres in area were planted to stone fruits in 1916. For the first four years these orchards received similar treatment, being intercropped with potatoes and other vegetables. In the spring of 1921 one block was seeded to hairy vetch and the other to alfalfa. Since that time the orchards have been carried on under the continuous vetch cover-crop and alfalfa sod mulch systems respectively. The relative merits of these two methods of orchard culture have been found to be much the same with stone fruits as with apples. Less water has been required where the vetch is used. Vetch has an added advantage in that it is out of the way at picking time, while the alfalfa interferes seriously with the work of harvesting. The trees in the alfalfa orchard received a severe check while the cover-crop was being established. No such effect was observed in the vetch orchard, in fact the trees in this block have made excellent growth and borne increasingly large crops every year since they were planted.

In the spring of 1924 an additional three acres of peaches and apricots were set out. This orchard was divided into three one-acre blocks. One of these blocks was seeded to hairy vetch and it is proposed to carry out continuous vetch cover-cropping on this acre. The other two acres are being devoted to production of intercrops such as corn and mangels, one acre being manured each year and the other fertilized with chemicals. It is proposed to continue this treatment for five years, an accurate record of the cost of operation, growth of trees, and yield of both fruit and intercrops being kept each year.

FILBERTS—VARIETY TEST—PROJECT H. 338

A small plantation of filberts is being grown on this station in order to secure information as to the varieties most likely to succeed under Okanagan conditions.

A few specimens of the Du Chilly and Barcelona varieties have been fruiting satisfactorily for several years. An additional fifty trees of these varieties were set out in 1922, and in 1924 specimens of the Daviana, Nottingham and White Aveline were secured.

A good deal of work has been done at the Oregon Agricultural College in connection with the pollenization of the filbert. The officials of the college recommend the Barcelona for commercial plantings, with Du Chilly, Daviana, Nottingham and White Aveline as pollenizers.

Further tests will be necessary before the commercial possibilities of the filbert in the Okanagan Valley can be determined, but there seems no reason why fruit growers in this section should not grow at least enough filberts to supply their own needs.

STONE FRUITS—THINNING EXPERIMENTS—PROJECT H. 410

This project was undertaken to secure information regarding the economy of thinning peaches, plums, prunes and apricots.

A large number of the trees in the cultural orchards are used in the thinning experiments and the work has been in progress since the trees first began to bear.

In general the results secured indicate that with certain varieties which tend to set an excessive amount of fruit, thinning is not only advisable, but is a necessity if a high percentage of marketable fruit is desired.

Unthinned trees of such varieties as Triumph peach, Burbank plum, Silver prune and Royal apricot have produced fruit of very inferior quality and have in many cases suffered severe breakage from overloading.

Varieties such as Early Crawford peach, Wickson plum, Italian prune and Moorpark apricot have seldom required to be thinned.

It is proposed to continue this experiment using the same trees each year.

WALNUT—VARIETY TEST—PROJECT H. 351

Variety tests of walnuts are being carried on in a limited way, with the view of determining the varieties most likely to give good results under our conditions.

In 1917 a number of seedling walnuts were planted. These have now begun to bear and some of them are quite promising. In 1923 a small plantation of grafted trees of the Franquette and Mayette varieties was set out. These have not yet come into bearing, but from the results secured under somewhat similar climatic conditions in Oregon and Washington it seems safe to state that the grafted Franquette is likely to prove the most satisfactory walnut in this locality. While nut growing may never assume commercial importance in this valley there seems good reason to hope that it will be found possible for every fruit grower to produce sufficient nuts for his own use.

SMALL FRUITS

Small fruits are grown only to a very limited extent in the southern Okanagan. For this reason the work with these crops at this station has been restricted to variety tests.

VARIETY TESTS OF SMALL FRUITS

Blackberry, Variety Test	Project H. 2
Currant, Variety Test	Project H. 4
Gooseberry, Variety Test	Project H. 6
Raspberry, Variety Test	Project H. 11
Strawberry, Variety Test	Project H. 21

These projects were started soon after the Station came into being, but the plants were set in an unfavourable location and by 1923 the plantation was in such poor condition that it was decided to plough it up. Although these fruits are never likely to prove of great commercial importance in this section, it is considered that a limited test of varieties is justified in that letters are frequently received from growers, asking for information regarding the best varieties of these fruits to grow for home use. Accordingly a suitable block of land has been set aside for this work and it is proposed to set out a new plantation in the spring of 1925.

GRAPES—VARIETY TEST—PROJECT H. 40

The purpose of this project is to ascertain what varieties are best suited to our climatic conditions.

Nine vines of each of four American and four European varieties were set out in 1922. During the winter of 1922-23 practically all the European vines were killed out. Largely on account of this injury it was decided to move the vineyard to a more sheltered spot. Accordingly a new site was chosen and planted in the spring of 1924. The planting plan was arranged to provide for a test of methods of training as well as a test of varieties. It is proposed to try out three systems of training, the Kniffin, the Fan, and the Upright Arm.

These vines are not yet in bearing so that no first-hand recommendations can be given regarding the best varieties to plant in the Okanagan. The results

secured in other sections where the conditions are somewhat similar suggest Campbell Early as a desirable American variety and White Sweetwater as a promising European sort. Okanagan fruit growers might do well to try a few vines of these varieties with a view to supplying their own tables.

VEGETABLES

The vegetable experiments which are being carried on at this station include variety and cultural tests of a wide variety of crops. Special attention is being given to a study of the cultural requirements of those vegetables which are grown commercially in the southern Okanagan, and breeding work has been started with tomatoes and cantaloupes. The various projects under way are outlined in brief in the following paragraphs.

VEGETABLE VARIETY TESTS

Asparagus, Variety Experiment	Project H. 54
Bean, Variety Experiment	Project H. 61
Beet, Variety Experiment	Project H. 68
Cabbage, Variety Experiment	Project H. 77
Carrot, Variety Experiment	Project H. 83
Cauliflower, Variety Experiment	Project H. 88
Corn, Variety Experiment	Project H. 102
Cucumber, Variety Experiment	Project H. 106
Egg Plant, Variety Experiment	Project H. 107
Lettuce, Variety Experiment	Project H. 116
Musk Melon, Variety Experiment	Project H. 122
Water Melon, Variety Experiment	Project H. 125
Onion, Variety Experiment	Project H. 138
Parsnip, Variety Experiment	Project H. 145
Pea, Variety Experiment	Project H. 154
Pepper, Variety Experiment	Project H. 157
Potato, Variety Experiment	Project H. 186
Pumpkin, Variety Experiment	Project H. 188
Spinach, Variety Experiment	Project H. 199
Squash, Variety Experiment	Project H. 201
Swiss Chard, Variety Experiment	Project H. 203
Tomato, Variety Experiment	Project H. 211
Vegetable Marrow, Variety Experiment	Project H. 216

Most of these projects have been carried on for a number of years. They were undertaken with the idea of determining the varieties best suited to this district.

A great many varieties of vegetables have been found to thrive under our conditions. Below is a list of those varieties which it is considered might be grown with advantage in the kitchen garden of every resident in the southern Okanagan valley.

Asparagus—Early Giant Argenteuil.
Bean—Round Pod Kidney Wax (bush).
Stringless Green Pod (bush).
Kentucky Wonder (pole).
Beet—Flat Egyptian (early).
Detroit Dark Red (late).
Cabbage—Copenhagen Market (early).
Danish Ballhead (late).
Carrot—Nantes Coreless (early).
Danvers (late).
Cauliflower—Dwarf Erfurt.
Corn—Golden Bantam.
Cucumber—Early Fortune.
Egg Plant—New York Purple.
Lettuce—Grand Rapids (leaf).
Iceberg (head).
Musk Melon—Hoodoo.

Water Melon—Kleckley Sweet.
Onion—Yellow Globe Danvers.
Parsnip—Hollow Crown.
Peas—Little Marvel (early).
Blue Bantam (medium).
Stratagem (late).
Pepper—Harris Earliest.
Potato—Early St. George (early).
Netted Gem (late).
Pumpkin—Pie or Sugar.
Spinach—King of Denmark.
Squash—Delicious.
Swiss Chard—Lucullus.
Tomato—Avon Early.
Vegetable Marrow—Cocozelle.

Special attention has been paid to variety tests of those vegetables which are grown on a commercial scale in the southern Okanagan. Accordingly it has been considered justifiable to publish the results of the variety tests of asparagus, cantaloupes and tomatoes in detail in this report.

ASPARAGUS—VARIETY TEST—PROJECT H. 54

This project was started in 1916, the object being to determine the varieties most suited to the district.

Four varieties, Conover Colossal, Columbian Mammoth White, Early Giant Argenteuil and Henderson Palmetto, were planted in the original test. These varieties have all yielded excellent crops although they have received no special attention. This fact has suggested that asparagus might well be grown to a larger extent in the Okanagan valley than is now the case.

In 1924 the variety plots were extended to include a test of Bonvallet Giant, Pedigreed Washington, Mary Washington, and Eclipse. A quantity of plants were grown from Mary Washington seed with a view to setting out a comparatively large bed of this variety in 1925. It is planned to use this variety in a cultural method experiment to secure information regarding the most economical method of growing this crop in the Okanagan. It is proposed to devote special attention to determining whether it is possible to use legume cover-crops to maintain the productivity of the asparagus bed.

With regard to varieties recommended for planting it may be stated that Early Giant Argenteuil has proved highly satisfactory. The Mary Washington variety has not been grown long enough to warrant a statement regarding its adaptability to local conditions, but it is reported as giving great satisfaction in the commercial asparagus sections of the United States, and growers are recommended to give it a trial.

BEANS, DIFFERENT DISTANCES OF PLANTING—PROJECT H. 58

This experiment was undertaken in 1923 with a view to ascertaining the most desirable distance apart to plant beans. Two varieties were used, Round Pod Kidney Wax and Stringless Green Pod. Three thirty-foot rows of each variety were planted. All rows were 30 inches apart but the plants were spaced 2 inches apart in one row, 4 inches apart in another, and 6 inches apart in the third row of each variety.

The yield of green beans harvested in 1924 is set forth in table 38.

TABLE 38—BEANS, DISTANCE OF PLANTING—1924 YIELDS

Variety	Distance apart in row	Yield of Green Beans							
		July 10		July 18		July 24		Total	
		lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
Stringless Green Pod.	2 inches	6	12	2	10	.....	5	9	11
" "	4 "	6	2	3	4	.....	4	9	10
" "	6 "	7	.....	3	10	.....	5	10	15
Round Pod Kidney Wax.	2 "	8	2	3	4	.....	5	11	11
" "	4 "	8	13	3	9	.....	4	12	10
" "	6 "	9	8	4	10	.....	12	13	14

The data embodied in table 38 show that with both Stringless Green Pod and Round Pod Kidney Wax the highest yield of green beans was secured where the plants were six inches apart. The fact that the six inch apart plants also gave the largest yield at the first picking indicates that these plants matured their crop just as ear y if not earlier than did those plants which were left closer in the row.

These results suggest that there is nothing to be gained from leaving beans closer than six inches apart in the row. Where poor germination is feared the seed may be sown closer and the plants later thinned out to the required distance.

BEAN, WEEKLY SOWINGS FOR YIELD—PROJECT H. 63

This experiment was begun in 1916 to determine whether date of planting has any influence on the yield produced by bush beans. Four sowings were made at intervals of a week. It was found that the later sowings usually yielded just as well as the early ones. There does not appear to be any advantage in sowing beans in this district before fruit trees are well in leaf.

BEETS, DIFFERENT DATES OF SOWING—PROJECT H. 65
CARROTS, DIFFERENT DATES OF SOWING—PROJECT H. 79
PARSNIPS, DIFFERENT DATES OF SOWING—PROJECT H. 142

These projects were undertaken in 1923 for the purpose of obtaining first-hand information as to the effect of sowing these vegetables at ten-day intervals from early spring until the end of May. In 1924 a thirty-foot row of Detroit Dark Red beet, Chantenay carrot, and Hollow Crown parsnip was sown every ten days beginning with April 7.

It was found that the later sowings of parsnips gave a relatively poor yield, but that all sowings of beets and carrots produced a good crop. The earlier sowings were ready for the table sooner than the later ones, but the roots were overgrown by the end of the season.

These results suggest that parsnips may wel be sown as early as the ground has warmed up sufficiently to ensure germination, and that several successive sowings of beets and carrots are advisable in order to ensure a continuous supply of tender roots for the table.

CABBAGE, PROTECTION FROM ROOT-MAGGOT—PROJECT H. 75
CAULIFLOWER, PROTECTION FROM ROOT-MAGGOT—PROJECT H. 86

These projects were started in 1916 for the purpose of finding out the best way to protect cabbage and cauliflower from root-maggot. Treatment of the soil around the stem of the plant with a dilute solution of bichloride of mercury has been found quite effective. One ounce of bichloride of mercury should be dissolved in a gallon of boiling water, to which nine gallons of cold water can then be added. About a quarter of a pint of the dilute solution should be applied to the soil around the stem of the newly set plant. Two or three successive applications should be made at ten-day intervals.

CORN—SUCKERING EXPERIMENT—PROJECT H. 101

The purpose of this project is to ascertain the effect of suckering on earliness, yield, and ear development. In 1924 the suckers were removed from twenty hills each of Early Malcolm and Golden Bantam. Another twenty hills of each variety were left with the suckers on. The hills were planted three feet apart each way and three plants were left to a hill.

No marked difference in earliness was observed and the yield from the unsuckered plants was slightly higher than that produced by those from which the suckers were removed. The plants from which the suckers were removed showed a tendency to blow over. These results suggest that the extra labour involved in removing the suckers was not justified.

CANTALOUPE—BREEDING—PROJECT H. 118

This project was started in 1920 with the object of isolating superior strains of Hoodoo cantaloupe both for home use and shipping purposes. The method followed has been the selection of outstanding plants followed by a comparative test of the progeny. In making the selections particular attention has been paid to yield, earliness, uniformity and shipping quality of the fruit; colour, thickness, and texture of the flesh; and vigour and disease resistance of the vines. Distinct strains have been isolated as is indicated by the data presented in tables 41, 42, and 43. Some of these strains are considerably earlier and of higher quality than the general run of Hoodoo seed obtainable from seedsmen and can be recommended for home use. Recently the Rockyford Cantaloupe Breeders Association has introduced a melon called the Gold Standard which is claimed to combine the pink flesh of the Hoodoo with the shipping qualities of the Pollock 10-25. It is planned to give this melon an extensive test in 1925 and if it proves to justify the claims made for it selections will be made in an attempt to isolate an early strain.

The attempts at improvement of the cantaloupe at this Station have so far been confined to selection, but it is hoped that in the future it may be possible to make controlled crosses which should result in greater progress.

CANTALOUPE—FERTILIZER EXPERIMENT

Frequent inquiries received regarding the value of commercial fertilizers as a means of maintaining soil fertility where truck crops are grown suggested the necessity for definite experimental work along this line. In 1924 an experiment was planned to secure information regarding the economy of using nitrate of soda, superphosphate of lime, muriate of potash, and barnyard manure in the culture of cantaloupes. The experiment was carried on in conjunction with the variety test reported in tables 42 and 43. Nine plots, 2/25 acre in area, were laid out, to which manure and fertilizer were applied as shown in table 39.

TABLE 39—PLAN FOR APPLICATION OF FERTILIZER TO CANTALOUPES

Plot	Fertilizer	Rate applied per acre	Date of Application
1	Manure	10 tons	March 10
2	Manure	10 "	" 10
	Nitrate of soda	150 lbs.	June 11
3	Manure	10 tons	March 10
	Superphosphate of lime	500 lbs.	March 12
4	Manure	10 tons	March 10
	Muriate of potash	150 lbs.	" 12
5	Check	No manure or fertilizer	
6	Nitrate of soda	150 lbs.	June 11
7	Superphosphate of lime	500 "	March 12
8	Muriate of potash	150 "	" 12
9	Check	No manure or fertilizer.	

The manure, superphosphate and potash were disked well into the soil early in March, but the application of nitrogen was deferred until after the crop was up.

The cantaloupe seed was sown in the field on May 22nd, three eighty-five-foot rows of each of four varieties, Hoodoo, Hearts of Gold, Perfecto, and Pollock being planted in each plot.

The yield of marketable cantaloupes harvested from the centre rows only is shown in table 40.

TABLE 40—CANTALOUPE—FERTILIZER EXPERIMENT—1924 YIELDS

Plot No.	Fertilizer	Yield in pounds per plot (4/150 acre)		
		August	September	Total
		lbs.	lbs.	lbs.
4	Manure. Muriate of potash	68·5	334·0	402·5
7	Superphosphate of lime	56·5	338·0	394·5
5	Check	31·5	345·5	377·0
6	Nitrate of Soda	52·0	307·5	359·5
3	Manure. Superphosphate of lime	21·5	290·5	312·0
2	Manure. Nitrate of soda	39·0	253·5	292·5
9	Check	24·0	245·0	269·0
1	Manure	38·5	227·0	265·5
8	Muriate of Potash	28·5	200·0	228·5

The yields reported in table 40 are not sufficiently consistent to permit of any conclusions being drawn. The soil on the plot where this experiment is located is not as uniform as could be desired, and it is considered that this fact may have seriously influenced the results. Accordingly it is planned in 1925 to reduce the size and increase the number of check and replicate fertilizer plots. In this way it is hoped that more accurate and consistent results may be secured.

CANTALOUPE—VARIETY TEST—PROJECT H. 122

This experiment has been in progress since 1916, the object being to ascertain those varieties most suitable both for home consumption and for shipping purposes.

In 1924 ten plants each of thirty strains and varieties of cantaloupes or musk melons were started in the greenhouse, and set out in the field on June 4th. The plants were set three feet apart in the rows and the rows were nine feet apart.

The number of ripe melons harvested from each variety during August and September is shown in table 41.

TABLE 41—CANTALOUPE—VARIETY TEST, 1924

Variety	Seedsman	Yield of marketable melons		
		August	September	Total
Hoodoo	Steele, Briggs Co	.....	117	117
Hoodoo 23-2	S. E. S	12	97	109
Hearts of Gold	Burrell	18	90	108
Eden Gem	Burrell	11	97	108
Rockyford Improved	Ewing	1	103	104
Burrell Gem	Burrell	.....	102	102
Paul Rose	Steele, Briggs Co	10	78	88
Pollock 10-25	Burrell	.....	85	85
Hoodoo 23-10	S. E. S	9	74	83

TABLE 41—CANTALOUPE—VARIETY TEST, 1924—*Concluded*

Variety	Seedsman	Yield of marketable melons		
		August	September	Total
Perfecto	Livingston	.....	81	81
Paul Rose	Vaughan	27	51	78
Perfecto	Rice	.....	77	77
Hearts of Gold	Hart & Vick	.....	75	75
Pollock 10-25	Rockyford Cant. Breeders	2	70	72
Emerald Gem	Ewing	10	58	68
Hoodoo	Vaughan	10	58	68
Hoodoo 23-12	S. E. S.	18	46	64
Hearts of Gold	Morrill	16	45	61
Tip Top	Burrell	2	58	60
Burrell Gem	Rockyford Cant. Breeders	3	55	58
Irondequoit	Hart & Vick	.....	56	56
Extra Early Hackensack	Ewing	.....	54	54
Honey Dew	Burrell	.....	53	53
Sugar Sweet	Stokes	28	23	51
Emerald Gem	Livingston	20	31	51
Milwaukee Market	Vaughan	12	30	42
Emerald Gem	Burrell	9	30	39
Extra Early Osage	Burrell	5	27	32
Golden Casaba	Burrell	.....	32	32
Oka	Vaughan	6	24	30

Table 41 is a fairly reliable indicator of the earliness of the several strains and varieties, but does not give a very accurate idea of the yield as no allowance has been made for differences in weight of the melons. Varieties such as Hoodoo, Eden Gem, Rockyford and Emerald Gem produce relatively small fruit, while the melons produced by varieties such as Oka, Milwaukee Market, and Irondequoit are quite large. Hearts of Gold and Hoodoo are very similar if not identical melons.

The several varieties were tested for quality. Emerald Gem, Sugar Sweet, Hoodoo, Paul Rose, Extra Early Osage, Irondequoit, Milwaukee Market and Oka, are all excellent for home use.

Since a large and increasing acreage of cantaloupes is being grown in the Okanagan valley for shipment to prairie markets a more extensive test of varieties possessing commercial possibilities has been made. The varieties used in 1924 were Hoodoo, Hearts of Gold, Perfecto and Pollock 10-25, and the seed was secured from Summerland Experimental Station, D. V. Burrell, Rice Seed Co., and the Rockyford Cantaloupe Breeders Association respectively.

The seed was soaked in warm water over night, and then planted in the field on May 22nd. Nine plots of each variety were sown, each plot being 1/50 acre in area. The rows were 83 feet long and 3½ feet apart and there were three rows to a plot, so that the centre row of each plot was under field conditions.

The yield of marketable cantaloupes produced by the centre rows only is shown in table 42.

TABLE 42—CANTALOUPE—YIELD OF COMMERCIAL VARIETIES, 1924

Variety	Yield of marketable melons from centre row of each plot (1/150 acre)									
	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Average
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Pollock	48	89·0	90·5	112·0	81·0	86	112	65·0	105·5	87·7
Hoodoo	74	78·5	82·0	108·0	82·5	113	79	64·5	71·0	83·6
Perfecto	82	79·0	87·5	93·5	76·0	91	79	50·0	49·5	76·4
Hearts of Gold	61	53·5	52·0	89·0	75·5	69	94	79·0	44·0	61·5

The data presented in table 42 show that there was quite a wide variation in the comparative yields produced by the several varieties in the different plots, but that on the average the Pollock gave the highest and the Hearts of Gold the lowest yield of marketable melons. Even the Hearts of Gold, however, gave an average yield of over four and a half tons to the acre.

The comparative earliness of the varieties is brought out in table 43 where the yield from all plots for each picking date is shown.

TABLE 43—CANTALOUPE—EARLINESS OF COMMERCIAL VARIETIES, 1924

Variety	Yield of marketable melons from centre row of all plots (9/150 acre)						
	Aug. 20	Aug. 25	Aug. 30	Sept. 3	Sept. 10	Sept. 16	Total
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Pollock	.....	.....	.....	63·5	527·5	198·0	789·0
Hoodoo	18·5	44·0	195·5	279·5	161·0	54·0	752·5
Perfecto	.....	.....	.....	158·5	366·5	162·5	687·5
Hearts of Gold	21·0	21·5	60·0	195·0	214·5	105·0	617·0

It will be noted that the Hoodoo and Hearts of Gold began to ripen in marketable quantity a good ten days ahead of the Pollock and Perfecto.

In order to test the shipping quality of these varieties a crate of each was shipped to the Experimental Stations at Invermere, Sidney, and Agassiz, and to various private individuals with the request that they make a report on the condition of the melons on arrival and state their preference. The reports received were far from unanimous in their choice, each variety having some advocates. The pink flesh of the Hoodoo and Hearts of Gold was preferred by most, but a number reported the Pollock as arriving in better condition and possessing a finer flavour. The Pollock has another advantage from the shipping standpoint in that it tends to size up very evenly while the other varieties tested produced melons of variable size and shape.

There seems to be room for a melon which will combine the pink coloured flesh and the earliness of the Hoodoo with the uniformity, good outward appearance and shipping quality of the Pollock.

LETTUCE, DATES OF SOWING—PROJECT H. 114

The increasing popularity of head lettuce and the fact that large quantities of this vegetable are imported into Western Canada from the United States suggested the necessity for an investigation to determine whether this crop can be produced economically in the Okanagan Valley.

As a first step in this investigation a date of sowing experiment was carried out in 1924. Seed of New York or Wonderful lettuce was sown in the autumn of 1923 and at ten-day intervals in the spring of 1924 in an attempt to determine the best date of sowing for the spring crop. Again in the late summer several sowings were made to find out whether a fall crop could be produced.

The soil on the location selected for the experiment was not altogether suitable for lettuce growing as it tended to bake and did not take water readily. A good deal of trouble was experienced with " tip burn ", a physiological disease which results in browning and decay of the leaves and renders the heads unfit for commerce.

In general it may be said that sowing very early in the spring or in the late fall so that the seed germinates first thing in the spring seems to offer most promise for the production of a spring crop, while a sowing made the third week in July gave the best results with the fall crop.

While the results secured in 1924 were not altogether satisfactory it is proposed to continue this work in 1925 on a more suitable piece of ground, with

a view to determining whether " tip burn " can be overcome by providing good cultural conditions.

PEA, OF DIFFERENT SEASONS VS. ONE VARIETY PLANTED AT DIFFERENT DATES—PROJECT H. 150

The purpose of this experiment is to determine whether a supply of green peas can be best secured by sowing several varieties of different ripening seasons or by making successive sowings of the same variety a week or so apart.

It has been found that the best results have been secured by sowing several varieties early in the season. Late plantings of peas have usually been stunted by the hot weather and seriously affected by mildew.

POTATOES—SOURCE OF SEED—PROJECT H. 374

POTATOES—MATURITY OF SEED—PROJECT H. 170

POTATOES—CERTIFIED SEED—H. 168

The low average yield of potatoes in the southern Okanagan, caused largely be so called " running out " diseases, made it seem desirable to carry out experiments to determine the influence of source of seed, maturity of seed, and seed certification. The experiments in progress were stated in detail in the report for 1923. Briefly it may be said that source of seed, maturity of seed and seed certification have each been found to have a bearing on the prevalence of diseases such as Mosaic and Leaf Roll. Growers are advised to plant certified seed grown in cool districts. The Soil and Crop Division of the Provincial Department of Agriculture at Victoria, B.C., has done a great deal of valuable work in connection with potato seed certification, and will be pleased to provide growers with detailed information as to where to get reliable seed.

RHUBARB—DEVELOPMENT FROM SEED—PROJECT H. 356

The object of this experiment is to determine how long it takes seedling rhubarb plants to become large enough to pull and force. Seed has been sown every year since 1916. The seedlings have usually attained sufficient size to pull and force two years after sowing. Rhubarb might well be grown to a larger extent in the home gardens of the Okanagan.

TOMATO—BREEDING—PROJECT H. 204

This project was begun in 1920, with the idea of isolating superior strains of the Earliana tomato. For several years special attention was paid to securing smoothness in this variety. By 1924 distinct strains which were outstandingly smooth had been isolated but it was found that size and earliness had to a certain extent been sacrificed. Since earliness is of very great importance in the Okanagan Valley it was decided to make a new start using the Avon Early variety as a base. Accordingly fifteen individual plant selections of this variety were made in 1924, and it is proposed to test these selections side by side in 1925, reserving seed of each for propagation should the progeny of any one plant prove to possess exceptional merit.

TOMATO—FERTILIZER EXPERIMENT—PROJECT H. 388

A number of inquiries regarding the economy of using commercial fertilizers in the production of tomatoes made it seem advisable to conduct experiments with a view to securing first-hand information in this connection.

It was decided in the spring of 1924 to test nitrate of soda, superphosphate of lime, and muriate of potash, with and without barnyard manure. Plots were laid out and the fertilizers applied as shown in table 44.

TABLE 44—PLAN FOR APPLICATION OF FERTILIZER TO TOMATOES

Plot No.	Fertilizer	Rate applied per acre	Date of application
1	Manure	10 tons	March 10
2	Manure	10 "	" 10
	Nitrate of soda	150 lbs.	June 11
3	Manure	10 tons	March 10
	Superphosphate of lime	500 lbs.	" 12
4	Manure	10 tons	" 10
	Muriate of potash	150 lbs.	" 12
5	Check	No manure or fertilizer.	
6	Nitrate of soda	150 lbs.	June 11
7	Superphosphate of lime	500 lbs.	March 12
8	Muriate of potash	150 "	" 12
9	Check	No manure or fertilizer.	

The experiment was carried on in conjunction with the variety test reported in tables 50 and 51. The yield of ripe marketable fruit harvested from the centre rows of the various plots during August and September is shown in table 45.

TABLE 45—TOMATO—FERTILIZER EXPERIMENT, 1924 YIELDS

Plot No.	Fertilizer	Yield in pounds per plot (4/150 acre)		
		August	September	Total
		lbs.	lbs.	lbs.
3	Manure. Superphosphate of lime	236·0	1,014·0	1,250·0
2	Manure. Nitrate of soda	200·5	840·0	1,040·5
4	Manure. Muriate of potash	262·0	765·5	1,027·5
7	Superphosphate of lime	241·25	695·0	936·25
1	Manure	250·0	678·0	928·0
6	Nitrate of soda	203·25	693·0	896·25
8	Muriate of potash	199·25	693·5	892·75
9	Check	157·0	636·0	793·0
5	Check	208·25	464·0	672·25

From the data presented in table 45, it would appear that each of the fertilizers applied has had the effect of slightly increasing the yield, and that the use of manure resulted in a still further increase in the crop harvested. None of the fertilizers exerted any marked influence on the earliness of the crop. The block of land on which this experiment was carried on, is however, far from uniform as regards soil and the results of a one year's test cannot therefore be regarded as conclusive.

It is worthy of note that the superphosphate of lime and muriate of potash, which appear to have given fairly satisfactory results in this experiment, were applied early in March and thoroughly incorporated with the soil. It seems probable that unless these fertilizers are applied early in the season in irrigated sections they frequently do not become available to the crop when they are most needed. With nitrate of soda there may be more danger of leaching if the application is made early in the season, but even this fertilizer may be applied to good advantage before the plants are set, as it is in the early spring that the stimulus provided by this chemical is most helpful.

It is planned to repeat this experiment in 1925, using smaller plots and a greater number of checks and replications. In this way it is hoped that any

variability in the soil and distribution of irrigation water may be overcome and that the results secured may be less affected by experimental error.

TOMATO—IRRIGATION EXPERIMENT—PROJECT H. 415

This experiment was started in 1920 with the object of determining the most economical irrigation practice for vegetables grown commercially in the southern Okanagan.

Information is being sought with regard to the most advantageous:—

1. Amount of irrigation water to apply.
2. Time to apply it.
3. Frequency with which to apply it.

The project is located on a fertile sandy loam soil with a subsoil of coarse sand about two and a half feet below the surface. No barnyard manure or commercial fertilizers have ever been applied to this soil. Since 1920 a crop of vegetables has been grown on it every second year, and a crop of vetch grown and turned under in the alternate year.

The results secured during the first three years which the experiment was carried out were presented at considerable length in the report of this Station for 1922.

In 1924, four plots, each one twentieth of an acre in area, were planted to Earliana tomato. The plants were set out on May 15th and were spaced three and a half feet apart each way.

Irrigation water was applied by the furrow method and was measured separately for each plot. The unit of measurement employed was the acre inch, the exact equivalent of an inch of rainfall. The rate and dates of application for each plot are shown in table 46.

TABLE 46—IRRIGATION OF TOMATOES—WATER APPLIED, 1924

Plot	Date and rate of application					
	May 6	June 17	July 1	July 17	Aug. 3	Total
	acre-inches	acre-inches	acre-inches	acre-inches	acre-inches	acre-inches
A	2·0	.....	2·0	.....	2·0	6·0
B	3·0	.....	3·0	.....	3·0	9·0
C	3·6	3·6	3·6	3·6	.....	14·4
D	4·0	4·0	4·0	4·0	4·0	20·0

The plan for applying water provided for another application to plots B, C, and D about the middle of August, which would have brought the total application on these plots to 12, 18, and 24 inches respectively. Owing to the fact that the supply of irrigation water was cut off early in August it was not possible to give this final application.

Since the results of an irrigation experiment are often greatly influenced by the amount of rainfall it has been considered advisable to present a table showing the natural precipitation which might have been available to the crop grown in this experiment. Accordingly a statement of the precipitation for the twelve months from October, 1923, to September, 1924, has been prepared and is set forth in table 47, together with the average precipitation for each month for the previous five years.

TABLE 47—IRRIGATION OF TOMATOES—NATURAL MOISTURE

Month	Precipitation in inches	
	Oct. 1, 1923, to Sept. 1, 1924	Average for previous five years
October	0·81	0·98
November	0·49	1·06
December	1·98	1·04
January	0·66	0·96
February	0·24	0·24
March	0·11	0·60
April	0·03	0·97
May	0·08	0·53
June	0·40	1·37
July	0·35	0·58
August	0·72	0·95
September	0·65	0·83
Total	6·52	10·11

From the data presented in table 47 it is apparent that the natural moisture available to the 1924 crop was considerably below average.

The yield of marketable ripe fruit produced by each plot during August and September is shown in table 48.

TABLE 48—IRRIGATION OF TOMATOES—YIELD PER PLOT, 1924

Plot	Water applied in inches per plot	Yields in pounds per plot (1-20 acre)		
		August	September	Total
	inches	lbs.	lbs.	lbs.
C	14·4	665·2	1,608·7	2,273·9
B	9·0	832·1	1,298·6	2,130·7
D	20·0	621·7	1,484·7	2,106·4
A	6·0	837·8	951·6	1,789·4

It will be noted that the highest yield for the season was produced by Plot C to which water was applied at the rate of just under fifteen acre-inches. Reference to table 48 shows that this water was applied in four equal amounts of just over three and a half inches each, the first application being made ten days before the plants were set out, and subsequent applications on June 17th, July 1st and July 17th, respectively. It will further be noted that Plot B, to which water was applied at the rate of only nine acre-inches for the season in three equal amounts on May 6th, July 1st and August 3rd, produced almost as large a total yield as Plot C.

Plot A which received only six acre-inches of water during the season produced the lowest total yield, but ripened the most fruit in the month of August, while Plot B ripened considerably more than Plot C during that month.

Plots B, C and D each produced at the rate of over twenty tons to the acre, while Plot A produced at the rate of over seventeen tons to the acre.

These results show that large crops of tomatoes can be raised with comparatively small amounts of irrigation water provided the necessary attention is paid to care of the young plants and to cultivation after they are set out. It is further apparent that unnecessarily heavy applications of water early in the season tend to retard the ripening of the crop.

The exact amount of water which it will be found most desirable to apply will vary with soil, location, etc., but these results suggest that care should be taken to guard against over irrigation especially in the early part of the season.

The fact that such large yields were secured is evidence that the soil has been brought to a high state of fertility by the use of a vetch cover crop without the addition of manure or chemical fertilizers.

It is proposed to continue this experiment with tomatoes as this crop is grown extensively in the Okanagan valley.

TOMATO, METHODS OF TRAINING—PROJECT H. 207

Each year since 1916 a number of tomato plants have been pruned and trained in various ways with the idea of finding out whether such practices are justified under Okanagan conditions.

In some cases the pruning and training have caused the fruit to mature a few days earlier than was the case where the plants were allowed to grow naturally. Training to stakes or wires and severe pruning have, however, always resulted in the production of a high percentage of cracked fruit.

Tomatoes can be ripened so easily under field conditions in the southern Okanagan that it is very doubtful whether any special attention to pruning or training is justified.

TOMATO—VARIETY TEST—PROJECT H. 211

The fact that the tomato is grown more extensively than any other vegetable in the Okanagan valley has suggested the advisability of carrying on a comprehensive variety test in order to determine what varieties or strains are best adapted to local climatic conditions. For this reason special attention has been given to variety tests of this vegetable for some years past.

In 1924 over ninety varieties and strains were tested in small plots of six plants each set four feet apart each way. Since the plots were so small and were not replicated the possibility of experimental error due to soil variation, unequal distribution of irrigation water, etc., is very great. Nevertheless it is considered that the results secured give a general idea of the earliness and yielding ability of the several varieties. Accordingly a statement of the yield of ripe fruit harvested during August and September has been embodied in table 49. Only those varieties which produced an average of over fifteen pounds of marketable ripe fruit per plant during August and September have been included in the table. For simplicity the yields have been shown to the nearest pound, although the weighings were actually made to the nearest ounce.

TABLE 49—TOMATO—VARIETY TEST, 1924

Variety	Seedsman	Yield of marketable fruit from six plants		
		August	September	Total
		lbs.	lbs.	lbs.
Avon Early	Hart & Vick	47	125	172
Bolgiano	Bolgiano	52	118	170
Earliana Grade No. 3	Langdon	50	113	163
Avon Early	Dreer	41	121	162
Alacrity x Hipper	Central Experimental Farm	28	128	156
Earliana	Stokes	23	133	156
Earliana	Dreer	47	108	155
Burbank	Aveson	28	117	145
Bonny Best	Landreth	16	124	140
John Baer	Vaughan	24	114	138
Bonny Best	Langdon	43	95	138
Earliana	Livingstone	27	111	138
Alacrity x Earlibell	Central Experimental Farm	19	117	136
Earliana	Hart & Vick	30	105	135
John Baer	Hart & Vick	8	124	132
First of All	McKenzie	38	94	132
Earliana	Ewing	47	85	132

TABLE 49—TOMATO—VARIETY TEST, 1924—*Concluded*

Variety	Seedsman	Yield of marketable fruit from six plants		
		August	September	Total
		lbs.	lbs.	lbs.
Earliana	Burpee	43	88	131
I.X.L	Bolgiano	37	94	131
Bonney Best	Stokes	16	113	129
Earliana	Moore	52	76	128
Red Head	Langdon	21	107	128
Avon Early	Vaughan	66	61	127
John Baer	Steele, Briggs Ltd	19	106	125
John Baer	Bolgiano	9	115	124
Earliana	Vaughan	50	71	121
Earliana	Ferry	52	68	120
Earliana	Landreth	12	107	119
Landreth	Landreth	16	100	116
Earliana	McLachlan	45	68	113
June Pink	Livingston	26	87	113
Earliana Grade No. 2	Langdon	45	67	112
Standard Bonny Best	Stokes	25	83	108
Chalks Jewel	Burpee	19	86	105
Bonny Best	Burpee	12	91	103
S.S. Bonny Best	Stokes	45	56	101
Burbank	Central Experimental Farm	48	52	100
John Baer	Langdon	15	82	97
Danish Export	Wibollt	39	57	96
Victoria Whole Salad	Burpee	8	88	96
Earliana	Burpee	24	71	95
Early Mascot	Graham	56	39	95
Magnum Bonum	James	24	71	95
Bloomsdale	Landreth	9	84	93
Earliest of All	Steele, Briggs Ltd	39	52	91
Self Pruning	Burpee	17	73	90
Red Rock	Landreth	7	83	90

It will be noted that the highest yield of marketable fruit for the season was produced by Avon Early, and that the highest yield of ripe fruit during August was harvested from the same variety from another seedsman. The fruit of this variety is smoother than many strains of Earliana and the plants appear to be equally if not more vigorous. The Bolgiano is another variety which merits further trial. Good yields were obtained from a number of strains of Earliana, John Baer and Bonny Best.

A more extensive test was made of Earliana, John Baer, Bonny Best and Avon Early from Langdon, Bolgiano, Stokes and Dreer respectively. These varieties were grown in 1/50 acre plots which were replicated nine times. The plants were set in the field on May 29th and were spaced three and a half feet apart each way. There were three rows of each variety in each plot so that the centre row was grown under field conditions. The yield of ripe fruit harvested from the centre row of each variety in each plot is shown in table 50.

TABLE 50—TOMATO—YIELD OF COMMERCIAL VARIETIES, 1924

Variety	Yield of marketable tomatoes from centre row of each plot (1/150 acre)									
	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7	Plot 8	Plot 9	Average
	lbs	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs
Avon Early	276·75	271·75	327·50	306·00	98·5	310·5	363·0	296·75	251·0	277·9
Bonny Best	259·25	267·50	311·00	212·50	156·0	324·0	308·0	275·50	254·50	263·1
Earliana	203·00	282·75	359·00	323·50	225·75	164·25	164·50	175·50	159·00	226·4
John Baer	189·00	218·50	252·50	185·50	192·00	97·50	100·75	145·00	128·50	167·7

It is apparent from the data presented in table 50 that there is a wide variation in the comparative yield produced by the several varieties in the different plots but that Avon Early gave the highest average yield. Even the John Baer, which gave the lowest average yield, produced at the rate of over 12½ tons to the acre. In plots 1, 2, 3, and 4 Earliana and John Baer were nearest to the source of irrigation water, while in plots 5 to 9 inclusive, Avon Early and John Baer enjoyed the advantage in this respect.

The comparative earliness of the varieties is shown in table 51 where the yield from the centre rows of all plots is given for each picking date.

TABLE 51—TOMATO—EARLINESS OF COMMERCIAL VARIETIES, 1924

Variety	Yield of marketable tomatoes from centre rows of all plots (9/150 acre)						
	Aug. 10	Aug. 20	Aug. 25	Sept. 2	Sept. 8	Sept. 15	Total
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Avon Early	133·75	221·00	315·0	482·0	791	559	2,501·75
Bonny Best	.....	107·75	204·0	599·50	829	628	2,368·25
Earliana	122·75	236·0	310·0	488·50	646	255	2,058·25
John Baer	.....	118·75	189·50	343·00	594	264	1,509·25

It is apparent from the data set forth in table 51 that Avon Early and Earliana ripened fruit in marketable quantity ten days earlier than John Baer and Bonny Best.

The results of this experiment indicate that it is possible to produce good crops of any of the four varieties tested, provided proper attention is paid to setting out good stocky plants and to giving them proper cultivation in the field.

The Avon Early variety seems to deserve an extensive trial in the Okanagan valley.

ANNUAL FLOWERS

PROJECT H. 261

Several hundred kinds of annual flowers have been tested at this Station with a view to ascertaining those which will give the most satisfaction under local conditions. Lists of some of those which it is considered should find a place in every Okanagan flower garden are given here.

Annuals which can be sown outside in the fall just before freeze up

Alyssum,
Brachycome (Swan River Daisy),
Clarkia,
Schizanthus (Butterfly Flower),
Shirley Poppy,
Antirrhinum (Snapdragon),
Calliopsis (Tick Seed),
Eschscholtzia (California Poppy),
Nemophila (Baby Eyes),
Larkspur.

Annuals which can be sown outside in early spring

Cosmos,
Dimorphotheca (African Daisy),
Nasturtium,
Salpiglossis (Velvet Trumpet),
Zinnia,
Convolvulus (Morning Glory),
Gomphrena (Globe Amaranth),
Mignonette,
Phlox Drummondi,
Scabiosa (Morning Bride).

Annuals which should be started in a hot-bed

Asters,
Canna,
Lobelia.
Nemesia,
Salvia (Flowering Sage),
Celosia (Coxcomb),
Pennisetum (Fountain Grass),
Petunia,
Statice,
Verbena.

GLADIOLUS—VARIETY TEST—PROJECT H. 272

The gladiolus does exceptionally well under Okanagan conditions. Such great improvements have been made in this flower during the past few years that it would be impossible to test out all the new varieties at this Station. An attempt has been made, however, to try out those new varieties which seem most likely to stand the test of time. The gladiolus should be grown much more extensively in this section as it is one of the best flowers for cutting, and thrives much better under Okanagan conditions than do sweet peas which are commonly used for this purpose.

The corms or bulbs should be planted from three to five inches deep after danger of frost is over in the spring, and the plants should be given plenty of cultivation during the growing season. Irrigation water should be applied freely when the flower spikes begin to appear.

The following list of varieties embodies some of the most satisfactory of the moderate priced sorts, and embraces a wide range of colours. Given fair treatment they will provide a wealth of bloom over a long season.

Gladioli found satisfactory under Okanagan conditions

Alice Tiplady,
Dorothy Wheeler,
Jack London,
Prince of Wales,
Scarlano,
Brilliant,
Flora,
Le Marechal Foch,
Red Emperor,
White Giant.

BULBS

BULBS—VARIETY TESTS

Crocus, Variety Test	Project H. 267
Hyacinth, Variety Test	Project H. 275
Narcissus, Variety Test	Project H. 278
Tulip, Variety Test	Project H. 290

Every spring the gardens at the Summerland Station are bright with bulbs. The display of bloom attracts many visitors to the Station, but it also serves another purpose; that of determining what varieties thrive best in this locality. While bulbs are not quite so happy in these surroundings as they are in the Coast sections they can be grown with most gratifying results.

At this Station the bulbs are usually planted some time in October or early November before the ground freezes up for the winter. A covering of straw has been found of advantage in retarding too rapid growth in the spring, thus giving time for development of a good root system.

Of the many varieties which have been tested the following are suggested as likely to prove satisfactory and to provide a pleasing display in the amateur garden.

Bulbs for the Okanagan

Crocus—
- King of Whites,
- Large Yellow,
- Lothair.

Hyacinths—
- La Grandesse,
- Marconi,
- King of the Blues.

Narcissi—
- Barri Conspicuus,
- Emperor,
- Sir Watkin.

PERENNIAL FLOWERS

PROJECT H. 274

A perennial border should be a feature of every Okanagan home garden. It is to secure information concerning the kinds of perennial flowers best adapted to the territory served by this Station that this experiment is being carried on. From early spring till late fall the perennial border provides something of interest to the flower grower, and a visit to the Station usually suggests some new idea which can be put in practice in the home garden. The best way for growers to become acquainted with the numerous perennial flowers which can be grown in this locality is to pay frequent visits to the Station grounds, and to follow up these visits by growing the plants in their own gardens.

For the benefit of those who cannot visit the Station at frequent intervals a list of a few of the hardy perennials which can be relied upon to thrive under amateur care is given below.

Herbaceous Perennials for the Amateur Garden

Arabis,
Aubretia,
Candytuft,
Columbine,
Delphinium,
Geum,
Gypsophila,
Pyrethrum,
Shasta Daisy,
Sweet William.

Tulips

Artus,
William III,
Clara Butt,
Murillo,
Chrysolora,
Jost van Vondel,
Phillippe de Commines.
Couronne d'Or,
Picotee,
Isis.

IRIS—VARIETY TEST—PROJECT H. 276

The German iris is a flower which gives the maximum of satisfaction for the minimum of trouble under our conditions. For this reason a large number of varieties are being tested out at this Station.

Unlike most perennials, the plants should not be divided during the dormant season. Good results are secured when divisions are made and new beds set out in the summer after the blooming period is over, or in early spring after growth has started.

A list of varieties which are worthy of a place in every fruit grower's flower garden is given below.

Iris for the Fruit Grower's Garden

Alcazar,
Lorely,
Madame Chereau,
Monsignor,
Pallida Dalmatica,
Parc de Neuilly,
Princess Victoria Louise,
Prosper Laugier,
Rhein Nixe,
White Knight.

ROSES

ROSE—VARIETY TEST—PROJECT H. 302

The rose will always be a popular flower. With this in mind a variety experiment on quite a large scale has been carried out on this Station. It has been found difficult to grow a number of the more tender varieties, but many beautiful roses have been found hardy under our conditions. Below is a list of a few of those which have been found most satisfactory and easy to grow.

Hardy Roses

Frau Karl Druschki,
George Arends,
Mme. Caroline Testout,
Gruss an Teplitz,
Paul Neyron,
Mme. Ed. Herriott,
Soleil d'Or,
Paul's Scarlet (climber),
Ulrich Brunner,
Tausendschon (climber).

HEDGES

HEDGES—VARIETY TEST—PROJECT H. 298

A number of specimen hedges were set out in 1916 in order to test their respective merits under local conditions. Anyone contemplating putting in a hedge would do well to visit this Station and inspect the hedges.

Berberis Thunbergii or Japanese Barberry has been found to make an excellent low-growing hedge. The red berries which it bears make it very attractive all through the winter. For a tall-growing, trimmed hedge Elaeagnus or Russian Olive has proved very satisfactory, while Spiraea Van Houttei is most effective if left untrimmed.

TREES AND SHRUBS

PROJECT H. 307

A large number of trees and shrubs are being tested to determine their adaptability to Okanagan conditions. There is room for more tree planting and a more extensive use of shrubs in the beautification of Okanagan home grounds.

For specimen trees Cut Leaf birch and Blue spruce are admirable, while for windbreaks the Lombardy poplar and the Douglas fir may be used to good advantage.

A number of varieties of the flowering shrubs listed below have proved to be well adapted for landscape work in this district.

Hardy Shrubs for Landscape Work

Berberis,	Deutzia,
Caragana,	Ribes,
Lilac,	Philadelphus,
Spirea,	Rhus,
Tamarix,	Lonicera.

POULTRY

The White Wyandotte still remains the only breed kept on this Station. At the end of December, 1924, the flock consisted of the following: 32 two-year-old hens; 164 yearling hens; 110 pullets; 30 cockerels for spring use and sale, making a total of 336 birds. A number of cockerels and 97 yearling hens were sold in the fall to farmers in the district or sent to farms in other provinces, to be used as breeders.

The egg production of the pullets, which have recently completed their first year's laying, has been high. Of 334 trap-nested, 125 laid 200 eggs or better, one individual reaching 301 in the 366-day period. This pullet average of 37.4 per cent of the flock laying 200 eggs is the best record made since the start of the poultry plant.

FEEDING

During the winter of 1923-24 an experiment to test the value of the various recognized green feeds compared with epsom salts was carried out. Five pens were used, each containing sixteen birds. One pen was used as a check pen, no green feed in any form being given during the six months of the test. The others received apples, dry alfalfa leaves, mangels, and epsom salts respectively. The salts was fed every morning in the drinking water, and the alfalfa, apples and mangels every other day about ten o'clock in the morning. Epsom salts is supposed to supply the laxative and medicinal properties attributed to the green feeds.

(1) The greatest number of eggs were produced by the mangel pen, which give 102 more than the check pen without green feed.

(2) The most feed was consumed by the mangel pen, although the birds on dry alfalfa leaves were only five pounds behind. The difference between the highest and lowest feed consumption was 121 pounds.

(3) The only lot to lose weight during the test was the mangel pen, the pen which laid the most eggs. The pen fed apples gained a total of 6 pounds, 13 ounces, whilst the others made slight gains.

(4) The greatest profit over cost of feed was made by the apple pen, although not laying the most eggs, due to smaller quantity of feed consumed.

(5) The variation in feed consumed, eggs laid, or profit over cost of feed, was not great between any of the pens. It is interesting to note that the pen not receiving green feed ranked last in all three of these columns.

These results, though not conclusive, give a very good idea of the value of green feed. However, it shows that apples, of which there are always a large quantity of culls in this district during the fall and winter months, can be used to advantage where poultry is kept. This same experiment is being duplicated during the winter of 1924-25. (Table 52.)

TABLE 52—GREEN FEED

Pen	Grain Feeds or Salts		Grain		Mash		Shell		Total feed		Eggs			Profit	Gain or loss in weight during test
	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Laid	Price per doz.	Value		
		$ cts.		$ cts.		$ cts.		$ cts.		$ cts.		$ cts.	$ cts.	$ cts.	
Apples	96	0 48	528	10 88	221	5 45	28	0 84	873	17 65	1,724	0 36	49 93	32 28	Gain 6 lbs. 13 ozs.
Mangels	96	0 48	537	11 07	243	6 00	27	0 81	903	18 36	1,746	0 36	50 06	31 74	Loss 1 lb. 13 ozs.
Epsom Salts	13	1 56	532	10 96	233	5 77	29	0 87	807	19 16	1,695	0 36	48 57	29 41	Gain 6 ozs.
Alfalfa leaves	94	0 47	541	11 15	236	5 83	27	0 81	898	18 26	1,679	0 36	48 54	30 28	Gain 2 lbs. 11 ozs.
No green feed	.....	.....	517	10 66	238	5 88	27	0 81	782	17 45	1,644	0 36	46 66	29 11	Gain 2 lbs. 3 ozs.

DIFFERENT GRAIN MIXTURES FOR EGG PRODUCTION

Owing to the high price of corn compared with the prices of Canadian-grown grains prevailing during the winter of 1923-24, an experiment was carried out during the winter months, November to April inclusive, to determine the comparative economic values of mixtures made up with or without cracked corn.

STOCK AND HOUSING.—The stock selected for this purpose comprised 72 pullets, which were divided into four equal pens, each containing 18 birds.

FEEDING.—Except for the grain mixtures all pens were fed alike, a standard dry mash being constantly before the birds, and green feed being given every other day.

The various scratch grains fed, and the prices per hundredweight, were as follows:—

Pen 1—Equal parts, by weight, of cracked corn, wheat and oats....	$2 00
Pen 2—Two parts cracked corn, two parts wheat, one part oats....	2 07
Part 3—Two parts wheat, one part oats.....	1 82
Part 4—Two parts oats, one part wheat.....	1 70

There was no variation in price of these mixtures during the experiment, as the feed purchased at the beginning sufficed for the entire six months.

Table 53 summarizes the results obtained from the use of each grain mixture.

TABLE 53—GRAIN MIXTURES

Pen	Grain mixtures—by parts	Grain		Mash		Green Feed		Shell		Total feed		Eggs			Profit
		Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Laid	Price per doz.	Value	
			$ cts.		$ cts.		$ cts.		$ cts.		$ cts.		cts.	$ cts.	$ cts.
1	1 corn, 1 wheat, 1 oats	549	10 98	251	6 21	96	0 48	32	0 96	928	18 63	1,621	36	45 62	26 89
2	2 corn, 2 wheat, 1 oats	576	11 81	268	6 50	96	0 48	34	1 02	976	19 81	1,869	36	50 88	31 07
3	2 wheat, 1 oats	570	10 39	240	5 95	96	0 48	31	0 93	937	17 75	1,660	36	46 41	28 66
4	2 oats, 1 wheat	572	9 62	227	5 63	96	0 48	34	1 02	929	16 75	1,627	36	47 45	30 70

CONCLUSIONS

1. The greatest number of eggs were produced by Pen 2, or that fed on 2 parts cracked corn, 2 parts wheat and 1 part oats. These birds laid 268 more eggs than pen 1, which gave the fewest eggs.

2. The most feed was consumed by Pen 2, by over two pounds per bird. There was very little variation between the other three pens.

3. A total gain of just over five pounds in weight was made by the pen 4, fed 2 parts oats and 1 part wheat. The weight of the other pens practically remained constant during the experiment.

4. The greatest profit over cost of feed was made by Pen 2, although Pen 4, fed on two parts oats and one part wheat, was not far behind, which is attributed, in some measure, to the fact that they were fed on a grain ration costing 37 cents per 100 pounds less than the former pen.

5. There were no deaths recorded in any of the pens during the entire six months of the experiment.

BREEDING FOR EGG SIZE

In order to determine the influence exerted by the male and female respectively on the egg size of the pullet progeny of a given mating, several breeding pens were checked during the spring of 1923 in which the males, bred from dams laying large eggs, were mated to females of varying egg sizes.

Weights of birds and eggs mentioned in tables 54, 55, 56, 57 and 58 were taken during May of the cockerel or pullet year during 1923. All progeny which lived until their egg weights were taken in May, 1924, are included.

TABLE 54—BREEDING FOR EGG SIZE

Pen No. 1.—Cockerel No. G 9 (7 lbs.) from dam F 13 (5 lbs.) laying eggs 27 ounces per dozen

Hen band number	Weight of bird		Egg weight	Progeny number	Egg weight	Average egg weight of progeny
	lbs.	ozs.	ozs. per doz.		ozs. per doz.	ozs. per doz.
F6	5	11	22·8	H11	27·3	
				82	24·2	
				245	24·8	25·4
F95	5	10	24·3	88	24·2	
				136	24·1	
				139	24·0	24·1
F167	?	?	24·0	24	22·7	
				185	24·0	23·2
F168	?	?	23·8	83	25·2	25·2
F225	?	?	23·8	70	24·8	
				302A	26·5	25·6
F258	?	?	22·0	123	24·1	
				182	27·0	
				305	26·6	25·9

TABLE 55—BREEDING FOR EGG SIZE

Pen No. 2.—Cockerel No. G12 (8 lbs. 8 ozs.) from dam E19 (4 lbs. 12 ozs.) laying eggs 24 ounces per doz.

Hen band number	Weight of bird		Egg weight	Progeny number	Egg weight	Average egg weight of progeny
	lbs.	ozs.	ozs. per doz.		ozs. per doz.	ozs. per doz.
F29	5	14	27·7	H198	24·4	
				217	24·1	24·2
F38	5	3	22·0	63	22·9	
				301A	25·7	24·3
F42	5	4	22·0	115	26·8	
				164	24·9	25·8
F51	4	0	25·4	119	24·2	
				289	24·0	24·1
F111	4	14	24·2	128	27·0	
				158	24·7	
				191	26·4	
				226	24·5	
				240	24·5	
				263	27·2	25·7
F147	?	?	24·5	116	24·0	
				173	27·2	
				274	31·0	
				275	27·2	27·3

TABLE 56—BREEDING FOR EGG SIZE

Pen No. 3.—Cockerel No. G13 (6 lbs. 13 ozs.) from dam F13 (5 lbs.), laying eggs 27 ounces per dozen

Hen band number	Weight of bird		Egg weight	Progeny number	Egg weight	Average egg weight of progeny
	lbs.	ozs.	ozs. per doz.		ozs. per doz.	ozs. per doz.
F7	6	0	22·9	H308	22·9	22·9
F9	5	9	25·0	126	23·0	
				129	23·0	
				133	22·3	
				157	22·6	
				231	23·7	22·9
F32	4	12	23·2	266	22·7	
				294	24·8	
				324	25·1	
				282A	26·0	24·6
F68	5	4	22·2	72	20·8	
				194	25·1	
				278	21·7	
				291	22·3	22·5
F144	4	8	22·5	79	24·7	
				200	24·1	
				208	25·6	24·8
F278	?	?	22·8	94	21·2	
				297	24·0	
				312	24·7	
				304A	25·4	23·8
F306	?	?	24·2	10	24·2	
				113	25·0	
				135	24·7	
				246	23·2	
				255	21·3	
				269	23·4	
				279	22·4	23·5

TABLE 57—BREEDING FOR EGG SIZE

Pen No. 4.—Cock No. F304 (7 lbs.) from dam E102 (4 lbs. 12 ozs.), laying eggs 24 ounces per dozen

Hen band number	Weight of bird		Egg weight	Progeny number	Egg weight	Average egg weight of progeny
	lbs.	ozs.	ozs. per doz.		ozs. per doz.	ozs. per doz.
F31	4	9	24·0	H4	26·5	
				195	25·4	
				220	25·9	
				250	28·3	
				276	24·0	26·0
F47	?	?	24·5	27	25·7	
				35	22·8	
				54	23·0	
				95	24·0	
				114	24·0	
				142	24·1	
				319	24·3	
				307A	24·0	24·0
F69	6	2	24·0	100	24·0	
				117	24·8	
				221	24·1	
				326	21·0	23·5
F181	5	6	24·0	125	23·0	
				176	24·1	23·5
F215	?	?	24·2	283A	23·7	
				286A	25·6	
				305A	25·5	24·9
F245	?	?	24·0	108	24·0	
				162	24·3	
				179	24·7	
				284	23·8	
				306A	26·7	
				309A	25·4	24·8

TABLE 58—BREEDING FOR EGG SIZE

Pen No. 5.—Cock No. F72 (7 lbs. 10 ozs.) from dam E19 (4 lbs. 12 ozs.), laying eggs 24 ounces per dozen

Hen band number	Weight of bird		Egg weight	Progeny number	Egg weight	Average egg weight of progeny
	lbs.	ozs.	ozs. per doz.		ozs. per doz.	ozs. per doz.
G33	?	?	23·5	H166	24·4	24·4
G39	?	?	24·6	7	24·0	
				30	24·7	24·3
G93	?	?	22·6	253	22·8	22·8
G131	?	?	23·9	160	26·9	
				189	24·6	25·7
G132	?	?	24·0	146	23·0	
				167	25·3	
				239	23·5	
				288	24·1	24·0

REMARKS

Pen 1.—Of the six females in this mating four laid eggs below standard in May of their pullet year. The progeny from these four without exception laid eggs over 24 ounces per dozen. The only failures to lay eggs of increased size came from the two "standard" matings, although only one bird laid less than a 2-ounce egg.

Pen 2.—Here again only one "progeny" pullet laid eggs below 24 ounces per dozen, but in this case the size has increased slightly above that of her dam.

Pen 3.—The male in this pen was a full brother to the one in Pen 1, mated to a number of birds picked for their high egg records in their first

year's laying. The average egg record of these seven dams was 249·1 eggs, the highest being 273 and the lowest 236. The hen which laid the most eggs—F9—gave the largest drop in progeny egg size, the average of the pullets being 22·9 ounces per dozen, whilst the lowest layer among the dams—F144—increased the egg size of the progeny to over standard. Taken without regard to production this mating gave quite different results to the preceding two pens.

Pen 4.—This pen was mated up with the intention of being a check pen, all hens chosen having egg sizes around the standard mark, bred to a male whose dam laid standard eggs. Of the progeny, 78·6 per cent laid eggs weighing 24 ounces per dozen, although only 50 per cent of the average weights of individual matings increased.

Pen 5.—This was a mating of pullets in full lay to an adult male. Thirty per cent of the progeny failed to lay standard eggs.

YARD RANGE VERSUS CONFINEMENT

This experiment was conducted for six months, November to April inclusive. Both pens were housed and fed alike, the only difference being that one pen was let out into an enclosed yard 60 feet by 100 feet whenever the weather permitted, while the other pen was confined in a house space of 6 feet by 16 feet.

All pullets weighed in at the commencement of the test completed it in good health.

TABLE 59—SHOWING GAIN OR LOSS IN WEIGHT DURING EXPERIMENT

Pen	Combined weight of pullets				Gain during test		Loss during test	
	Nov. 1, 1923		April 30, 1924					
	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.	lbs.	ozs.
Yard range	96	1	97	11	1	10	..	..
Confinement	94	13	94	10	..	..	0	3

TABLE 60—PEN 1—YARD RANGE

Month	Grain		Mash		Green feed		Shell		Total feed		Eggs			Profit
	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Laid	Price per doz.	Value	
		$ cts.		$ cts.		$ cts.		$ cts.		$ cts.		$ cts.	$ cts.	$ cts.
November, 1923	65	1 30	12	0 27	16	0 08	3	0 09	98	1 74	76	0 55	3 48	1 74
December	89	1 78	68	1 53	16	0 08	5	0 15	178	3 54	316	0 52	13 69	10 15
January, 1924	85	1 76	79	1 97	16	0 08	6	0 18	186	3 99	374	0 42	13 09	9 10
February	98	2 02	49	1 23	16	0 08	7	0 21	170	3 54	330	0 34	9 35	5 81
March	117	2 42	36	0 90	16	0 08	7	0 21	176	3 61	390	0 17	5 52	1 91
April	122	2 53	24	0 60	16	0 08	6	0 18	168	3 39	383	0 18	5 75	2 36
Totals and averages	576	11 81	268	6 50	96	0 48	34	1 02	976	19 81	1,869	0 36	50 88	31 07

TABLE 61—PEN 2—CONFINEMENT

Month	Grain		Mash		Green feed		Shell		Total feed		Eggs			Profit
	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Lbs.	Value	Laid	Price per doz.	Value	
		$ cts.		$ cts.		$ cts.		$ cts.		$ cts.		$ cts.	$ cts.	$ cts.
November, 1923	65	1 30	16	0 36	16	0 08	4	0 12	101	1 86	63	0 55	2 89	1 03
December	90	1 80	60	1 35	16	0 08	3	0 09	169	3 32	312	0 52	13 52	10 20
January, 1924	85	1 76	74	1 85	16	0 08	5	0 15	180	3 84	319	0 42	11 16	7 32
February	105	2 20	49	1 23	16	0 08	9	0 27	179	3 78	313	0 34	8 87	5 09
March	113	2 34	35	0 87	16	0 08	8	0 24	172	3 73	380	0 17	5 38	1 65
April	105	2 17	22	0 55	16	0 08	5	0 15	148	2 95	317	0 18	4 75	1 80
Totals and averages	563	11 57	256	6 21	96	0 48	34	1 02	949	19 48	1,704	0 36	46 57	27 09

REMARKS

1. The pen on yard range laid 165 more eggs than the pen confined for the period of the test, an average of 9·2 eggs per bird.

2. Pen 1 showed a total profit of $31.07, or $1.73 per bird for six months. This is $3.95 better than the confined pen.

3. There was very little variation in the weight of either of the pens at the beginning or end of the experiment, pen 1 making a slight gain, whilst pen 2 showed a slight loss. (Tables 59, 60 and 61).

GENERAL REMARKS

Irrigation Works.—The irrigation water supply for the station was augmented during the fall by the construction of a storage dam at Crescent Lake on the headwaters of Trout Creek. A storage record for 300 acre feet of water in the name of the Station was applied for and the dam completed in October and November. This should give a reserve of water for that period of the year when the normal supply runs short. The 75-horsepower electric pumping outfit lifting water from Trout Creek canyon against a 170-foot head was started early in the spring and used when needed as long as water was available under the Station records. This outfit is very efficient. A smaller electric automatic pumping outfit is being installed to lift water from the irrigation weirs to an elevation above the grounds, where it will be stored in a 25,000-gallon reserve tank at a head of 50 feet. From this tank a fire protection main will be fed, and water also supplied to the lawns and ornamental gardens. This outfit will augment the domestic water supply considerably, and provide much needed protection in case of fire.

BUILDINGS.—The horse barn, 30 feet by 60 feet completed in March of this year has been referred to elsewhere in this report. The dairy barn, 36 feet by 54 feet, with feed room annex, in course of construction at the present time, will enable our Jersey herd to be handled economically and efficiently. The Superintendent's residence is in course of erection and will relieve the housing problem considerably. An addition to the boarding house has provided livable quarters for the housekeeper and her help and also given larger and better accommodation for the men in the rooms upstairs. A public convenience with flush toilets and wash basins built in the grounds near the pavilion or log cabin will provide much needed accommodation for the ever-increasing number of visitors at the Station.

FAIRS, MEETINGS AND PICNICS.—Exhibits were forwarded to Vancouver and New Westminster fairs, but no local fairs were attended this past year, as the water shortage hit all crops hard and destroyed the usefulness of a great deal of work. However, plans are being made to take an exhibit to a limited number of local fairs in 1925.

Numerous fruit growers' and general farmers' meetings were attended and addresses given where requested by the Station staff during the year. Owing to low returns from crops, notably fruit, the interest which is being taken in meetings by farmers and growers is at a low ebb. These conditions fortunately show signs of improvement for the coming year.

A large picnic, which was attended by over 1,200 people, was held in June. Short addresses were given by several prominent agriculturists of the province. The event attracted very favourable comment and it is proposed to make this picnic an annual event under the auspices of the Farmers' Institutes and Fruit Growers' Association.

The delegates to the Western Association of Horticulturists, Entomologists and Plant Pathologists, and the Pacific Division of the American Phytopathological Society, were entertained at the Station for a day in August. Delegates were present at these meetings from all the Western States.

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