Reports
B.C.
N.R.

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This volume includes progress reports of the following Experimental Farms and Substation of the Canada Department of Agriculture:

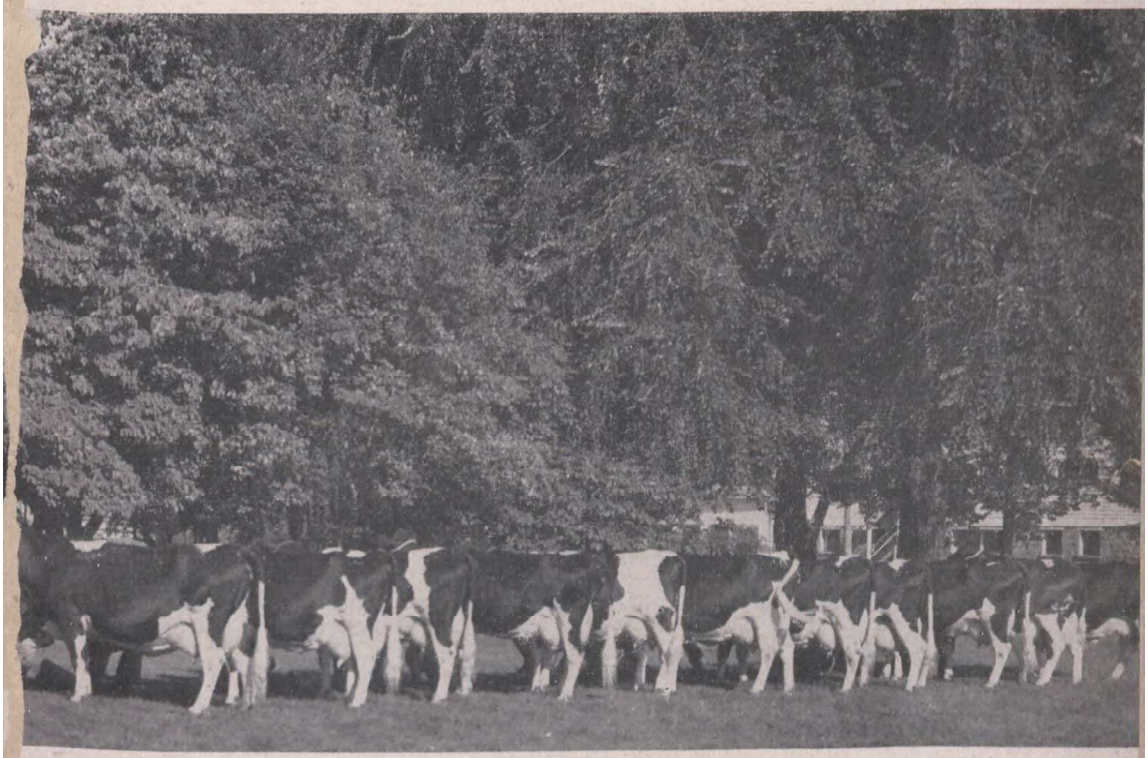
CANADA
DEPARTMENT OF AGRICULTURE
EXPERIMENTAL FARMS SERVICE

DOMINION EXPERIMENTAL FARM

AGASSIZ, BRITISH COLUMBIA

W. H. HICKS, B.S.A., Superintendent

PROGRESS REPORT
1948-1952



A fine group of Holsteins at the Agassiz Farm

Published by authority of the Right Hon. JAMES G. GARDINER, Minister of Agriculture,
Ottawa, Canada

COVER PHOTOGRAPH: A fine group of Holstein cows on the Agassiz Farm, all by the same sire, born between April 2, 1943 and February 5, 1945. The cow nearest the camera is the first cow in the herd to grade "excellent". Four others grade "very good"; five "good plus"; and one "good". The sixth cow in the row died young and her production is not included in the following figures.

In 49 lactations ten cows produced 809,476 pounds of milk and 30,610 pounds of fat, or an average of 80,948 pounds of milk and 3,061 pounds of fat per cow. Fifteen of the lactations were over 20,000 pounds of milk with the best one, eighth in the row, making 24,571 pounds of milk and 972 pounds of fat in a year at four years of age.

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PERSONNEL

Dominion Experimental Farm
Agassiz, B.C.

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INTRODUCTION

The Agassiz Dominion Experimental Farm is situated in the lower Fraser valley of British Columbia, 70 miles east of Vancouver. It is one of the original five Canadian Experimental Farms, being authorized by Parliament in 1866 and established in 1888. During the last 41 years livestock and general farming problems have been emphasized, but prior to 1911 horticulture was the main line of work and since 1926 this division has again gradually gained in importance. This Experimental Farm, with the eight Illustration Stations associated with it, serves chiefly the agricultural community of the southwestern mainland region of the province. Illustration Stations in the upper country are also supervised from Agassiz. A high producing herd of Holstein cattle that averaged 679 pounds of butterfat in 1950 is kept. The major stud of Clydesdale horses in the province, a fine herd of Yorkshire swine, and a high class flock of Dorset Horn sheep are maintained, from which breeding individuals have been widely distributed to improve the quality of stock throughout the farming areas of British Columbia.

TABLE 1—SUMMARIES OF MONTHLY TEMPERATURE, PRECIPITATION AND SUNSHINE DATA

DOMINION EXPERIMENTAL FARM, AGASSIZ, B.C. 1892–1952 (61 years)

Month	Temperature					Precipitation					Sunshine				
	Highest		Lowest		Mean	Highest		Lowest		Average	Highest		Lowest		Average
	°F	yr.	°F	yr.	°F.	in.	yr.	in.	yr.	in.	hr.	yr.	hr.	yr.	hr.
January	62	1900	−13	1893	34·5	20·03	1913	1·67	1929	7·61	103·0	1930	9·9	1952	48·1
February	68	1906	−12	1893	38·0	15·99	1951	0·82	1928	6·13	143·6	1920	23·0	1904	92·3
March	77	1900	10	1897	43·2	13·78	1916	1·98	1926	5·67	207·0	1912	47·7	1950	95·9
April	90	1934	25	1936	49·7	9·95	1920	0·77	1951	4·35	215·1	1911	34·0	1937	123·7
May	93	1898	28	1897	55·7	8·46	1905	0·39	1946	4·12	229·1	1928	90·4	1899	160·2
June	97	1925	35	1919	60·4	12·06	1897	0·35	1938	3·68	256·0	1940	80·0	1901	220·5
July	100	1941	38	1918	64·2	5·09	1912	0·00	1901	1·91	303·2	1894	106·3	1916	220·5
August	103	1898	35	1918	64·1	7·94	1918	0·01	1930	2·14	298·2	1908	75·4	1948	196·4
September	96	1898	32	1919	58·6	12·42	1920	0·26	1918	4·14	208·8	1918	60·3	1914	132·9
October	83	1923	20	1919	51·1	14·85	1918	0·77	1895	6·73	165·2	1895	50·5	1927	97·0
November	70	1949	9	1896	42·4	20·88	1909	1·87	1952	8·05	93·8	1936	12·9	1927	48·2
December	63	1935	−3	1924	37·4	16·75	1933	0·53	1914	8·19	86·1	1943	11·4	1920	38·2
Yearly Totals	.....	.....	.....	.....	.....	.....	.....	.....	.....	62·72	.....	.....	.....	.....	1,391·8
Monthly Averages	.....	.....	.....	.....	49·9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE 2—PRECIPITATION RECORDS

DOMINION EXPERIMENTAL FARM, AGASSIZ, B.C.

Monthly and Annual Precipitation Records (inches) 1948-1952 inclusive with 61-year averages and monthly extremes for the same period.

Year		Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total Annual		
														*Snowfall	Rainfall	Precipitation
1948		6·01	8·54	5·63	3·20	3·54	2·13	2·88	5·65	3·67	4·90	12·85	8·28	20·8	65·20	67·28
1949		2·68	11·96	3·39	4·03	1·83	3·55	2·48	1·66	3·15	5·82	10·24	10·08	47·4	56·21	60·95
1950		5·19	10·60	11·17	5·48	5·12	1·58	1·36	3·84	2·80	7·51	9·13	13·20	36·5	73·33	76·98
1951		12·50	15·99	5·45	0·77	4·63	0·70	0·42	1·00	2·45	8·00	5·92	5·70	68·5	56·68	63·53
1952		7·47	4·34	6·47	3·03	2·69	4·76	0·78	2·06	1·45	2·47	1·87	5·90	15·2	41·77	43·29
61-year average		7·61	6·15	5·67	4·35	4·17	3·57	1·88	2·16	4·17	6·73	8·02	8·19	37·7**	48·64**	62·58
Monthly extremes for the 61-year period	Driest year	1·67	0·82	1·98	0·77	0·39	0·35	0·00	0·01	0·26	0·77	1·87	0·53	.....	.....	30·49
		1929	1928	1926	1951	1946	1938	1901	1930	1918	1895	1952	1914	.....	.....	1929
	Wettest year	20·03	15·99	13·78	9·95	8·46	12·06	5·09	7·94	12·42	14·85	20·88	16·75	.....	.....	90·63
		1913	1951	1916	1920	1905	1897	1912	1918	1920	1918	1909	1933	.....	.....	1932

* Snow is converted to water equivalent by the formula; 10 inches of snow equals one inch of water.
** Five-year Average.

NOTE: Annual precipitation records prior to 1948 may be obtained from the previous Progress Reports for this Farm.

TABLE 3—SUMMARY OF WIND DATA

DOMINION EXPERIMENTAL FARM, AGASSIZ, B.C.

1948–1952 inclusive

Anemometer 40 feet above ground

Month	Hourly velocity mean–5 years	Greatest mileage in one hour		
		Mileage	Direction	date
January	10·1	47	NE	18–1950
February	6·5	37	NE	4–1950
March	5·6	39	NE	8–1951
April	4·9	26	N	14–1951
May	3·7	29	NE	15–1948
June	3·3	23	N	21–1951
July	2·6	24	NE	31–1948
August	2·5	24	NE	33–1952
September	4·2	29	N	26–1951
October	4·5	28	NE	27–1952
November	6·7	35	NE	30–1952
December	7·2	39	NE	31–1951
Average	5·1	—	—	—

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TABLE 4—FROST RECORDS

DOMINION EXPERIMENTAL FARM, AGASSIZ, B.C.

Frost: 32°F. or lower. Killing frost: 28°F. or lower

Year	Last frost in spring		First frost in fall		No. of frost-free days	Last killing frost in spring		First killing frost in fall		No. of killing frost-free days
	Date	Temp.	Date	Temp.		Date	Temp.	Date	Temp.	
		°F.		°F.			°F.		°F.	
1948	April 30	32	Nov. 7	32	191	Feb. 20	26	Nov. 9	26	262
1949	Mar. 31	29	Dec. 3	32	247	Feb. 21	24	Dec. 11	28	292
1950	April 21	28	Nov. 13	24	206	April 21	28	Nov. 13	24	206
1951	April 9	32	Nov. 25	29	232	Mar. 17	28	Nov. 24	25	252
1952	April 29	31	Nov. 18	32	203	Feb. 21	26	Nov. 25	22	277
39-year average	April 8	.....	Nov. 6	22	212	Feb. 28	.....	Nov. 26	.....	270
Shortest season	May 3/19	32	Sept. 28/19	32	147	April 19/27	28	Nov. 14/27	24	206
Longest season	Feb. 25/41	32	Nov. 20/41	31	267	Dec. 28/33	28	Dec. 25/34	18	363

Earliest and latest frost dates (32°F. or lower)
1914-1952

Latest spring frost ..... May 24, 1918 — 32°
Earliest last spring frost ..... Feb. 25, 1941 — 32°
Earliest fall frost ..... Sept. 28, 1919 — 32°
Latest first fall frost ..... Dec. 24, 1939 — 30°

Earliest and latest killing frost dates (28°F. or lower)
1914-1952

Latest spring killing frost ..... April 21, 1950 — 28°
Earliest last killing frost of spring ..... Dec. 28, 1933 — 28°
Earliest fall killing frost ..... Oct. 18, 1946 — 27°
Latest first killing frost of fall ..... Jan. 11, 1940 — 27°

SEASONAL
1948 - 1952

The year 1948 goes down in history as the year of the "Big Flood". It was a very wet season with 67·28 inches of precipitation. The three months July to September had an aggregate precipitation of 12·2 inches which made haying and harvesting operations very difficult. Most unusual was the fact that only three weeks during the entire year were without rain. May was backward with snow continuing to fall on the mountains and the air kept cool. A sudden jump to 80 degrees on May 19 melted snow on the mountains and during the closing week of May caused the most disastrous floods ever to occur in the lower Fraser river valley.

January and up to February 23 of 1949 were very cold with frost recorded almost every day. There was a lack of wind storms but frost penetrated the ground to a depth of 12 inches. On February 24 temperatures rose and, since the water could not get away, yards and low places were flooded. The spring was late, followed by a fine summer and autumn. Crop yields were average and the quality was good. November and December were wet. Snow fell on Christmas day and this was followed by an ice storm that broke trees and telephone and power lines. The year finished with cold, strong winds.

January 1950 was a very severe month with a minimum of -2° recorded on January 25, and on only two days of the month did the maximum temperature get above freezing. January 13 went down in history as one of the worst days on record. The terrific wind with a minimum temperature of zero and a maximum of only three degrees almost paralysed communications. Electric power was off from January 20 to 22. Trucks and cars were stored and teams and sleighs were pressed into service. On February 6 a bulldozer was employed to clear the Farm roads and mild weather with plenty of rain filled sloughs and basements. The water pressure in the ground was so great that water was forced up through the gutters in the cow barn. The Agassiz-Rosedale ferry was off the regular run from January 6 to March 24.

The weather pattern from then on was similar to that of 1948 with the Fraser river very low on into May. The result was another flood, although it was three weeks later than in 1948. As the Fraser river had been dyked the task was to hold dykes. With the aid of men from the Chilliwack Army Camp this was accomplished. Civilians filled and delivered sand bags to the dykes and the military took charge from there. The low section of the dyke from the ferry road east to the Fraser was raised as much as two feet in some places and the flood situation was controlled. The Experimental Farm staff and equipment played no small part in this conquest. Crops were normal for the year with September providing exceptional autumn weather.

In 1951 the first three months were very wet, with a cold week at the end of January. The crop months, April to September, were the driest ever recorded in sixty years, with only 9·97 inches of precipitation. The last three months were again wet, with a cold, windy period during the last twelve days of the year and sufficient snow for excellent sleighing. The oat crop was heavy with one of the best quality crops of grain and straw ever harvested. Hay and pastures were light, with the former stored in fine shape. Ensilage corn was a good crop, well matured.

The last year covered by this report, 1952, from a weather standpoint was one of the most delightful ever experienced. Only three other years have had less precipitation than the 43·29 inches recorded. Only March, June, and December had above average rainfall while November was the driest ever recorded. The total precipitation for the five months, July to November, was only 8·63 inches. The mild, open, bright, dry fall allowed all crops to be stored in excellent condition and the period will long be remembered as one of the very best.

ANIMAL HUSBANDRY

Dairy Cattle

W. H. HICKS

Three important factors contributed to the increase in size of the Holstein herd during the last five years. Briefly these were: a 55·5 per cent cut in the horse population; the erection of a new experimental loose housing barn; and lastly an increase in the grass and hay growing areas on the Farm. On January 1, 1948 the herd numbered 59 head while five years later there were 82, all bred on the Farm, an increase of 39 per cent. The objective during the next year is 100 head of females.

The health of the herd was excellent. Brucellosis or Bang's Disease was absent from the herd and all heifer calves were vaccinated against this disease as a precautionary measure. Regular tests for tuberculosis were carried out and the herd remained free of the disease.

The average production of all cows finishing lactations from 1948-52, including all ages, was 15,548 pounds of milk and 598 pounds of fat. The average production in 1950, of 25 cows, was 17,622 pounds of milk and 679 pounds of fat. Nine of these cows gave over 20,000 pounds of milk with the top record being 26,393 pounds of milk and 974 of fat, and another with 22,771 pounds of milk and 1,022 pounds of fat.

More important than good yearly records are those of Lifetime Production. Thirteen cows in the herd have completed R.O.P. lifetime records of over 100,000 pounds of milk, as shown in Table 5.

TABLE 5—COWS THAT HAVE PRODUCED IN THE AGASSIZ HERD OVER 100,000 POUNDS OR MORE OF MILK IN THEIR LIFETIME

Ear Tag	Name and registration number	Production		Class	No. of lactations
		Milk	Fat		
		lb.	lb.		
259	Agassiz Lulu Canary Fobes, 170021	103,547	3,858	Red Seal	7
299	Agassiz Lulu Fobes Tsussie, 223209	146,549	5,146	Blue Seal	9
320	Agassiz Sylvia Perfection, 254315	104,423	3,711	Red Seal	7
342	Agassiz DeKol Sylvia Perfection, 280299	121,421	4,017	Red Seal	8
376	Agassiz Mercena Hartog, 343826	106,488	3,984	Red Seal	8
388	Agassiz Mercena Wayne, 352669	116,433	3,783	Red Seal	9
399	Agassiz Lulu Rajah Hartog, 369830	128,293	4,816	Blue Seal	9
410	Agassiz Fobes Hartog Lulu, 417865	137,275	4,566	Blue Seal	8
411	Agassiz Mercena Hartog, 417866	111,359	4,045	Red Seal	6
417	Agassiz Canary Lulu, 448853	100,543	3,995	Red Seal	6
420	Agassiz DeKol Sylvia Romeo, 454871	126,090	4,639	Blue Seal	7
456	Agassiz Lulu Romeo Mercena, 769681	105,117	3,818	Red Seal	5
462	Agassiz Sylvia Romeo Vale, 564920	103,191	3,949	Red Seal	6

Besides the work of breeding and testing the Holstein herd, two important projects were inaugurated in 1951, i.e. "Sprinkler Irrigation of Fertilized Pastures" and "Loose Housing versus Standard Stabling of Dairy Cattle".

Figure 1.—Agassiz Hartog Meg, 618,003. Total production, 6 lactations, 111,789 pounds milk; 5,096 pounds fat (average test 4·56 per cent).

Sprinkler Irrigation of Fertilized Pastures

A 20-acre field was divided into four equal parts as shown in Table 6. These fields were grazed in rotation by 18 to 20 cows. After each grazing the ungrazed herbage was clipped and the field was harrowed. Supplemental feeding of silage and grain was provided as required to maintain production. The average per-acre carrying capacity in Animal Units per day was 0·99 for the irrigated and 0·64 for the non-irrigated fields for a season of 150 days. Other data are shown in Table 6.

TABLE 6

Field	Cow days on pasture	Supplementary feed		Milk production
		Silage	Grain	
		lb.	lb.	lb.
1. Old pasture, irrigated	1,039	17,305	8,652	34,528
2. Old pasture, non-irrigated	786	16,147	6,400	25,510
3. New seeding, non-irrigated	461	3,272	3,658	15,278
4. New seeding, irrigated	853	10,464	6,994	29,159

Of interest in evaluating irrigation in the Agassiz area is the fact that during 1951 the six months April to September were the driest ever recorded at this Farm, with only 9·97 inches of precipitation.

During the 1952 season only the newly seeded, irrigated field of the previous year was utilized. This five-acre field was divided evenly with one half irrigated and the remainder not. The cows were not rotated, but from five to eight head pastured on the 2·5-acre non-irrigated pasture and from six to nine on the irrigated field. In the 169-day grazing season the non-irrigated group had 1,043 cow days pasture, consumed 8,344 pounds of

grain, 15,645 pounds of corn silage, and produced 36,241 pounds of milk. The group on irrigated pasture had 1,230 cow days pasture, consumed 9,840 pounds of grain, 18,540 pounds of silage, and produced 42,858 pounds of milk.

On a per-acre basis the carrying capacity in Animal Units per day for a season of 150 days was: non-irrigated 2·49 and irrigated 3·13.

The total precipitation in 1952 from April to September was 14·77 inches.

Loose Housing of Dairy Cattle

On October 16, 1951, 38 cows were divided evenly into two groups, 19 going into the new loose housing barn and the remainder into the standard barn. The new barn is a frame building 36 feet by 80 feet, with full loft; a three-stall, well insulated milking parlor across the end 12 feet by 30 feet, equipped with milker; and two silos at the oposite end. The west wall consists of a built-in feed rack 45 feet long, with cement floor on each side 10 feet wide, and on the outside an over-hang roof to protect the cows when feeding. A 10-foot door between the end of the feed rack and the milking parlor remained open at all times. The lounging area is unfloored and was cleaned out once per season, while the cemented area at the feed racks was cleaned bi-weekly.

Two particular features of this loafing barn are: First the cows are free to be out or inside at will, and hence, with the open door, ventilation is not a problem. Secondly, it necessitates the cleaning of the feeding area, which tends to save bedding but increases labor.

The two groups of cows remained on this test until April 17, i.e., 175 days. During that period the standard barn group produced 109,815 pounds of milk as compared with 105,452 pounds from the loose housing group or 4,363 pounds more milk from the stanchion barn. As nearly as possible the same amounts of hay, grain, and corn silage were fed to each group. In animal weights the standard group lost an average of 26 pounds while the loose group lost an average of 63 pounds.

The cost of litter for each barn was equal. The time of milking was identical with two men taking one hour in each barn morning and night. A twelve-year-old cow and a two-year-old heifer in the loose group were classed as timid animals and underwent real punishment from other cows. Cows in heat were a problem and were removed to another barn until normal. Veterinary examinations and blood testing or other inspections were accomplished with greater ease in the stanchion barn. One winter's results rather favored the stanchion barn. With the disposal of timid cows and the hard-surfacing of the yard to eliminate the mud hazard, the loose barn might show to better advantage. The study will be continued until data for a valid comparison become available.

Horses

W. H. HICKS

The Clydesdale horses bred and maintained on this Farm are a credit to the breed as well as to the Experimental Farm. In 1948 the stud numbered 20 head. In five years with increased use of tractors the number fell to an all-time low of eight head.

During the five years covered by this report an average of seven head were shown at the Pacific National Exhibition in Vancouver. Each year the Stallion Championship and the female Junior, Senior, Grand and Reserve Grand awards were won. Other important wins each year were Get-of-Sire, Progeny-of-Dam, and in all years but 1952, the "Grand Display" of five draft animals, any age, any breed, either sex, owned by exhibitor.

The highlight of showing the results of the Clydesdale breeding took place at the Pacific National Exhibition in 1950 when 62·5 per cent of the horses owned were exhibited, and for the first and only time a four- and six-horse team were shown which won the classes in competition with four other outfits. The horses in these teams were all bred at the Farm from the same sire and all but Phyllis were blacks. This fine display was the climax to the horse breeding operations carried on successfully here for thirty-five years.

During 1948 to 1952 feed and labor costs for handling horses gradually increased with an average cost of 35·12 cents per hour for horse labor. This included feed, labor, shoeing, and stabling and was based on good Clydesdale horses working average hours, well shod and well harnessed.

Sheep

D. M. Bowden

During the five-year period covered by this report the sheep flock averaged 60 purebred Dorset Horn ewes for breeding. A purebred Dorset Horn ram was kept each year as well as the rams required for cross-breeding work. Each year, sufficient purebred ewe lambs were raised to replace the older ewes culled from the flock. During the period 1948-52, inclusive, 430 lambs were born from 249 ewes for a percentage of 173. Three hundred and seventy, or 86 per cent, of these lambs were raised. This meant that an average of 1·48 lambs were raised per pregnant ewe.

Cross-Breeding

A Hampshire ram was used in each of the five years covered by this report for cross-breeding with Dorset Horn ewes. In addition, a Suffolk ram was used in 1951 and 1952.

TABLE 7—CROSS-BREEDING RESULTS 1948-52 (INCLUSIVE)

Breed		Ewes lambed	Lambs born	Birth weight live lambs	Lambs raised	Average weight at sale	Average age at sale	Average value per lamb
Ram	Ewe							
		no.	no.	lb.	no.	lb.	day	$
Dorset	Dorset	93	156	8·20	128	84·0	168·3	21·72
Hampshire	Dorset	106	181	7·84	167	83·6	150·2	21·04
Suffolk	Dorset	58	101	7·65	90	84·5	145·8	24·84

Table 7 summarizes the effect of cross-breeding on production of market lambs. Production of lambs by cross-breeding was superior in all respects except weight of live lambs born. The Suffolk × Dorset produced the greatest percentage of lambs. The Hampshire × Dorset produced the most vigorous lambs with the highest percentage raised to maturity. The Suffolk × Dorset developed to market weight faster than either of the others. Both cross-bred groups were superior to the pure-breds in production of market lambs.

Swine

D. M. Bowden

The herd of Yorkshire swine averaged nine breeding sows and one boar during the period covered by this report. Market demand for swine of all classes was very high in 1948 and 1949 but dwindled to almost nil in 1952. High feed cost was the main reason for this decline.

Self Feeding versus Hand Feeding

The main stress has been on this project during the period of this report. During 1950-52, five replicates of four lots of four pigs each were fed on this project. All lots received the standard Advanced Registry Testing Station ration until reaching 125 pounds live weight. The lots in each replicate were hand fed from beginning to market and two were self fed. After reaching 125 pounds one hand fed lot and one self fed lot received a finishing ration formed by replacing 20 per cent of the basal Advanced Registry ration with bran. The other two lots continued on the regular Advanced Registry ration.

Table 8 summarizes the results of this test. Statistical treatment of the data shows a significant difference in method of feeding during the growing period to 125 pounds live weight. Self feeding shows the advantage over hand feeding during the period in daily rate of gain. During the finishing period, 125 to 200 pounds, there was no significant effect of self feeding over hand feeding. Dilution of the Advanced Registry ration with bran during the

TABLE 8—SELF FEEDING VERSUS HAND FEEDING TRIALS 1950-1952 (INCLUSIVE)

	A.R. finishing ration		Bran-diluted	
	Hand fed	Self fed	Hand fed	Self fed
Average daily gain.....lb.	1·48	1·52	1·42	1·46
Total feed per 100 pounds gain.....lb.	366	392	370	405
Carcass score (3 replicates only).....pt.	77	69	76	71
Returns over feed cost (per lot).....$	96·31	90·96	93·96	90·83

finishing period did not significantly affect rate of gain or feed efficiency per 100 pounds of gain. There was a significant difference between replicates both in rate of gain and feed efficiency. Since replicates were in different seasons this indicates a definite influence of season on the thriftiness of feeder pigs. Those litters born in the fall showed higher daily gains and greater feed efficiency than those born in the spring.

The usefulness of self feeding in swine production depends on proper construction and handling of feeders to prevent feed wastage and on the abiilty to save labor over hand feeding methods.

CEREALS

D. K. TAYLOR

The testing and breeding of new cereal varieties for the lower Fraser valley area are two of the main functions of the Cereal Division at Agassiz. Each year many new varieties and unnamed lines released by plant breeding institutions are evaluated at the Agassiz farm in order that only best adapted varieties are recommended to farmers. Especially promising varieties are tested at outside locations to secure added information quickly and to determine the effect of local variations in soil and climate. The breeding work involves the production of new oat and barley varieties with improved resistance to lodging and disease, along with high yield and the many other desirable characteristics.

Wheat

Spring Wheats are not generally recommended for the lower Fraser area and give on the average at Agassiz at least five bushels less per acre than winter wheats. Of the hard red wheat varieties, Garnet and Thatcher have given the highest yields. However, the variety Cascade, a productive variety

of white wheat released by the Central Experimental Farm to farmers in 1948, has outyielded Thatcher by 2·5 bushels per acre. It is a taller variety than Thatcher and Garnet and matures approximately four days later than Thatcher at Agassiz.

Winter Wheat trials show that Dawson's Golden Chaff has given consistently good yields over the years. Cornell 595 tested now for eight years has been slightly superior to Dawson's Golden Chaff in yield and resistance to loose smut, but both varieties are moderately susceptible to shattering. In 1952, two new varieties Dawbul and Genesee, significantly outyielded Dawson's Golden Chaff but further trials will be necessary to fully assess the merits of these two promising varieties.

Oats

The oat crop is the best adapted cereal for the lower Fraser valley area where a long cool growing season favors the medium late maturing varieties. Diseases are not usually a limiting factor in oat production in this area.

Eagle is a well adapted variety that combines a high yield of grain with good resistance to lodging, and kernel quality. On the basis of 73 tests over a five-year period it has outyielded Victory by 7·2 bushels per acre. Under test conditions on Lulu Island it has yielded as much as 176 bushels or 3 tons per acre. Compared with other varieties that approach Eagle in yield it is by far the most resistant to lodging. Although sometimes criticised for its thin kernels, Eagle does not lack in quality and excels Victory in percentage of kernel.

Victory has long been a favorite with farmers but it has been yielding consistently less than Eagle under test conditions and many farmers are changing to the more lodging resistant Eagle. In limited trials a new selection, Victory II grown widely in Eire, has not been superior to local available seed stocks of this variety.

Ajax has matured on the average eight days ahead of Eagle and has yielded 10·7 bushels per acre less in tests conducted by this Farm. Although it lacks high resistance to lodging this variety is recommended to farmers who desire an early maturing variety.

Bambu is a variety originating in Sweden, that approaches Eagle in resistance to lodging, and does particularly well in the Delta areas. Under test conditions it does not equal Eagle in yield and lacks in uniformity. Bambu II a new strain recently released by Swedish plant breeders has been tested to a limited extent and appears to be an improvement over the original strain in uniformity, yield, and quality.

Onward, Roxton and Exeter have in trials approached Eagle in yield but all are inferior in resistance to lodging. Onward and Exeter also have a comparatively high percentage hull.

Other varieties such as Beaver, Abegweit, Garry, and Fortune have not been sufficiently promising to be recommended.

Breeding New Oat Varieties

Since a number of the soils of the lower Fraser valley often produce lodged crops of oats the breeding of lodging-resistant varieties has been undertaken at Agassiz. In the crossing program to date, Eagle has been used extensively because of its high yielding capacity and good strength of straw. In an effort to increase its lodging resistance, crosses have been made using such parents as Ardri, Clinton, Off-type Ajax, and Holmberg 54. From other varieties, desirable characteristics such as earliness, disease resistance, plump kernels, and a quick ripening straw are sought.

82397—3½

Elite Seed Stocks of Oats

Each year the Farm at Agassiz produces an Elite crop of Eagle oats which is available to growers of registered seed. This ensures a reliable source of high quality seed of a well adapted variety.

Rate of Seeding Three Varieties of Oats

Three years' results have been obtained at Agassiz and Ladner from rate-of-seeding tests with Eagle, Ajax, and Bambu oats. Rates of seeding ranged in 30-pound intervals from 40 to 190 pounds per acre.

Although the two extreme rates of seeding were not promising there was very little difference in the yield of the treatments ranging from 70 to 160 pounds per acre. At both stations the yields increased up to the 160-pound rate of seeding but when net yields were considered the difference between any two treatments was at the most two bushels per acre. As the seeding rates increased the resulting crop was slightly earlier maturing, shorter in the straw, and more subject to lodging. The results to date indicate that on reasonably clean land the optimum seeding rates for Agassiz and Ladner are 70 and 100 pounds per acre, respectively.

All three varieties gave similar results, although there are indications that Bambu at Ladner requires a seeding rate of more than 100 pounds per acre for highest yields.

Clipping Oats in the Early Growth Stages

Ten varieties of oats were clipped at two different growth stages over a three-year period to determine the effects of these treatments on the oat crop. Since lodging was not severe during this experiment only the weaker varieties lodged to any extent. Clipping did improve the lodging resistance of these weaker varieties but under the conditions of this experiment the choice of variety was more important than clipping in avoiding lodging.

Clipping at the five- to seven-inch stage on the average significantly delayed maturity three days, caused a reduction of 3·6 inches in height and 12·8 bushels per acre in yield, and resulted in lower weights per bushel and per 1,000 kernels. In deciding whether to clip or not it is apparent that the farmer must balance expected field losses caused by lodging against the loss in yield resulting from clipping.

Barley

Spring barley is not so well adapted as oats to the lower Fraser valley area and in recent years yields of the leading variety at Agassiz and Ladner have averaged 42 and 70 bushels per acre, respectively.

Vantage a smooth-awned variety has given high yields along with exceptionally good resistance to lodging. On soils suited to barley production Vantage is recommended.

Olli is an early rough-awned variety that often gives high yields, and is recommended where an early variety is desired. In certain areas of the Delta, having a compacted subsoil, Olli will outyield the normally higher yielding Vantage.

Trebi has long been known as a high yielding variety especially in the Eastern end of the lower Fraser valley. It is no longer recommended to farmers because of its susceptibility to lodging.

In trials of winter barleys at Agassiz, Olympia has been the outstanding variety tested to date. This variety survives most winters in the lower Fraser valley and does particularly well where soil drainage is adequate. During one

five-year period at Agassiz, Olympia averaged 49 bushels per acre in comparison with 42 bushels for the best spring sown variety. However, during a four-year period of relatively severe winters Olympia averaged only 24 bushels per acre, 9 bushels less than the best spring sown variety. Search is under way for new varieties that are even better adapted to local conditions.

Mixtures of Barley and Oats

Mixtures of oats and barley sown at two rates of seeding, in three well adapted varietal combinations, have been tested along with pure stands of the same varieties. Results from these completed tests at Agassiz failed to show any advantage in yield from mixtures of these two crops. As might be expected in an area favoring oat production, the proportion of oats was higher in the harvested crop than in the mixture sown.

Barley Breeding

One of the diseases that seriously limits barley production in the area served by this farm is powdery mildew. Since none of the recommended varieties carry resistance to this disease, a back-crossing program was started at Agassiz to incorporate resistance to powdery mildew in the varieties Vantage, Titan, Montcalm, and Byng. Using the Rabat resistance to powdery mildew, seven dosages of the recurrent parent were incorporated by 1952. Selection is now under way to obtain lines similar to the original parents but with the added resistance to powdery mildew.

Field Peas

Over an eight-year period long vined varieties such as Green Wrinkled (Lethbridge) and Valley (Ottawa) have given the highest yields of dry peas. Bluebell, a shorter variety producing a medium sized pea, has also given good yields. Farmers often prefer Early Blue, an early variety, or Chancellor, a small seeded variety, but these varieties have yielded only 75 per cent as much as the above mentioned varieties.

Linseed

Varieties of linseed have been tested at Agassiz during the years 1940 to 1952, inclusive. Three varieties tested over that period have yielded as follows: Bison 12·7, Royal 11·8, and Redwing 10·9 bushels per acre. Although lower yielding, Redwing, a small seeded variety, matured on the average eight days earlier than the other two varieties at Agassiz. Among the other varieties tested for a shorter period Victory and Dakota were superior in yield to Bison.

Fibre Flax

During the post war period interest in fibre flax production has not been sufficient to warrant extensive testing of this crop. However, certain new varieties and strains have been tested along with Liral Dominion, the commercial variety formerly grown in the lower Fraser valley. Of these, S. Gossamer L. 26, S. Motley, Cascade, and Pacific have all exceeded L. Dominion in fibre production. S. Gossamer L. 26 and S. Motley are both moderately early varieties but they have been low in seed yields. Pacific and Cascade have been outstanding for high fibre and seed yields and at the same time both varieties have been resistant to rust in natural and artificial epidemics. Pacific has been medium early in maturity and has shown excellent resistance to lodging.

Fall Rye for Grain

Storm is a well adapted local variety that has given a good performance over the years. At Agassiz over an eleven-year period yields ranged from 28 to 54 bushels per acre, averaging 42 bushels per acre. Prussian is another long strawed variety that has been very similar to Storm in performance.

Dominant, Petkus 2 and Kings II are short strawed varieties that are oustanding for their resistance to lodging. In limited trials Dominant and Petkus 2 have outyielded the variety Storm.

Balbo and Abruzzi are two varieties that make an early and quick growth in the spring. At Agassiz, these varieties have been less winter hardy than Storm, and lower in seed yield.

FIELD HUSBANDRY

H. F. FLETCHER

A long-time fertility experiment was begun in 1937, representing an expansion of similar work that had been conducted previously in a series of short duration studies. From 1937 to 1943, inclusive, the three crops grown in rotation were mangels, oats, and clover. From 1944 on, ensilage corn was substituted for mangels. The experiment is designed to provide yield data on each crop in each year.

The fertilizer treatments comprised twelve chemical fertilizer formulae applied broadcast to the hoed crops at two rates of 500 and 1,000 pounds per acre. From 1949 on, fertilizer was broadcast prior to seeding the oat and clover crops at one half the rate received by the corn. Another series of treatments included various rates of manure with and without commercial fertilizer. Within the manure series, provision was made for comparison between rotted and fresh manure and fall and spring application of fresh manure.

Response of Crops to Fertilizer and Manure Treatments

Corn

The data have indicated the need for a complete fertilizer for corn where manure was not used. Response to phosphorus and potash application was particularly pronounced, while the nitrogen requirement appeared to vary with the season. The highest yields were afforded by the 4-18-6, 4-12-12, and 4-8-10 fertilizer formulae. Application of 1,000 pounds per acre gave an average yield of 13·0 tons of green matter per acre compared with 12·2 tons for the 500-pound rate, while the check plot yields averaged 9·4 tons.

Manure alone and manure with fertilizer generally resulted in higher corn yields than did fertilizer used alone. Manure alone at 30 tons per acre yielded an average of 16·9 tons per acre compared with 15·3 and 16·5 tons from the 10 and 20 ton manure rates respectively. Manure supplemented by commercial fertilizer was effective in some instances. Twenty tons manure plus 250 pounds of 19 per cent superphosphate yielded an average of 16·8 tons, 10 tons manure plus 500 pounds superphosphate and 10 tons manure plus 500 pounds 4-12-6 yielded 16·2 and 16·4 tons per acre respectively. No significant differences were noted between fresh and rotted manure applied in the spring, but fresh manure applied in the spring resulted in higher yields than fresh manure applied in the fall.

Oats Following Corn

From 1938 to 1948 fertilizer formulae were applied to the corn crop at 500 and 1,000 pounds per acre. While some residual fertilizer effect on the subsequent oat crop was evident, yield increases over the unfertilized check generally were small. The 1,000 pound per acre rate yielded an average of only 1 bushel per acre over the 500 pound rate. The best fertilizer treatment at the lower rate was the 4-18-6 formula which produced 46·0 bushels compared with the check which yielded 40·4 bushels per acre.

During the period 1949 to 1952 fertilizer was applied to the oat crop at one half the rates received by the corn. The average increase in yield of the 500 pound over the 250 pound rate of application was 5·5 bushels. The best treatments at the lower rate were the 6-12-6 and 4-18-6 formulae which yielded 58·0 and 52·8 bushels per acre, respectively, compared with the check plot yield of 39·4 bushels.

Residual effects of manure applied to the corn crop were evident in the oat year. Generally, treatments that provided the highest corn yields afforded the highest oat yields. Thirty tons of manure applied to corn yielded 55·9 bushels of oats compared with 51·4 and 53·0 bushels for the 10 and 20 ton manure rates respectively. Ten tons of manure applied to corn plus 50 pounds sulphate of ammonia applied to the oat crop yielded an average of 55·9 bushels. The unfertilized check plot yielded 43·9 bushels per acre.

Clover Following Oats

Fertilizer applied to corn had little effect on clover two years later. The fertilizer plots showed some increase in yield over the check plots, possibly because of a greater amount of organic residue returned to the fertilized plots in previous years.

While only two years' data are available regarding fertilizer application to clover in the seeding year, marked differences in clover establishment between variously treated plots were evident. Lack of adequate potash resulted in poor stands of clover. The 4-12-0 treatment yielded 1·5 tons per acre dry matter compared with the 4-12-6 which yielded 2·0 tons. Clover stand was further increased by increased phosphorus as illustrated by the 4-18-6 treatment which produced 2·2 tons of dry matter. Nitrogen had little effect on clover establishment or yield.

Manure applied to corn resulted in high clover yields two years later. Compared with a check plot yield of 2·7 tons of dry matter the 10, 20, and 30 ton manure rates yielded 3·4, 3·7, and 4·0 tons respectively. Twenty tons of manure plus 250 pounds of superphosphate and 10 tons of manure plus 500 pounds of 4-12-6 both yielded 3·8 tons of clover.

It is interesting to compare the carryover effects of manure and fertilizer. The effects of manure applied to the corn crop are evident in both the oat and clover years while the effect of fertilizer alone applied to corn shows only minor response in the oat year and little or no response in the clover year. It is evident that, under the conditions of this experiment, the commercial fertilizer program is not adequate for sustained high yields.

Fertilizer Trials With Oats on Soil Types

Since 1947, 31 oat fertilizer trials have been conducted on various soil types in the lower Fraser valley. Average grain yields from seven fertilizer formulae applied at three rates of application are shown in Table 9.

TABLE 9—AVERAGE YIELDS OF OATS GROWN ON VARIOUS LOWER FRASER VALLEY SOIL TYPES IN 31 ROD-ROW FERTILIZER TESTS WITH SEVEN DIFFERENT FERTILIZER FORMULAE EACH AT THREE RATES

Bushels per Acre

Treatment	Rate of application in pounds per acre			Average Yields
	200	400	600	
8-12-4	80	94	101	91·5
8-8-8	80	94	101	91·5
8-4-12	79	85	95	86·5
4-16-4	79	87	91	85·7
4-12-8	78	87	90	85·0
4-8-12	75	85	89	83·0
4-4-16	73	80	85	79·5
0-0-0	59	60	58	59·0
Means	75·4	84·1	88·3	

With few exceptions, response of oats to fertilizer formulae was similar at all locations. In 20 of the 31 tests the 8-8-8 and 8-12-4 formulae outyielded or equalled all other treatments. In 27 of the 31 trials, the fertilizer containing eight per cent nitrogen outyielded or equalled all other treatments. The four per cent nitrogen rate appeared adequate for high yields on the Ladner soils and on soils that had received manure in the oat year.

Generally there was a high positive correlation between the response of grain and straw to fertilizer. An exception to this occurred on the Ladner soils where straw yields were increased by nitrogen above the four per cent level while grain yields were not appreciably affected.

FORAGE CROPS

M. F. CLARKE and W. E. P. DAVIS

During the five-year period investigations relative to pastures and plant breeding have been greatly expanded and work on the testing of corn, soybeans, and plant introductions has been maintained on the same scale as in former years. A special project Illustration Station was established in the Ladner district in 1952. On this latter station the work is concerned entirely with pasture and hay crop investigations.

Hay and Pasture

In the lower mainland region, pastures are now recognized as specialized crops capable of yielding high net returns provided they receive their full measure of care and attention. On the whole, climate is well suited to high forage yields but rainfall distribution is such that an "over-grassed" condition results during the May-June period while drought conditions are rather general during the months of July and August. During the autumn rainfall is adequate in most districts. In addition to variations within the growing season, a barn feeding period of fully six months is required. Therefore pastures must be considered in association with the harvesting of silage and hay in order that a flexible and self-sufficient management program can be worked out. Thus seed mixtures that will supply a good yield of hay or silage in the first year, followed by pasture for one or more years, are one of the mainstays of the Fraser valley dairy farmer. Also in mixtures seeded primarily for pasture it is frequently necessary to harvest the first flush growth as early-cut silage.

Species for Pasture and Hay

Experiments during the past five years have not resulted in any material change in the recommended species for hay and pasture. Space will not permit a full discussion of the many grasses and legumes adapted to the region. A few of the more important species are worthy of mention in the light of recent experimental data, however.

Orchard grass continues as the most generally useful pasture and hay grass in the lower mainland. In experiments at Agassiz this species has proved the most aggressive of the grasses and holds up better in the midsummer period than most other species. Orchard grass heads rather early and for this reason is better suited for silage than for hay. Ladino clover is an excellent companion legume for orchard grass when used for pasture or early-cut silage. Leaving the first cutting to the full bloom or hay stage of the orchard grass tends to be rather hard on ladino, however.

Perennial rye grass ranks second in usefulness for pasture. It develops very quickly from seeding and yields heavily, particularly on clay loam and clay soils. Perennial rye makes its principal contribution in the spring and fall months. During the midsummer drought period growth is slight under non-irrigated conditions. On the loam soils at Agassiz perennial rye has proved very compatible with both wild white clover and ladino.

Italian rye grass is a biennial species closely related to perennial rye. It is primarily a hay species being taller growing and more erect than the perennial type. This grass is of value in short-duration mixtures for hay and silage or as a source of bulk in the early stages of a pasture seeding.

Meadow fescue develops somewhat more slowly from seeding than perennial rye or orchard grass. It is most useful on the heavier classes of soils.

Tall fescue is a taller, much coarser growing, and deeper rooted type than meadow fescue. This species seems to thrive under both damp and dry conditions. A characteristic of this species is its habit of growing very late in the fall. Results to date would indicate that it has definite possibilities for late fall and early winter pasture. There is some doubt, however, as to the palatability of the variety Alta for dairy cattle. The tests at Agassiz have not been conclusive on this point. In a grazing trial with sheep, Alta fescue lacked palatability in comparison with other species. It is possible, however, that in combination with other grasses and legumes this difficulty may be overcome.

Reed canary grass has, in the past, been recommended primarily for poorly drained locations. More recent plantings at Agassiz indicate that this grass has excellent drought-resistant qualities. When grown with ladino clover, reed canary grass was readily grazed by sheep during the first two seasons after planting.

Timothy is best suited to the heavy loams and clay soils, also reclaimed peat soils. The palatability of this grass is excellent. Experimental data indicate very clearly that this grass is primarily a hay plant. Spring growth starts rather late and ceases toward late summer, thus limiting its value as a main pasture plant. Moreover timothy is rather short-lived under frequent close grazing.

Red clover is primarily a hay legume but is also useful in the early stages of a pasture seeding. Under close grazing red clover quickly disappears after the first year. As a hay crop under fertile conditions red clover has produced the highest yield of all legumes during the year following seeding in experiments at Agassiz.

Alsike clover has consistently shown up as a valuable addition to mixtures cut for hay in the experiments at Agassiz. It has been more tolerant of wet conditions and low fertility than has red clover. Alsike has also been silghtly more tolerant of grazing than red clover.

Ladino clover has far outyielded wild white clover in all experiments at Agassiz. It is not particularly drought resistant, however, and should be used mainly on soils that are well supplied with moisture. Under irrigation, ladino clover at 2 pounds with orchard grass at 15 pounds per acre provides a very high quality pasture.

Wild white clover is a low growing, persistent legume of wide natural occurrence throughout the lower Fraser valley. When other species, such as ladino, are overgrazed wild white clover comes into the sward.

Alfalfa is an excellent perennial hay legume on deep, well drained soils. More recent experiments indicate that alfalfa can be grown satisfactorily with grasses in mixtures for hay or silage. Alfalfa should not be used extensively for pasture, however. In an experiment in which three intensities of cutting are being studied, it has been observed that the alfalfa is noticeably reduced in stand and vigor in the second season of frequent clipping to simulate grazing.

Birdsfoot trefoil is a persistent perennial legume said to be well adapted to conditions that are too low in fertility for the satisfactory production of the common clovers or alfalfa. In an experiment completed in 1952 birdsfoot trefoil was grown in various grass mixtures harvested as both hay and pasture. In all cases the birdsfoot trefoil mixtures were significantly lower yielding than the check mixture containing ladino and red clover. It was noted that birdsfoot trefoil became established very slowly in mixed seedings. A further point was that this legume tended to start active growth more slowly than alfalfa or the clovers. In row trials seeded to trefoil alone establishment was much quicker and good yields were obtained. From these latter tests marked strain differences were also noted. Experiments with trefoil are being continued on an expanded scale with a view to determining more fully the value of this legume under lower mainland conditions.

General Conclusions Based on Hay and Pasture Experiments

Space will not permit of listing recommended combinations of grasses and legumes for various purposes. Specific information concerning these is available in a circular obtainable from the Experimental Farm, Agassiz. Certain broad principles that have been established by experiments are listed below.

(1) The majority of experiments conducted to date indicate very definitely that yields of both pasture and hay are higher in mixtures with a high legume content. The grasses make their principal contribution in the early spring period while the legumes provide the greater part of the yield in the June to August period.

(2) In a management system whereby hay is cut in the first year or two followed by pasturing, ladino clover is superior to alsike plus wild white clover.

(3) Orchard grass is an excellent pasture grass but some care is required to prevent it from crowding out the associated legume. In the case of an unusually heavy spring growth of orchard grass and ladino clover that cannot be grazed adequately, an excellent yield of grass silage can be obtained by cutting the crop immediately the orchard grass reaches the heading stage. Delaying harvest to the full bloom stage of orchard grass will result in losses of ladino and wild white clover from shading. During the pasture period, grazing should be uniform and rapid, allowing a recovery period of fully three weeks between grazings. A good rule is to turn the stock in when the growth has reached a height of 8 to 10 inches and to allow this amount of growth to be reached before each successive grazing. This rule applies equally well to all pasture meadows irrespective of whether they contain orchard grass.

(4) Grazing or cutting should not be carried on too late in the fall. Experiments in which pastures have been grazed or clipped late in the fall have shown very slow spring growth and if the practice is continued the sward quickly deteriorates to inferior grasses and weeds. As a general rule at least five to six weeks' growth should be left untouched before killing frost. Late fall grazing should be confined to old pastures that are due for breaking the following spring.

(5) Grazing in the seeding year can be carried out to advantage, particularly in the case of establishing a high grade pasture of orchard grass and ladino clover. In two years of tests at Agassiz, oats were seeded as a companion crop with orchard grass and ladino clover according to the usual practice for the district. Instead of harvesting the stand as hay or grain, grazing was started when the oats reached a height of 10 inches. The oats were grazed down to about three inches and allowed a rest period to achieve the required amount of re-growth. With early April seeding, three excellent grazings were obtained by mid-July and following that the orchard grass and ladino were able to carry normal grazing on a rotational basis. The returns from the oats as pasture were fully as high as for grain and a much heavier yielding catch of ladino was obtained. Red clover and alfalfa are much more tolerant of shading than ladino and seedings of these are generally quite satisfactory if the companion crop is harvested for grain provided, of course, that soil moisture remains at a satisfactory level.

Plant Breeding

At Agassiz, plant breeding work is being carried out with orchard grass and perennial rye grass. In the case of orchard grass, two strains are in the process of being tested at other stations in Canada with a view to determining their winter hardiness and general suitability for a wide range of conditions. Three additional synthetic strains will become available for limited testing in 1954. The principal objective in developing an improved orchard grass has been to locate material that is very leafy and somewhat later heading than common orchard grass.

In the work with perennial rye grass the chief objectives have been to obtain material that combines winter hardiness with high yield and a greater degree of drought resistance than the average for this species. During the war years the variety Pacific was released and licensed at Agassiz. This variety excelled in hardiness but did not outyield ordinary commercial material. In the present work an effort is being made to obtain much higher yield. Some progress has been made in this direction, but considerable testing is required before a new variety can be released.

Soybeans

Twenty-five varieties of soybeans have been tested over the period 1948-1952. The oil content and quality of the seed has been high. However, the mean grain yield of 18·2 bushels per acre is considerably below the 35·0 bushels per acre necessary for economical production. Furthermore, varieties or strains that will mature six to eight days earlier than the 122 days required for Pagoda 17, the earliest variety, will have to be obtained before recommendations can be made for this area.

Corn Hybrids for Ensilage

During the years 1948-1952, 36 different corn hybrids representing three maturity groups, viz., early, medium, and late, have been tested at Agassiz. Hybrids have proved to be more uniform in year-to-year performance than open-pollinated varieties. Yield differences between hybrids and open-

pollinated varieties have been negligible. However, the hybrids have proved to be superior in strength of stalk, cob development and in uniformity of ripening.

Rates-of-seeding tests have indicated 15 pounds per acre, or six seeds per hill thinned to five, to be the best rate for this area.

Figure 2.—Orchard grass types. *Left*—common; *Right*—improved strain. Note superior leafiness.

It has been found that for this area the early-maturity group do not utilize the full growing season and that the hybrids in the late-maturity group do not produce cobs of sufficient maturity to give the highest quality of ensilage. The hybrids from the medium-maturity group are most widely adapted to this area since their yield is only slightly less than the late group and their cobbing and maturity approaches closely the optimum for quality silage. Furthermore, being shorter than the late group they are better adapted for harvesting with the lighter makes of forage harvesters.

Recommended Corn Hybrids for Silage

Canada 335 and Canada 355—for heavy clay soils, well supplied with moisture.
Pioneer 355 and Canada 531—for general use.
DeKalb 240 —for use as a late summer and fall soiling crop.

Red Clover Varieties

Eleven named varieties of double-cut red clover along with fourteen lots grown locally have been tested over the last five-year period. Fraser valley double-cut clover is generally slightly more vigorous than the named varieties but is also coarser and more susceptible to mildew. Of the named varieties, Ottawa red clover has been surpassed in yield by only two varieties, namely Kenland and Pennscott. However in neither instance were the differences statistically significant. The other varieties tested were Cumberland, Wisconsin, Mildew Resistant, Dollard, Midland Medium, Craig Mammoth—a single-cut type, Redon, Lion, and Ottawa Commercial, arranged in descending order of yield.

Alfalfa Varieties

Rhizoma alfalfa has proved superior to both Grimm and Ladak for Fraser valley conditions and is the recommended variety in that area. Du Puit alfalfa has considerable promise because of its great vigor and high yields. However, winter hardiness under coastal conditions must be fully determined before Du Puit can be included in the recommended list.

Plant Introductions

The testing of new plan species and strains of old species is a continuous feature of any forage program. It is in these tests that species of grasses and legumes from all parts of the world are first evaluated for an area. Those species that are not suited are rejected while species with desirable characteristics are moved into more comprehensive trials when they are tested against standard species.

During the past five years 74 grass species and 80 legume species or strains have been evaluated at Agassiz.

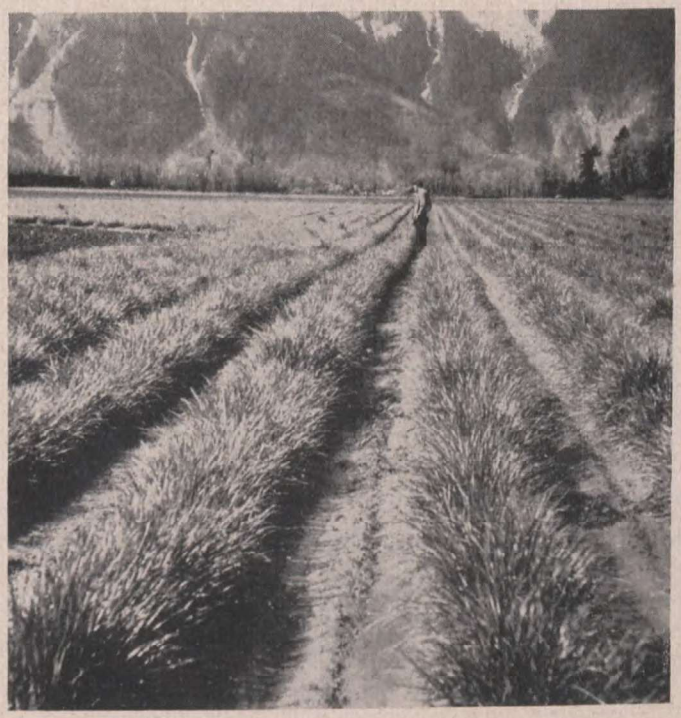


Figure 3.—Seed increase of Pacific perennial ryegrass.

HORTICULTURE

The work of the Horticulture division has been expanded in the past five years to include a laboratory for fruit and vegetable testing, cold storage space, specialized machinery and an additional four acres for experimental plots. An Experimental Substation at Ladner has also been established which is primarily devoted to potato research studies. The work of the division is divided into two general phases, small fruit and vegetables.

The addition of Mr. Freeman to the staff has greatly increased the capacity of the division.

Small Fruits

T. H. ANSTEY

Strawberries

The berry industry in the lower Fraser valley is in need of a variety with the quality of British Sovereign, but having resistance to the root-rotting disease, red stele, and producing fruit of more uniform size than British Sovereign. During the period covered by this report 3,762 seedling strawberries from controlled crosses have been fruited and 86 selections have been made. Of these selections 25 still remain under test, 10 of which show some promise as commercial varieties.

Raspberries

The present varieties of raspberries now grown in the Fraser valley have serious disadvantages for West Coast growers. Washington produces a high quality fruit but cannot be grown on heavy wet soils, while Newburgh will grow on heavy soils but produces extremely low quality fruit. An attempt is being made to bring together the better characteristics of both varieties combined with resistance to virus diseases. To date 27 selections have been made from 2,347 seedlings fruited. In addition to this breeding work 27 varieties and selections from other breeders have been tested for yield and fruit qualities. None tested to date have proved superior to Washington.

Grapes

Since 1937 a total of 25 grape varieties have been tested. From these tests the following varieties show promise:

Green	*Black*	*Red*
Portland	Beta	Delaware
Emerald	Campbell Early	Mary
Niagara	Fredonia	
Seneca	Concord	
Diamond		

In 1952 a new vineyard was established containing in addition to the above listed varieties another 14 new or untested varieties. Under local climatic conditions varieties must ripen early and be moderately resistant to mildew before they are of much value to the grower.

Other Small Fruit

A plantation of 29 seedlings and varieties of gooseberries was made in 1950 which bore lightly in 1952. No recommendations can be made, but varieties are available that have few or no thorns and are resistant to mildew. These varieties should be considered for planting and include the following:

Captivator	Ottawa 272
London	Ottawa 274
Ottawa 261	Ottawa 275
Ottawa 271	

The numbered Ottawa seedlings have not been generally released but commercially suitable ones will be made available when fully tested.

A small test of two black and three red currant varieties was set out with the gooseberries, but to date has not borne fruit.

Vegetables

J. A. FREEMAN

Variety Trials and Recommendations

Every year, new varieties of vegetables are tested and compared with older standard varieties. At present these tests embrace over 400 varieties involving

25 different crops. This makes it possible to draw up an annual list of varieties best adapted to conditions in the Fraser valley. A list of the recommended varieties may be had by writing to the Superintendent, Experimental Farm, Agassiz, B.C.

Broccoli Variety Trials

Fifty different varieties or strains of broccoli have been tested at this Farm since 1949. The results of the better varieties are summarized in Table 10.

Waltham 29 and Freezers have consistently given better yields than all other varieties. Freezers, however, is inclined to have smaller laterals than Waltham 29, which has exceptionally strong and sturdy laterals. An experimental strain of Italian Green Sprouting yielded nearly as much as Waltham 29. The plant type was similar to other Green Sprouting strains which is larger than Waltham 29.

The medium strains of both Asgrow and Ferry Morse had good shoot size but gave lower yields than Waltham 29. These two varieties are later than Waltham 29 and their cut-off date at Agassiz comes before the crop is finished. The De Cicco varieties have proved to be unsuitable commercially at Agassiz because of their spindly, loose laterals.

All varieties in these trials were planted at the same time, June 15 to June 30, and thus the later maturing varieties such as the medium strains may not have shown up so well as they might have if planted earlier.

From these trials it would appear that Waltham 29 is the most promising variety for commercial plantings in the Agassiz district.

TABLE 10—SUMMARY TABLE OF THREE YEARS' DATA ON BROCCOLI VARIETY TRIALS

Variety	Source	3-Year average (tons/acre) (1949-50-51)	No. laterals per pound (1950)	Remarks
Waltham 29	E.S.F.E.	5·12	15	good sturdy laterals.
Freezers	Asgrow	4·76	19	fair laterals, little small.
Italian Green Sprouting	D.E.F. Agassiz	4·50	12	good laterals, inclined to large bud.
Italian Sprouting	Stokes	4·18	14	small tight buds. fairly good laterals and heads.
Medium Green Sprouting	Asgrow	4·05	13	fairly good laterals.
Dé Cicco	F. Morse	4·04	28	laterals spindly and loose.
Italian Early	Dominion	3·88	14	loose heads and laterals.
De Cicco	Stokes	3·78	20	fair to loose laterals.
Medium Strain	F. Morse	3·45	11	heads and laterals fair.
L.S.D. (P = ·05)		0·79		

Broccoli Breeding

Techniques have been worked out whereby F_1 hybrid broccoli seed can be produced from inbred lines without hand manipulation. Experimental plots using this seed have shown that up to 25 per cent increase in yield of the hybrid over Waltham 29 (the standard commercial variety) may be expected. Supplementing this work, studies on the inheritance of self-incompatibility and the inheritance of several genetic mutations have been made.

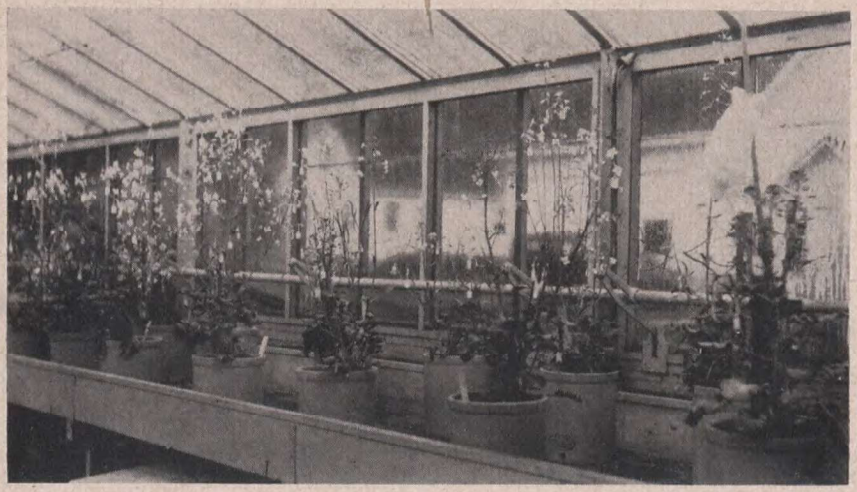


Figure 4.—A section of the greenhouse where broccoli breeding studies are conducted during the winter.

Mulching with Sawdust

An experiment designed to determine the effect of sawdust upon soil fertility and as a mulch in the production of vegetable crops was begun in 1951. A brief summary of the first two years' data is as follows:

The yield data show that there was no difference in yield of peas or cabbage. The length of harvest period for the peas was increased by five days by the mulch treatments. Carrots produced better yields under the mulches. Corn yields were not affected by the mulches but maturity was delayed slightly.

Sawdust showed a slight tendency to increase air temperature four inches above the sawdust. Soil temperature was slightly lower and soil temperature fluctuation was less under the sawdust mulch. The sawdust mulch treatments maintained a higher soil-moisture content than the other treatments.

The 2-inch sawdust mulches gave good control of annual weeds but did not control perennials such as couch grass and creeping yellow cress.

Effect of Maturity on the Carotene Content of Carrots

In a study conducted during 1952, comparisons were made of the carotene (pro-vitamin A) content of 22 varieties or strains of carrots sown on two different dates. All carrots were harvested on November 17. The fresh weight carotenoid contents were as follows:

Date sown	Total carotenoids (mean of 22 varieties)
	mgm./100 gm. F.W.
June 23	17·09
July 21	13·58
L.S.D. (P=·05)	0·82

These results are in accordance with those reported by Booth and Dark who found that immature carrots have much lower concentrations of pigment than mature roots whether the immaturity results from early harvesting or late sowing.

Chemical Weed Control

J. A. Freeman

Experiments have shown that almost complete control of many of the weeds found growing in certain crops can be obtained by the use of chemical sprays.

Carrots and Parsnips

Trials carried out since 1949 have shown that post-emergence treatment with Stoddard Solvent (supplied by most oil companies) controls most annual weeds and grasses in these crops. Rates of application vary but 50 to 60 gallons per acre are required if complete coverage of soil is desired. However, if the spray is confined to a band over the row, 20 to 25 gallons are sufficient. The oil sprays are best applied when the weeds are small.

Peas

Dinitro compounds, applied before the peas are more than four to six inches in height have been found to kill most broad-leaved annual weeds without injuring the peas.

Spinach

Spinach acreage in the lower Fraser valley is increasing rapidly to meet the demands of the frozen food industry. Possibly the chief problem in the growing of this crop is the growth of weeds. Since 1951, twelve different materials have been tried as pre-emergence treatments. Results of these experiments show that CMU at one-half to one pound per acre applied three to five days after seeding is the most promising treatment, controlling all weeds including grasses without any apparent injury to the spinach. The other materials under test gave poorer weed control or proved too expensive to warrant their use on a low-return crop such as spinach.

Plate 5.—Chemical trimming of Privet (untreated on the left).

Strawberries

Weed control experiments with strawberries have been conducted since 1949. IPC applied at six pounds per acre in the fall following cultivation has shown considerable promise as a control for winter annuals such as common chickweed and rye grass.

Ornamentals

Chemical Growth Control of Hedges

For the past two years experiments of a preliminary nature have been conducted on this Farm to determine whether or not there are any practical advantages to be obtained from chemically controlling the growth of hedges.

The results obtained indicate that for some hedges at least the use of MH (maleic hydrazide) as a growth retarder shows promise. Growth of sharpleaf willow (*Salix acutifolia*) and common buckthorn (*Rhamnus cathartica*) was satisfactorily retarded for several months with a 0.1 per cent concentration of MH. Privet (*Ligustrum vulgare*) required a concentration of at least 1.0 per cent MH to give satisfactory results. Caragana (*Caragana arborescens*) proved most sensitive requiring less than 0.1 per cent to control growth. Results indicate that for hedges such as slender deutzia (*Deutzia gracilis*) which are comparatively slow growing and on which close clipping is not practised in order to allow flowering, the use of MH is not practicable. MH also appeared non-promising for use on goldleaf ninebark (*Physocarpus opulifolius aureus*) since the minimum concentration required for sufficient growth retardation caused some discoloration of the foliage.

Experimental Substation, Ladner, B.C.

T. H. ANSTEY

Since the last progress report (1938-1947) marked progress has been made in the research work with potatoes. This work has been facilitated by the establishment in 1949 of an Experimental Substation at Ladner for the study of potato problems.

Potato Varieties and Breeding

In co-operation with the National Potato Breeding program, selected and unselected seedling material has been grown annually at both Agassiz and Ladner. Unselected material bred for resistance to late blight has been grown and selected at Agassiz since late blight is more prevalent under the higher precipitation at the eastern end of the valley. In the five years under review 4,301 seedlings have been grown from which 203 selections have been made. The seedlings were all obtained from the Experimental Farm, Fredericton, N.S., and generally first subjected to a screening test for late blight at Fredericton. The selections were then grown at Ladner together with 188 varieties and selections from other stations making a total of 396 varieties and selections tested over the five-year period. From these tests have come the following recommendations with respect to potato varieties for the lower Fraser valley:

Early	Early Epicure	Warba
Second Early	Katahdin	White Rose
Main	Netted Gem	Green Mountain

Three recently introduced late-blight-resistant varieties Canso, Keswick, and Kennebec, are suggested for trial. Pontiac, a red-skinned variety which gives exceptionally high yields is also suggested for trial. Netted Gem should be grown only on moist organic soils while Green Mountain can be grown successfully on upland and lowland soils.

Progress is being made in the development of an early variety of better shape than the two recommended. However to date none is ready for release.

Fertilizer Studies

Intensive potato fertilizer studies have been conducted, the results of which show the necessity for a balance between nitrogen and phosphorus applications on a Ladner clay soil. Neither element increases yield to any extent if applied alone, but when applied together at the rates of 80 lb. of nitrogen and 100 lb. of phosphorus per acre yields are increased over the check plots by 278 per cent. Potash on the soils used had little or no effect on yields. Potatoes grown with muriate of potash in the fertilizer tended to have a lower percentage of dry matter than those grown without potash. Those potatoes from plots fertilized with phosphorus, on the other hand, had a higher dry-matter content than those grown without phosphorus.

Soil conditioners (Krilium) and various commercial fertilizers said to contain ingredients other than nitrogen, phosphorus, and potash but beneficial to plant growth are currently under test. However, no conclusive results are yet available.

Other Potato Experiments

Samples of certified and foundation potato seed stocks have been tested for freedom from disease and yield for 116 growers involving 125 samples. Little difference could be found between yield potential of stock from the various growers although some growers' stocks were much freer from the disease than others.

Experiments in co-operation with entomologists on tuber flea beetle control and plant pathologists on late blight control have yielded interesting results. These have been published by the co-operators concerned.

Intensive studies on plot methodology with potatoes including plot size, lateral spread of fertilizer, and on guard-row and guard-plant effects have been made over a period of three years.

POULTRY

D. M. Bowden

The high-producing strain of Barred Plymouth Rocks which had been maintained at this Farm since 1900 was disposed of in September 1952. The birds remaining are all Single Comb White Leghorns under Project P 1.111.

Early Hatching

A test of chicks hatched in February, March, and April in each of the years 1948-50 showed a tendency to greater production for the early-hatched chicks.

Eye Color

A test in 1947-48 of two groups of pullets selected for eye color and pupil formation showed a lower mortality and higher egg production for those with normal eye color and formation, The abnormal eye color studied here has been definitely linked with deterioration attributable to the leucosis complex. In the absence of leucosis a difference in eye color would not be expected to exist and any that did would probably not influence production or livability.

Selection Based on Progeny Test

A long-term project on the feasibility of selection on a progeny-test basis as a method for increasing egg-producing ability was begun in 1950. All breeding and hatching is done at Ottawa with samples of chicks from each strain being shipped by air express for testing at Charlottetown, Morden, Harrow, Lethbridge, and Agassiz. This gives a test of a large number of birds under a variety of environments. Both these factors are essential for progress in genetic studies of this nature.

The project is testing the most efficient methods of selection within a closed flock. A random-bred control strain is used to determine environmental fluctuations caused by year or major changes in feed and management. Estimates will be possible from these data of the relative effect of heredity and environment on egg production, mortality and associated characteristics. This should indicate the nature of future work on inheritance of individual egg production characteristics.

Standardization of management procedures, housing and feed is desired and has been obtained as closely as possible between co-operating units. Differences in types of laying houses and brooding facilities are showing possible influences which should be eliminated in the future if possible.

Birds tested at Agassiz show a definite difference in production level between strains. Higher production in shift 1 was noted in all strains under test. Environmental influence is shown in the high rearing mortality at this station resulting from crowded conditions in the brooder houses and range houses.

From results so far, it appears that this project will be of real value to the poultry breeder in the near future. Statistical analysis should bring to light many points that will encourage further study.

ILLUSTRATION STATIONS

R. M. HALL

There are eight Illustration Stations in the Agassiz Supervisory District. The purpose of these farms is to permit the study of problems in their local environment and under normal farm conditions. Operations are based on a co-operative agreement between the farm owner and the Experimental Farms Service.

The scope of work includes variety testing of cereals and forage crops, soil fertility experiments, and in more recent years, the use of water has been investigated in its relation to raising the productivity of pastures. Six of the eight operators derive the greatest portion of their farm income from fluid milk.

Throughout this report specific reference will be made to particular locations and where this is done it will relate to work being developed in co-operation with the farmers listed below as operators of Illustration Stations.

Station	District	Operator
Ladner	Fraser Valley	Murray Davie
Cloverdale	Fraser Valley	Theodore Kuhn
Armstrong	Southern Interior	Dr. W. B. McKechnie & Son
Armstrong	Southern Interior	L. A. Johnston
Mt. Cartier	Southern Interior	Roley Hold
Salmon Arm	Southern Interior	Lloyd Stewart
Chase	Southern Interior	R. C. Dunn
Darfield	North Thompson Valley	Schilling Bros.

Rotations

A systematic layout of the farm and the rotation of crops form the basis of Illustration Station work. Livestock requirements are considered in deciding on the rotation to follow. A cropping system providing for two thirds of the tillable land in sod and one third in cereal crops has been found satisfactory for the majority of the Illustration Station farms.

Six-year Rotation

Stations at Armstrong (Johnston), Chase, Darfield, and Salmon Arm have their rotations planned to allow for two fields in grain and four fields in hay. With the exception of Armstrong new seedings are sown with the second-year grain. Oats or barley at 70 pounds and a mixture of alfalfa 10 and timothy 2 pounds per acre is found satisfactory at Salmon Arm. At Chase and Darfield a mixture is seeded of alfalfa 6, brome 4 and orchard grass 4 pounds per acre. It is important to seed in a firm, well prepared seedbed. Packing before and after seeding with a cultipacker aids materially in obtaining a satisfactory stand. Covering the seeds with one-half inch of soil is sufficient. The alfalfa most commonly seeded is the Grimm variety. Other varieties on test include Ladak and Rhizoma. Farm manure is applied at 10 tons per acre on new seedings. If corn is grown for ensilage in the rotation the manure is applied in the corn year up to 15 tons per acre.

Ten-year Rotation

A longer rotation is found satisfactory on the heavy clay soil of the McKechnie farm at Armstrong. Alfalfa is seeded alone after field corn. The corn stubble is surface worked only. Firming the soil is done by the cultipacker before and after seeding. Grimm alfalfa is drilled in at 12 pounds per acre. Alfalfa remains down for seven years (including the year seeded), fall wheat is seeded on alfalfa sod, followed by coarse grain in the ninth year and corn for ensilage in the tenth season. The only manurial treatment is barnyard manure applied in the corn year at 15 tons per acre. All forage and grain produced is fed to livestock. Some of the crop yield records at this station extend over a period of 26 years. The following figures show the average yields and the number of years grown: fall wheat 38·2 bushels (26); barley 49·5 bushels (17); oats 56·9 bushels (16); ensilage corn 10·52 tons (24). Average alfalfa yields in tons were, first year 2·10 (26), second year 2·22 (25), third year 2·04 (23), fourth year 1·99 (19), fifth year 2·04 (19) and sixth year 1·96 (17).

Soil Fertility

Detailed fertilizer studies conducted on Illustration Station farms have given specific leads as to the fertility requirements of the soils dealt with. In the main, nitrogen has been the most important limiting factor in crop production. Phosphorus alone or a combination of nitrogen and phosphorus are next in order of importance with potash being somewhat less essential as a basic fertility requirement. Cereals have not responded generally to potash, however pastures, especially those on heavier soils such as Langley clay, have given increased yields where potash was applied. A review of the fertility work conducted through varying periods of years indicates that, for pastures, 6-30-15 at 400 pounds per acre applied in the spring, followed by annual

spring applications of 10-20-10 at 200 pounds per acre will give sustained production. For grain crops 16-20-0 at 100 pounds per acre when no manure is available or 11-48-0 at 100 pounds per acre where farm manure is applied in the rotation give satisfactory results. On mixed hay land ammonium phosphate 16-20-0 at 200 pounds per acre has given profitable yield increases. On Mara clay at Salmon Arm tests have shown that an application of gypsum at 500 pounds per acre in addition to fertilizer treatment has given marked increases in yields of alfalfa.

Cereal Variety Tests

Cereal variety tests are conducted on Illustration Station farms in co-operation with the Cereal Crops Division. The varieties that show most promise and are recommended on the basis of their yielding ability are as follows:

Barley: Vantage, Trebi, Olli. Varieties suitable for fall seeding are on trial with Olympia showing considerable promise.

Oats: Eagle, Victory, Ajax. The new variety Abegweit is also showing up well in trials.

Fall Wheat: Ridit, Wasatch. Two hybrids C.I. 12242 and C.I. 12421 are standing high in the trials conducted at Armstrong.

Weed Control Studies

Methods of control for hoary cress (*Lepidium draba*) and field bindweed (*Convolulus arvensis*), two deep-rooted perennial weeds, are being studied at Armstrong, B.C., where both weeds are of concern in the type of farming followed. Cultural practices are still basic in dealing with hoary cress and to a lesser extent in the case of field bindweed. The latter has been effectively controlled by seeding down to alfalfa for six years, followed by fall wheat, corn for ensilage and re-seeding to alfalfa, without a companion crop. Spot treatments with 2,4-D may, or may not be necessary in the grain year.

Alfalfa has not been effective in controlling hoary cress in any phase of the work undertaken. In fields largely taken over by hoary cress, results show it is best to summerfallow and sow fall wheat. Spot treatments are carried out on the wheat crop with Ester 2,4-D when the hoary cress is breaking into flower. The one-pound rate of acid equivalent has been effective in killing the weed to ground level. Available moisture is a factor in battling hoary cress. If soil moisture is low, a second year of fallow is necessary before again sowing to fall wheat, or seeding down to alfalfa.

The habit of this weed is to grow in patches that spread slowly unless the roots are dragged by machinery. Scattered patches that carry through into new seedings of alfalfa are best seeded in October with crested wheat grass. Light working with harrows and broadcasting the seed has given excellent stands of grass the following year. Hoary cress in crested wheat sod has been materially reduced after three years when given spot treatments of 2,4-D twice annually using up to 20 ounces acid equivalent of Ester 2,4-D per acre.

Results of tests indicate that under the moisture conditions prevailing at Armstrong mixed seeding of alfalfa with grass is not to be recommended where hoary cress is present to any extent.

Until 1952 when CMU was first used, sodium chlorate applied dry at a minimum rate of five pounds per square rod had proved the best soil sterilant in combating hoary cress and field bindweed in places not accessible to

machinery. Applications of sodium chlorate (dry) to be effective must cover an area at least 15 feet beyond the infested area. Areas thus sterilized for periods up to five years have been restored to normal crop production more rapidly by applications of gypsum at one ton per acre. CMU applied in water (1 lb. to 3 gallons) at 40 pounds per acre effectively sterilized the ground against all plant growth for one year. Further residual effect is yet to be

Figure 6.—Chemical control of volunteer annual ryegrass in a red clover seed crop, treated area right foreground. (12 pounds I.P.C. per acre).

Volunteer annual rye grass is a problem with growers of red clover seed on the heavy clay soils in the lower Fraser valley. Initial treatments with I.P.C. were laid down on new clover seeding on November 5, 1951, at 6 and 12 pounds per acre of acid equivalent diluted in water and applied at 1 gallon per square rod. The action of this chemical takes place through the root system and by February 5, 1952, the rye grass was severely browned. The red clover plants appeared normal in every way.

Spring treatments were made on a second series of plots on February 5, 1952, using Wettable I.P.C. at 3, 6, 9 and 12 pounds of acid equivalent per acre dissolved in water and applied at 1 gallon per square rod. Control of rye grass was satisfactory though not so permanent as from the fall treatments. It is evident that fall treatments of I.P.C. (Wettable) at the six pound rate will give at least two years immunity from volunteer annual rye grass.

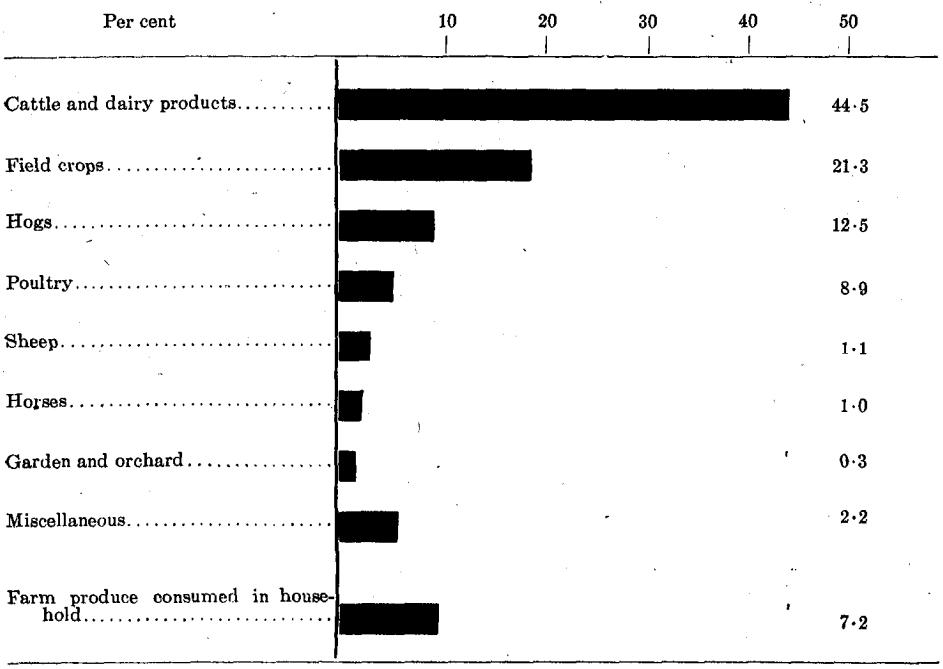
Farm Business Studies

Farm business studies comprising a record of revenues and expenditures, an annual inventory, and calculation of depreciation and capital charges are conducted on all Illustration Station farms. A financial summary is drawn up that permits the determination of the return to the farm operator as labor income and labor earnings.

A summary of the data from these studies indicates that average revenue in the period 1948-52 was 33 per cent greater than the average of the five-year period 1943-47. Conversely average cash expenditure shows an increase of 35 per cent for the same period. Labor earnings in 1943 averaged $1,511, reached a peak of $2,028.66 in 1948, declining to a low of $1,473 in 1952. Productivity per man equivalent (12 months of man labor) in terms of gross revenue for the 10-year period 1943-1952 was $2,806.07. Lowest productivity was $2,146.04 in 1943 with a high of $3,944.42 in 1951.

SOURCES OF REVENUE ON ILLUSTRATION STATIONS

Ten-year average 1943-1952



The foregoing graph presents a 10-year summary of the sources of farm revenue on the Illustration Station farms. Sales of cattle and dairy produce increased 6·6 per cent during the second half of the period under review. Proportionate revenue derived from field crops decreased 6·7 per cent during the same period. Hogs held steady, and poultry revenue declined by only 1 per cent.

LIST OF PROJECTS

Dominion Experimental Farm, Agassiz, B.C.

Animal Husbandry

Breeding of high class Holstein-Friesian cattle, Clydesdale horses, Dorset Horn sheep and Yorkshire swine.

Advanced Registry work with Holstein-Friesian cattle and Yorkshire swine.

Policy projects in connection with disease control in livestock.

Pasture management—fresh daily grazing versus free range grazing of dairy stock.

Sprinkler irrigation of fertilized pastures as related to grazing capacity and yields.

Loose housing versus standard stall stabling of dairy cattle.

Economy of early versus late lambs for markets.

Study of fecundity and nursing capacity in swine.

Self feeding versus hand feeding of swine on Advanced Registry test.

Economy of spring versus fall litters in swine.

Feeding antibiotics and A.P.F. antibiotic supplements to weanling pigs on skim-milk plus grain ration.

Cereals

Variety tests of spring and winter wheat, spring and winter oats, spring and winter barley, field peas and winter rye.

Breeding new varieties of spring oats, spring barley, and winter barley with emphasis on lodging and disease resistance.

Rates of seeding with three varieties of oats.

Production of elite stocks of spring oats.

Field Husbandry

Meteorological records.

Pasture studies—fertilizers, irrigation, grazing management, and pasture renovation.

Soil fertility investigations—

long term experiment with manure and fertilizer on corn, oats and clover in rotation;

determination of soil fertility requirements of Fraser valley soils.

Weed control—studies with herbicides for weed control in cereals, grains and pastures.

Loose housing versus standard stall stabling of dairy cattle.

Farm and garden tractor operating cost and utility.

Forage Crops

Plant breeding—orchard grass and perennial rye grass.

Plant introductions and testing of new species.

Variety testing—corn, soybeans, red clover, alfalfa.

Pasture and hay studies—species and mixtures.

Multiplication of forage seed stocks.

Horticulture

Plant breeding—strawberries, raspberries, broccoli.

Variety testing—tomatoes, corn, leafy vegetables, root crops, vine crops.

Weed control—chemical weed control experiments with small fruits and vegetable crops.

Sawdust mulching experiments.

Potato seedling and variety trials, fertilizer experiments, late blight control experiments.

Ornamentals (trees and shrubs, variety experiments; flowering and ornamental shrubs).

Poultry

The feasibility of selection based on the progeny test as a method for increasing the egg producing ability of fowl.

Agassiz Supervisory District

Division of Illustration Stations

Rotations—five, six, and ten years.

Soil fertility experiments.

Cultural methods and practices.

Agricultural engineering.

Meteorological studies.

Cereal variety testing.

Forage crop studies.

Pasture investigational studies.

Root and silage crops.

Potato production studies.

Horticulture.

Livestock.

Poultry.

Farm management.

Irrigation.

Publicity.

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