DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

REPORT OF THE

DIVISION OF FORAGE PLANTS

FOR THE YEARS 1924 and 1925

G. P. McROSTIE, Ph.D., DOMINION AGROSTOLOGIST

STANDARD HAY MIXTURE
Left: Without alfalfa. Right: With alfalfa.

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TABLE OF CONTENTS

DIVISION OF FORAGE PLANTS

REPORT OF THE DOMINION AGROSTOLOGIST, G. P. McROSTIE, Ph.D.

INTRODUCTION

The years 1924 and 1925 have seen a marked improvement in the apparatus used in securing absolute dry-matter determinations. The ordinary chemical methods were found to involve too much labour to adequately handle the large numbers of samples necessary for the successful carrying on of the various forage-crop projects on the Dominion Experimental Farms and Stations.

Satisfactory drying apparatus which will be described in the following pages has been designed and has been proven to be accurate, simple in operation, and speedy. During the first three months of its operation over twenty thousand absolute dry-matter determinations were made. The development of this apparatus, however, delayed the determinations necessary for the understanding of the 1924 data to such a late date that it was deemed advisable to include the data for 1924 and 1925 in one compilation.

No very pronounced deviations from average seasonal conditions were encountered in either the 1924 or 1925 growing seasons. As a consequence, the results recorded in this report can be accepted as a fair indication of what might be expected under average climatic conditions.

A new Assistant Agrostologist has been appointed in the person of Mr. S. E. Clarke, whose time will be occupied entirely with range investigations on the Canadian prairies. Some much needed investigational work is being begun in conjunction with the Field Husbandry Division of the Central Experimental Farm and with the ranchers themselves, which investigations should be productive of worth-while results.

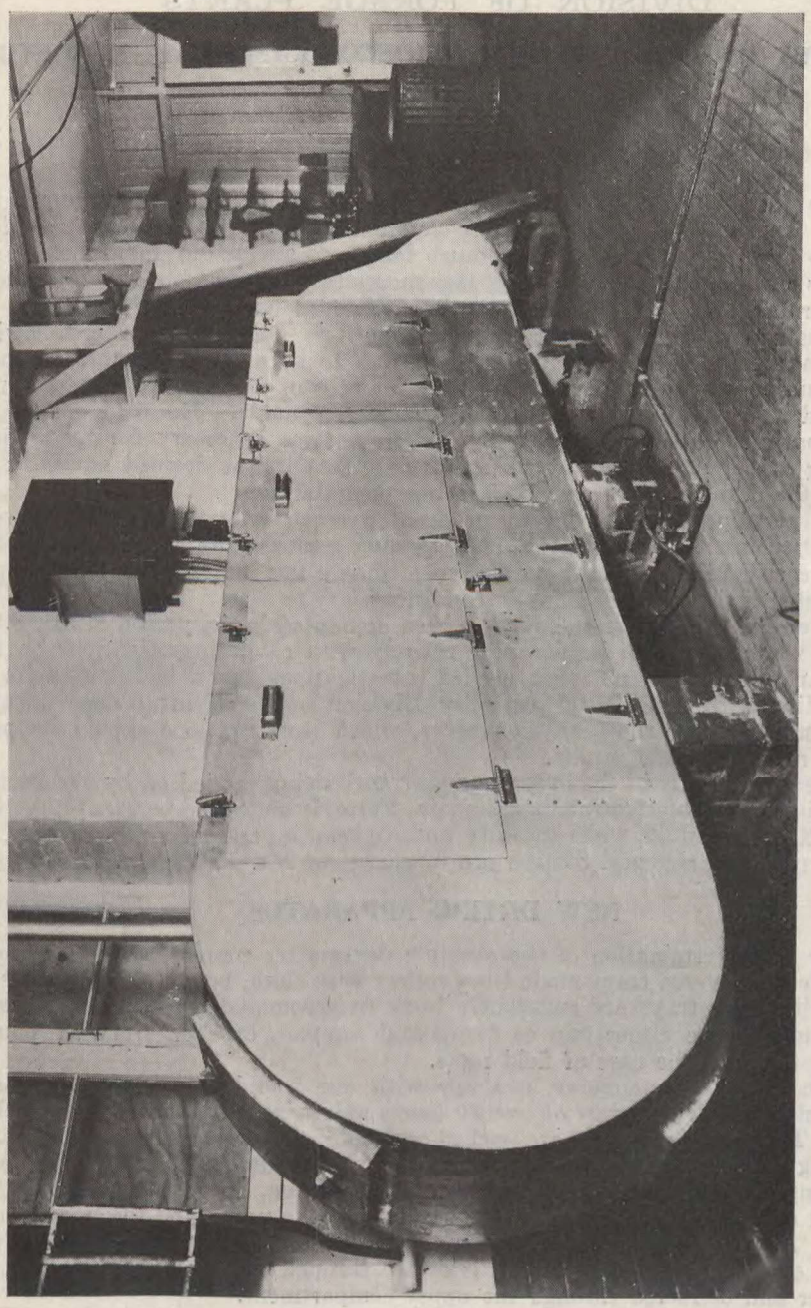
The greater part of the investigational work being carried on by the Forage Crop Division at the Central Experimental Farm, is under the personal direction of Mr. R. I. Hamilton, while the corn and soybean investigations carried out at the Harrow Experimental Station are in charge of Mr. F. Dimmock.

NEW DRYING APPARATUS

For the determination of the absolute dry-matter content, air-dry samples are placed in covered trays made from copper wire cloth, bound throughout with heavy tin. The trays are sufficiently large to accommodate the complete air-dry material from either two or five-pound samples, or even from ten-pound samples taken in the case of field roots.

The drier is rectangular in shape with one rounded end, the walls are constructed from two layers of twenty gauge galvanized iron, spaced two inches apart. The two-inch spaces are packed with mineral wool to increase the heat-retaining capacity of the machine. The interior is divided longitudinally into two compartments by a one inch insulated partition, space being left at the rounded end for a free circulation of air between the upper and lower compartments. At the opposite end of the machine a sirocco fan is connected with the drier in such a manner that the air is drawn through the lower compartment of the drier and delivered through the upper compartment.

This upper compartment is much larger than the lower and is fitted on either side with a number of narrow iron strips which support the trays during the drying process. Fifty trays can be accommodated in the machine at one time.



View of drying apparatus showing case, fan (covered) electrical control panel and scale.

These are arranged in tiers ten trays long and five trays deep with a space left both between the tiers and at each end of the trays.

In the lower compartment are two batteries of 500 watt Westinghouse strip-heaters which generate the heat required for the drying process. The temperature is regulated to a fine degree of accuracy by means of a thermostatic control. All that it is necessary for the operator to do is to set the hands of the regulating dial to the temperature or range of temperatures desired and the control system will automatically regulate.

At the rounded end of the drier are two doors, one at the top through which moist air may be expelled and the other opposite the lower compartment through which fresh air may be drawn. These doors are arranged so that as much or as little air as desired may be changed in the drier.

The machine has been carefully checked against the ordinary laboratory methods of drying and has been proven accurate in its work. With stationary air quite a few hours drying are necessary to expell all of the moisture from the samples under test, but with this machine, where a heavy forced draft is used, drying is accomplished in a remarkably short time. Practically all of the moisture is extracted from the ordinary air-dried fodder-samples in about one hour's time. However, in our operations samples were left in the oven for two hours to allow a wide safety-margin.

About two hundred samples constitute an average day's drying with the machine in question, but during a rush-period last December the machine was run continuously and five hundred samples every twenty-four hours were put through.

Two complete sets of trays are used with the machine so that one set of trays can be filled and labelled while the material in the duplicate set is being dried. This arrangement results in a minimum waste of time in refilling the machine, and consequently increases the day's output.

For the final weighings a standard model of Dayton scale was used. The chart on this scale is graduated to one-sixteenth of an ounce and can be read accurately to the nearest thirty-second of an ounce. The pointer with its hair line for accurate reading comes to rest very quickly so that little time is lost in securing a reading.

Given a standard weight of the shrinkage sample as harvested, each division on the chart of the scale corresponds to a definite percentage of dry matter in the sample being weighed. This relationship has been worked out separately in tabular form for two, five, and ten-pound shrinkage samples. All that it is necessary to do is to record the weight as indicated by the scale-pointer, then by reference to the portion of the table opposite the weight obtained to read off the percentage of dry matter in the sample concerned.

Extensive tables, which we hope to publish shortly are being prepared for translating various green weights at varying percentages into total tons and pounds per acre of both green and absolute dry material.

FIELD CORN

During the seasons of 1924 and 1925 the work conducted by the Division of Forage Plants at the Experimental Station, Harrow, Ont. has been made more extensive and considerably broadened in its scope as compared with that carried on previously.

The following lines of experimental work are being conducted with field corn.

Variety Testing

Twenty-five varieties of corn were included in this test in 1924, while in 1925 twenty-four of the same varieties were tested. As seventeen of these varieties were also in the 1923 test, the following tables give the yields of fodder and grain for 1925, a three-year average for these varieties tested in all three years, and a two-year average for the remainder. All varieties were harvested for fodder when their cobs had reached, as nearly as possible, the glazed stage.

Table I.—Field Corn—Variety Test

Variety	Source	Yield of Grain per Acre for 1925 and Average							
		Days to maturity	As harvestsd			Moisture-free			
			Corn on cob			Corn on cob			
		1925	1925	Three-year average, 1923-1925		1925	Three-year average 1923-1925		
			bush.	bush.	tons lb.	bush.	bush.	tons	lb.
Lancaster	Hoffman	133	112·7	97·8	3 847	62·4	53·5	1	1,742
U.S. Selection No. 119.	United States Dept. of Agriculture.	.....	101·5	†88·3	2 184	49·6	41·0	1	868
Burr Leaming	G. S. Carter	135	113·7	94·4	3 604	65·6	54·0	1	1,779
Silver King	A. C. Popp	127	99·5	79·3	2 1,552	58·3	46·7	1	269
Wisconsin No. 7	Experimental Station, Harrow, Ont.	126	97·3	85·9	3 39	56·9	50·0	1	1,500
Wisconsin No. 7	John Parks	126	97·1	*88·7	3 211	57·4	51·0	1	1,570
Leaming	John Parks	125	109·0	*93·3	3 536	63·3	51·6	1	1,612
White Cap Yellow Dent.	Steele Briggs Seed Co., Toronto, Ont.	119	86·4	79·2	2 1,544	50·8	46·8	1	1,276
White Cap Yellow Dent.	J. O. Duke, Ruthven, Ont.	121	94·9	81·0	2 1,672	57·7	48·6	1	1,402
Bailey	J. O. Duke	124	102·1	*88·0	3 162	61·5	51·3	1	1,591
Yellow Dent	A. J. Wimple	124	100·2	*89·7	3 284	55·8	49·3	1	1,451
Golden Glow	University of Wisconsin	120	84·8	75·9	2 1,323	50·1	44·2	1	1,094
Golden Glow	J. O. Duke	122	97·4	80·5	2 1,639	54·9	45·6	1	1,192
Cold Resistant	University of Wisconsin	122	95·7	79·6	2 1,570	54·5	44·4	1	1,108
Hybrid	A. J. Wimple	120	92·0	*85·1	2 1,956	45·6	43·5	1	1,045
Disco 90 Day White Dent.	Dakota Improved Seed Co.	124	104·1	*93·1	3 388	55·6	50·4	1	1,528
Disco Northwestern Dent.	Dakota Improved Seed Co.	114	81·0	69·8	2 887	48·2	41·0	1	870
Disco Pride Yellow Dent.	Dakota Improved Seed Co.	.....	.....	‡54·2	1 1,793	.....	30·5	1	138
Amber Flint	A. J. Wimple	103	45·2	*43·4	1 1,037	26·4	24·8	–	1,736
Twitchell's Pride	Experimental Station, Fredericton, N.B.	105	56·5	48·8	1 1,414	32·9	29·6	1	72
King Philip	Wm. Rennie Seed Co., Toronto, Ont.	113	72·1	*68·1	2 769	44·3	39·4	1	758
North Dakota	Steele Briggs Seed Co.	115	96·0	77·9	2 1,452	53·5	44·9	1	1,143
Early Dent	Milton Backus, Chatham, Ont.	115	89·5	*73·7	2 1,160	49·1	40·3	1	821
Longfellow	Dakota Improved Seed Co.	114	80·0	72·5	2 1,069	46·8	42·1	1	947
Compton's Early	J. O. Duke	115	89·3	77·6	2 1,436	47·6	42·1	1	947

Notes.—1 bushel corn on cob 70 lb.
1 bushel shelled corn 56 lb.
Add 12 p.c. moisture to moisture-free dry weight to obtain air-dry.

A glance at the three-year averages in table 1 shows that the highest yields of both grain and fodder were obtained from the Lancaster variety and the double-cross Burr Leaming. Unfortunately both of these require from seven to ten days longer to mature than Leaming and Wisconsin No. 7. This makes them somewhat late for even the longest-season districts of Canada. Some selection work is now being carried on with Lancaster in an endeavour to select out some earlier strains of this variety.

The lateness of the United States, Selection 119 is indicated by the low yield of grain obtained from this variety when reduced to absolute dry weight. It is entirely unsatisfactory for grain-production in Canada.

The average grain yields for the Leaming, Bailey and Wisconsin No. 7 varieties show there is little to choose between these varieties, and they all require approximately the same length of time to mature.

Inter-Varietal Crosses

With the object of producing high-yielding hybrid corn suitable for those districts in Canada where the season is comparatively short, a number of different varieties of corn were artificially crossed in 1924. Twelve varieties, representing early, medium and late types of flint and dent corn, were used in this work. A sweet corn variety was also included. In all, over fifty different combinations were made, necessitating about 2,000 artificial pollinations.

Table 1.—Field Corn Variety Test

Yield for Three Years Period, 1923–1925 dry weight					Yield of Fodder per Acre 1925 and Three-Year Average, 1923–25 Fodder				
Shelled corn			Percent of total ear		Date cut	Green weight		Moisture—free dry weight	
1925	Three-year average 1923–1925		1925	3-year ave 1923–25	1925	1925	3-year ave., 1923–25	1925	3-year ave., 1923–25
bush.	bush.	tons lb.	bush.	bush.		tons lb.	tons lb.	tons lb.	tons lb.
65·4	54·4	1 1,046	83·79	81·37	Sept. 17.....	13 1,072	11 1,884	4 46	3 1,000
48·0	38·4	1 151	77·46	74·32	" 26.....	17 184	13 1,527	4 1,243	3 957
67·9	55·6	1 1,114	82·87	82·48	" 16.....	13 942	11 983	4 250	3 864
62·2	49·0	1 744	85·38	83·72	" 12.....	10 1,478	8 1,247	3 946	2 1,055
59·7	51·5	1 884	83·86	82·97	" 10.....	10 1,928	8 1,993	3 166	2 1,445
61·2	53·7	1 1,007	85·36	84·14	" 11.....	11 639	10 477	3 864	2 1,885
66·3	53·8	1 1,013	83·80	83·43	" 10.....	11 1,339	10 1,486	3 894	3 418
53·8	48·8	1 733	84·68	83·51	" 9.....	9 1,036	8 1,424	3 335	2 1,434
60·1	50·2	1 811	83·19	82·76	" 9.....	10 1,252	9 341	3 906	2 1,749
64·1	63·7	1 1,007	83·29	83·77	" 9.....	10 1,703	9 1,083	3 849	3 46
59·0	51·3	1 873	84·55	83·03	" 9.....	11 687	10 5	3 878	2 1,787
52·9	45·2	1 531	84·45	81·58	" 4.....	8 1,305	8 265	2 1,773	2 1,104
57·1	46·9	1 626	83·34	82·19	" 6.....	10 1,110	8 1,701	2 1,839	2 1,279
56·4	45·1	1 526	82·81	81·19	" 5.....	10 1,892	8 1,476	2 1,779	2 728
46·7	44·3	1 481	81·93	81·49	" 4.....	10 766	9 569	3 358	2 1,602
56·7	51·8	1 901	81·53	82·32	" 9.....	11 307	9 1,442	2 1,960	2 1,535
49·4	41·5	1 324	81·92	80·91	" 2.....	9 597	7 1,786	2 824	2 525
.....	32·1	.. 1,798	.....	84·15	.....	.. ....	5 1,330	.. ....	1 1,487
26·7	24·9	.. 1,394	80·95	80·40	Aug. 22.....	5 751	5 103	1 419	1 475
34·8	30·9	.. 1,730	84·66	83·56	" 23.....	7 899	5 1,116	1 1,492	1 1,124
45·2	40·1	1 247	81·63	81·49	" 31.....	9 123	8 1,049	2 1,393	2 762
54·8	45·7	1 559	81·86	81·51	Sept. 3.....	13 1,262	9 517	3 1,071	2 810
49·9	41·1	1 302	81·30	81·60	" 3.....	11 414	9 1,125	3 795	2 1,595
48·7	42·8	1 397	83·31	81·17	" 3.....	11 414	9 947	3 266	2 1,341
48·4	42·1	1 358	81·3	79·97	" 5.....	12 702	9 865	3 1,025	2 1,236

†Average 2 years (1923 and 1925).
*Average 2 years (1924 and 1925).
‡Average 2 years (1923 and 1924).

The seed obtained was grown under test this year, the yield of the hybrids being compared with that of their parents.

The result of this test shows:

1. The yield of the hybrids exceeded that of both parents in some cases.
2. The yield of the hybrids was intermediate between that of the two parents in the majority of cases.
3. In crossing an early and late corn the yield of the hybrid was nearer to that of the later and higher-yielding parent than to that of the earlier and lower-yielding parent in most cases.
4. The hybrids were intermediate in time of maturity between the two parents, the date of maturity in most cases being closer to that of the earlier parent than the later parent.

Further work must be done with hybrid corn to determine which hybrids will give the best results, but the results of even this one year's test would indicate that a definite place may be found for hybrid corn in the shorter seasoned districts of Canada, where early maturing, high-yielding corn is desired in order to make the growing of this crop profitable.

Some results of the test are given in table 2.

TABLE 2.—INTER-VARIETAL CORN CROSSES

Varieties and crosses	Days to maturity	Yield of ears per acre (absolute dry weight)	Increase of hybrid	
		tons lb.		lb.
Leaming	125	2 458	Over Leaming	100
Twitchell's Pride	102	1 928	" Twitchell's Pride	1,630
Leaming x Twitchell's Pride	111	2 258		
Leaming	125	2 458	Over Leaming	116
Falconer	102	1 1,110	" Falconer	1,464
Leaming x Falconer	112	2 574		
Leaming	125	2 458	" Leaming	−1,143
Howe's Alberta Flint	90	.. 1,212	" Howe's	+2·103
Leaming x Howe's	105			

BREEDING

In 1924 over 600 inbred strains of corn representing early medium and late types of both flint and dent varieties were again inbred, the process requiring the making of about 12,000 to 15,000 artificial pollinations. Selection at harvest time resulted in the elimination of about fifty per cent as undersirable. These included strains which showed susceptibility to lodging, to rust, to smut, to barrenness, etc., strains obviously of no further use as breeding material.

About 250 of the remaining strains were planted out in 1925, the inbreeding process necessitating the making of 5,000 to 6,000 artificial pollinations.

As segregation is still going on, selection was again made and strains possessing undesirable characters were eliminated. The remaining strains will be carried on for further work next year.

This work of breeding is being carried on with the expectation that when the strains are finally recombined or crossed, corn that will be more suitable for the different corn-growing districts of Canada, will be obtained.

CLASSSFICATION OF VARIETIES

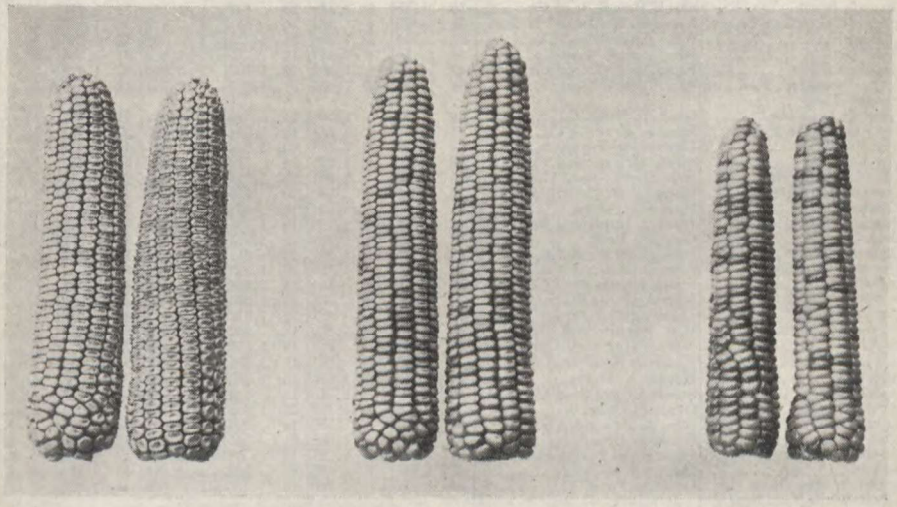
During 1924 and 1925 two hundred varieties of corn have been grown for the purpose of classifying the different varieties of corn grown in Canada. These included representatives of the commonly grown varieties, and were secured from as many different sources as possible throughout Canada and the United States. Accurate records of both plant- and ear-characters were taken, also the length of time required by each variety to mature.

It is hoped in this work to reduce the number of so-called corn varieties, by including all those exhibiting the same characters under one varietal name. The varieties will also be grouped according to the length of time taken to mature. This will enable a farmer, knowing the average length of his season, to choose a variety from among those included within the seasonal group corresponding in the number of days of his own particular season. He will thus have some assurance that the variety selected will do, within a reasonable degree, what is expected of it.

Methods of Testing Varieties

In 1923 an experiment was begun to test the influence of one variety on another when planted side by side. This competitive influence is indicatd by the yields of the varieties under test.

Three-row blocks of six varieties were used representing a fairly wide range of type and length of time to maturity. This test has now been continued for three years and the results so far have shown that competition does exist between varieties of different type and time of maturity when grown in rows side by side. The yields of the earlier varieties are affected adversely when grown in rows beside larger and later varieties, while the larger varieties show an increased yield when grown beside smaller varieties.



Left, Wisconsin No. 7; centre, Wisconsin No. 7 X Squaw; right, Squaw.

Variety Test at the Central Experimental Farm

In 1924, one hundred and fifty-five, and in 1925, one hundred and forty-nine, lots of corn were tested for yield and general suitability. These lots of corn represent all the varieties and strains offered for sale in any commercial quantity in Canada. The tests with corn were made more inclusive than usual because of the necessity of obtaining as much data as possible that could be used in connection with the classification of Canadian-grown corn.

All plantings were made in quadruplicate and representative shrinkage samples were taken from each plot. The results are reported on an acre basis in terms of both green weight and absolute dry matter. The latter figures of course represent more accurately the relative values of the different lots.

TABLE 3.—VARIETY TEST OF FIELD CORN

Variety	Source	Green yield per acre, 1924		Yield dry matter per acre, 1924		Green yield per acre, 1925		Yield dry matter per acre, 1925		Average green yield per acre, 1924–25		Average yield dry matter per acre, 1924–25	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Squaw Corn	Dakota Improved Seed Co.	53	366	8	532	28	511	6	652	40	1,434	7	592
North Dakota White Flint.	Wm. Ewing Seed Co	50	160	8	586	30	722	6	249	40	441	7	418
Selection 119	U.S. Dept. of Agriculture	66	844	8	965	26	1,848	4	622	46	1,346	6	794
Longfellow	Dupuy and Ferguson	66	1,599	9	942	17	806	3	636	42	203	6	789
Angel of Midnight	John A. Bruce & Co.	51	1,489	8	211	23	623	4	1,009	37	1,056	6	610
Early Compton	Dupuy and Ferguson	44	244	8	163	23	262	4	866	33	1,253	6	515
North Dakota	Wm. Rennie Seed Co	50	584	8	409	22	1,072	4	358	36	828	6	384
Early Longfellow	Graham Bros.	56	556	8	479	21	927	4	121	38	1,742	6	300
Golden Nuggett	John A. Bruce & Co.	50	1,120	7	1,498	24	994	4	794	37	1,057	6	146
Leaming	John A. Bruce & Co.	45	1,201	6	691	30	1,507	5	1,411	38	354	6	51
Longfellow	John A. Bruce & Co.	52	1,746	7	1,619	20	1,145	3	1,593	36	1,446	5	1,606
Compton's Early	Graham Bros.	42	1,678	6	413	25	975	4	1,811	34	327	5	1,112
Giant Prolific	John A. Bruce & Co.	42	970	6	867	23	1,122	4	1,326	33	46	5	1,097
Wisconsin No. 7	Steele Briggs Seed Co.	38	165	6	516	25	427	4	1,186	31	1,296	5	851
Mammoth Southern Sweet.	Kenneth McDonald & Sons.	39	465	6	862	20	651	4	449	29	1,558	5	656
Silo King	Wm. Rennie Seed Co.	32	554	5	1,253	24	1,225	5	51	28	890	5	652
Longfellow	Wm. Rennie Seed Co.	44	1,115	6	1,583	19	15	3	1,657	31	1,565	5	620
Longfellow	Kenneth McDonald & Sons.	47	140	6	1,264	20	1,707	3	1,909	33	1,924	5	587
North Western Red or Smoky Dent.	Wm. Rennie Seed Co.	34	1,434	5	1,650	21	1,034	4	1,311	28	234	5	481
Improved Leaming	Graham Bros.	39	198	5	1,508	24	595	4	1,362	31	1,397	5	435
Australian White Flint	John A. Bruce & Co.	43	935	6	1,286	18	1,358	3	1,305	31	147	5	346
Early Northern	Dupuy and Ferguson	44	689	5	1,854	20	1,334	4	812	32	1,012	5	333
Early Leaming	Steele Briggs Seed Co.	39	1,560	5	1,209	24	712	4	1,450	32	136	5	330
Pride of the North	Wm. Rennie Seed Co.	34	1,619	4	1,981	22	1,014	5	662	28	1,317	5	322
Improved King Philip	Kenneth McDonald & Sons.	37	1,315	6	542	20	550	4	2	28	1,933	5	272
Dakota	Hector L. Dery	41	1,895	6	794	19	631	3	1,691	30	1,263	5	243
Disco Longfellow	Dakota Improved Seed Co.	44	1,001	6	1,360	18	1,235	3	1,100	31	118	5	230
Cuban Giant	Graham Bros.	42	431	6	867	20	1,311	3	1,464	31	871	5	166
Minnesota No. 13	John A. Bruce & Co.	38	934	5	1,922	20	311	4	248	29	623	5	85
Improved Leaming	John A. Bruce & Co.	41	205	5	1,105	24	1,883	4	1,057	33	44	5	81
Eureka	Steele Briggs Seed Co.	50	1,073	6	564	22	1,898	3	1,554	36	1,486	5	59
Compton's Early	John A Bruce & Co.	37	571	5	35	24	1,295	5	53	30	1,933	5	44
King Philip	Dupuy and Ferguson	36	334	5	922	22	1,512	4	1,142	29	923	5	32
Improved Leaming	Wm. Rennie Seed Co.	37	1,234	5	1,809	18	602	4	202	27	1,918	5	6
Longfellow	Wm. Ewing Seed Co.	44	1,317	6	674	19	1,625	3	1,332	32	471	5	3
Pride of Nishna	Kenneth McDonald & Sons.	43	1,191	6	761	19	1,431	3	1,103	31	1,311	4	1,932
Longfellow	Hector L. Dery	44	1,113	6	1,474	15	1,053	3	355	30	83	4	1,915
Longfellow	Steele Briggs Seed Co.	50	489	6	1,719	16	618	3	51	33	554	4	1,885
Leaming Fodder	Graham Bros.	38	1,559	5	1,485	23	1,990	4	136	31	775	4	1,811
Smoky Dent	John A. Bruce & Co.	29	400	5	155	19	295	4	1,379	24	348	4	1,767
North Dakota	Graham Bros.	41	814	5	1,668	21	741	3	1,797	31	778	4	1,733
White Cap Yellow Dent	Dupuy and Ferguson	37	1,717	5	1,781	18	64	3	1,682	27	1,891	4	1,732
Red Cob	Hector L. Dery	43	1,083	6	96	23	369	3	1,275	33	726	4	1,686
Mammoth Southern or Giant White Ensilage.	Graham Bros.	35	1,769	6	369	15	376	3	985	25	1,073	4	1,677
Lancaster	U.S. Dept. of Agriculture and Hoffman.	42	1,988	5	1,750	20	1,854	3	1,544	31	1,921	4	1,647
Selected Red Cob Ensilage.	John A. Bruce & Co.	36	1,086	4	1,793	25	1,633	4	1,417	31	360	4	1,605
Reid's Yellow Dent	John A. Bruce & Co.	42	274	5	1,294	19	414	3	1,732	30	1,344	4	1,513
Sanfords	Hector L. Dery	34	1,517	5	227	21	1,914	4	728	28	716	4	1,478
Sugar Fodder (sweet fodder).	Graham Bros.	32	1,971	4	810	26	1860	4	1,967	29	1,816	4	1,389
Hybrid	A. Wimple	37	152	5	1,018	15	1,800	3	1,705	26	976	4	1,362
Improved Leaming	Wm. Ewing	36	379	5	1,156	16	1,927	3	1,525	26	1,153	4	1,341
Mammoth Cuban Yellow Dent.	Steele Briggs Seed Co.	33	1,872	4	1,727	19	1,858	4	917	26	1,865	4	1,322
Perry's Hybrid	Wm. Ewing	33	696	4	1,640	20	1,155	4	917	26	1,926	4	1,279
Golden Glow	John A. Bruce	36	762	5	1,356	17	1,409	3	1,190	27	86	4	1,273
Leaming	Dakota Improved Seed Co.	32	1,313	5	389	18	1,911	4	129	25	1,612	4	1,259
Queen of Nishna	Graham Bros.	36	1,438	5	1,417	19	795	3	1,080	28	117	4	1,249
Giant Prolific Sweet Ensilage.	Steele Briggs Seed Co.	28	1,448	4	1,084	26	1,754	4	1,335	27	1,601	4	1,210
White Cap Yellow Dent	Steele Briggs Seed Co.	32	1,806	5	753	16	480	3	1,560	24	1,143	4	1,157
Eureka	J. Harris	44	265	5	1,013	21	1,320	3	1,196	32	1,793	4	1,105
Ordinary Leaming	Wm. Ewing	30	136	4	1,798	21	1,572	4	362	25	1,604	4	1,080
North Dakota	Steele Briggs	32	1,265	4	1,316	24	834	4	714	28	1,050	4	1,015
White Cap Yellow Dent	Graham Bros.	30	164	4	1,523	16	1,326	4	488	23	745	4	1,006
Red Cob Selected	Kenneth McDonald & Sons.	36	436	4	1,734	20	1,330	4	246	28	883	4	990
Rainbow Flint	Oscar Will & Co.	33	660	5	713	18	653	3	1,190	25	1,657	4	952
Longfellow	J. O. Duke	35	923	5	219	19	57	3	1,660	27	490	4	940
North Dakota	Dupuy and Ferguson	22	124	4	658	23	306	4	1,220	22	1,215	4	939
Compton's Yellow Flint	Steele Briggs Seed Co.	39	805	5	720	17	1,854	3	1,142	28	1,330	4	931
Red Cob Ensilage	Steele Briggs Seed Co.	37	962	5	285	22	133	3	1,563	29	1,548	4	924
Red Cob	Wm. Ewing Seed Co.	37	542	4	1,972	21	1,276	3	1,851	29	909	4	912
Leaming	John Parks	31	1,217	4	1,477	20	1,315	4	318	26	266	4	898
Wisconsin No. 7	Wm. Rennie Seed Co.	36	1,240	4	1,891	23	969	3	1,886	30	105	4	889
Wisconsin No. 7	John A. Bruce	24	1,583	5	506	19	399	3	1,225	21	1,991	4	866
Golden Glow	Wm. Rennie Seed Co.	37	357	5	1,608	12	1,563	3	87	24	1,960	4	848
Evergreen Sweet Fodder	Wm. Rennie Seed Co.	37	916	4	1,011	23	1,508	4	657	30	1,212	4	834
Stowells	Oscar Will & Co.	41	347	5	344	15	1,922	3	1,315	28	1,135	4	830

TABLE 3.—VARIETY TEST OF FIELD CORN—*Continued*

Variety	Source	Green yield per acre, 1924		Yield dry matter per acre, 1924		Green yield per acre, 1925		Yield dry matter per acre, 1925		Average green yield per acre, 1924–25		Average yield dry matter per acre, 1924–25	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Wisconsin No. 7	Dupuy and Ferguson	31	1,210	4	1,225	20	109	4	402	25	1,660	4	814
White Cap Yellow Dent	Wm. Ewing Seed Co	31	1,804	4	1,433	16	1,638	4	141	24	721	4	787
Burr Learning	Geo. Carter	33	489	4	1,189	22	1,284	4	308	27	1,887	4	749
King Philip	Wm. Rennie Seed Co	34	804	4	1,609	18	1,925	3	1,835	26	1,365	4	722
Twitchell's Pride	Fredericton Exp. Farm	27	175	4	922	19	674	4	448	23	425	4	685
Silver King	U.S. Dept. of Agriculture	29	689	4	1,421	17	1,486	3	1,929	23	1,088	4	675
Wisconsin No. 7	Kenneth McDonald & Sons	28	1,957	4	1,418	17	1,273	3	1,869	23	615	4	644
Sandfords White Flint	Wm. Rennie Seed Co	27	1,741	4	414	24	1,811	4	840	26	776	4	627
Silver King	Dakota Improved Seed Co	25	1,443	3	1,872	20	1,496	4	1,293	23	470	4	583
Northern Prolific	Wm. Rennie Seed Co	37	914	5	687	15	671	3	457	26	793	4	572
Minnesota No. 13	Dakota Improved Seed Co	31	1,005	5	161	15	1	3	913	23	503	4	537
Evergreen Sweet Fodder	John Bruce & Co	36	439	4	1,888	20	90	3	1,123	28	265	4	506
Champion White Pearl	Dupuy and Ferguson	32	846	4	1,963	18	692	3	1,045	25	769	4	504
Evergreen	Dupuy and Ferguson	38	1,383	4	1,944	19	398	3	1,035	28	1,891	4	490
Early Smoky Dent	Graham Bros	24	1,310	4	482	16	532	4	481	20	921	4	482
Disco 90 Day White Dent	Dakota Improved Seed Co	27	735	4	619	17	140	4	288	22	438	4	454
Yellow Dent	A. Wimple	34	15	4	1,767	16	1,165	3	1,115	25	590	4	441
Early Murdock	Dakota Improved Seed Co	28	1,594	4	860	15	1,321	3	1,974	22	458	4	417
Evergreen Sweet Fodder	Kenneth McDonald & Sons	34	226	4	810	21	1,051	3	1,979	27	1,639	4	400
Compton's Early	J. O. Duke	30	128	4	471	23	1,161	4	292	26	1,645	4	382
Angel of Midnight	Wm. Rennie Seed Co	29	1,873	4	1,448	18	1,931	3	1,236	24	902	4	342
Giant Southern Sweet	Wm. Ewing Seed Co	35	23	4	1,178	21	887	3	1,442	28	445	4	310
Wisconsin No. 7	Graham Bros	31	224	4	1,268	15	1,014	3	1,265	23	619	4	267
Learning	J. O. Duks	31	408	4	1,684	14	1,310	3	821	22	1,859	4	256
White Cap Yellow Dent	Wm. Rennie Seed Co	26	366	4	573	16	509	3	1,898	21	438	4	236
Bailey	Wm. Rennie Seed Co	28	683	4	611	15	254	3	1,844	21	1,469	4	228
Compton's Early	Wm. Rennie Seed Co	29	809	4	744	17	1,907	3	1,687	23	1,358	4	215
North Western Dent (red)	Dakota Improved Seed Co	24	1,634	4	459	15	304	3	1,706	19	1,989	4	83
Wisconsin No. 7	Wm. Ewing Seed Co	23	709	4	512	20	995	3	1,512	21	1,852	4	12
Northwestern Dent (Neb. grown)	A. E. McKensie Seed Co	19	600	3	1,119	23	754	4	606	21	722	3	1,863
Golden Glow	University of Wisconsin	23	1,532	4	710	13	741	3	973	18	1,137	3	1,842
Learning Fodder	Kenneth McDonald & Sons	30	1,042	4	1,454	11	1,637	3	98	20	1,710	3	1,776
Learning	Hector L. Dery	24	437	3	842	27	640	4	658	25	1,539	3	1,750
Angel of Midnight	Steels Briggs Seed Co	36	1,523	4	1,366	15	674	3	43	26	99	3	1,705
Wisconsin No. 7	John Parks	31	811	4	1,156	13	1,495	3	247	22	1,153	3	1,702
Stowell's Evergreen Sugar	Wm. Ewing Seed Co	30	668	3	1,711	21	1,355	3	1,638	26	12	3	1,675
Red Cob	Dupuy and Ferguson	33	1,171	4	839	18	1,161	3	508	26	166	3	1,674
Wisconsin No. 7	J. O. Duke	27	1,732	4	158	14	1,133	3	1,184	21	433	3	1,671
Wisconsin No. 7	Hector L. Dery	22	1,343	3	1,034	20	907	3	1,847	21	1,125	3	1,441
Bailey	J. O. Duke	24	1,384	3	1,514	15	616	3	1,365	20	....	3	1,440
Yellow Ensilage	A. E. McKensie	22	1,482	3	1,423	17	47	3	1,290	19	1,765	3	1,357
Golden Glow	J. O. Duke	25	786	3	1,579	16	817	3	1,118	20	1,802	3	1,349
Golden Glow	Steele Briggs Seed Co	24	1,255	4	28	15	1,172	3	616	20	214	3	1,322
Mandan King	Oscar Will & Co	25	202	4	1,236	13	836	2	1,276	19	519	3	1,256
Golden Glow	Kenneth McDonald & Sons	23	1,325	3	1,882	17	1,362	3	628	20	1,344	3	1,255
Pride of the North	Dakota Improved Seed Co	19	1,212	3	357	14	251	3	1,784	16	1,732	3	1,071
North Western Dent	Oscar Will & Co	21	769	3	1,724	13	755	3	26	17	762	3	875
Canada Yellow Flint (Que. 28)	Dupuy and Ferguson	24	196	4	834	11	1,597	2	903	17	1,897	3	869
Quebec No. 28	Dr. Todd	19	1,493	3	1,674	12	47	2	1,524	15	1,770	3	649
Dakota Gold	Oscar Will & Co	20	122	3	1,819	14	764	2	1,227	17	443	3	523
North Western Dent	Brandon Exp. Farm	15	1,627	3	317	12	589	3	364	14	104	3	341
Gehu	Dakota Improved Seed Co	16	1,619	3	776	14	530	2	1,675	15	1,075	3	226
North Western Dent (N.D. grown)	A. E. McKensie	18	1,964	3	520	13	1,688	2	1,909	16	826	3	215
Minnesota No. 13	Oscar Will & Co	20	42	3	205	11	531	3	151	15	1,827	3	178
North Dakota White Flint (N.D. grown)	A. E. McKensie	19	1,034	3	206	13	1,239	2	1,726	16	1,137	2	1,966
Gehu (N.D. grown)	A. E. McKensie	15	1,734	2	1,838	15	775	3	63	15	1,255	2	1,951
Amber Flint	A. J. Wimple	22	1,624	3	1,561	10	1,266	2	201	16	1,455	2	1,881
Dakota Flint	Oscar Will & Co	16	1,220	3	952	11	237	2	616	13	1,729	2	1,784
Sweet Fodder	Oscar Will & Co	22	990	3	722	13	372	2	764	17	1,681	2	1,743
Falconer	Oscar Will & Co	13	1,771	2	557	14	1,712	3	814	14	742	2	1,686
Gehu Flint	Oscar Will & Co	13	1,474	2	1,326	14	116	2	1,670	13	1,795	2	1,498
Shota	Oscar Will & Co	17	1,716	2	1,807	11	262	2	1,146	14	989	2	1,477
Assiniboine Yellow Sweet	Oscar Will & Co	22	1,067	2	1,602	10	709	2	513	16	888	2	1,058
Pioneer	Oscar Will & Co	14	43	2	401	11	1,242	2	1,386	12	1,643	2	894
Burleigh	Oscar Will & Co	13	1,480	1	1,399	14	759	2	1,758	14	120	2	579
Ivory King	Oscar Will & Co	11	1,812	2	5	12	181	2	1,136	11	1,997	2	571
Howe's Alberta Flint	University of Alberta	5	1,037	1	44	6	1,921	1	1,943	6	479	1	994
Dakota White Flint	Oscar Will & Co	68	1,349	9	778	..	....	..	....	..	....	..	....
Early Canada Yellow	Wm. Ewing Seed Co	47	1,737	7	1,096	..	....	..	....	..	....	..	....
North Dakota	Kenneth McDonald & Sons	46	83	6	429	..	....	..	....	..	....	..	....
Southern White Champion	Hector L. Dery	44	280	6	150	..	....	..	....	..	....	..	....
King Philip	Wm. Ewing	36	1,376	5	1,431	..	....	..	....	..	....	..	....
White Cap Yellow Dent	Kenneth McDonald & Sons	32	1,892	5	1,308	..	....	..	....	..	....	..	....
White Cap Yellow Dent	John A. Bruce	36	1,212	5	1,149	..	....	..	....	..	....	..	....
Black Mexican Sugar	Wm. Ewing Seed Co	37	152	5	660	..	....	..	....	..	....	..	....
Sandfords White Flint	Wm. Ewing Seed Co	35	734	5	469	..	....	..	....	..	....	..	....
King Phillp	Hector L. Dery	32	1,510	5	242	..	....	..	....	..	....	..	....

TABLE 3.—VARIETY TEST OF FIELD CORN—*Concluded*

Variety	Source	Green yield per acre, 1924		Yield dry matter per acre, 1924		Green yield per acre, 1925		Yield dry matter per acre, 1925		Average green yield per acre, 1924–25		Average yield dry matter per acre, 1924–25	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Compton's Early	Kenneth McDonald & Sons.	32	126	4	1,780	..	....	..	....	..	....	..	....
Early Eureka	John A. Bruce	33	389	4	1,332	..	....	..	....	..	....	..	....
Reid's Yellow Dent	Kenneth McDonald & Sons.	32	1,479	4	1,325	..	....	..	....	..	....	..	....
Twitchell's Pride	G. M. Twitchell	30	1,457	4	1,274	..	....	..	....	..	....	..	....
Early Compton	Wm. Ewing Seed Co.	29	799	4	1,244	..	....	..	....	..	....	..	....
Smoky Dent	Kenneth McDonald & Sons.	26	835	4	1,182	..	....	..	....	..	....	..	....
Reid's Yellow Dent	Dakota Improved Seed Co.	30	1,514	4	781	..	....	..	....	..	....	..	....
Improved Squaw	A. E. McKenzie Seed Co.	17	1,163	3	1,558	..	....	..	....	..	....	..	....
Disco Pride Yellow Dent	Dakota Improved Seed Co.	19	1,793	3	1,224	..	....	..	....	..	....	..	....
Minnesota No. 13 (N.D. grown).	A. E. KcMenzie	17	876	2	1,946	..	....	..	....	..	....	..	....
Dakota White Flint	Oscar Will & Co	17	522	2	1,523	..	....	..	....	..	....	..	....
Hall's Golden Nugget	Jos. Harris	..	....	..	....	30	1,282	6	481	..	....	..	....
Sweepstakes	Jos. Harris	..	....	..	....	28	1,699	6	281	..	....	..	....
Dakota White Flint	John A. Bruce	..	....	..	....	27	593	5	560	..	....	..	....
White Cap Yellow Dent	J. O. Duke	..	....	..	....	20	318	4	1,399	..	....	..	....
Silver King	University of Wisconsin	..	....	..	....	17	1,409	4	485	..	....	..	....
Disco Special	Dakota Improved Seed Co.	..	....	..	....	18	525	4	312	..	....	..	....
Davis Improved Early Huron.	Jos. Harris	..	....	..	....	13	1,117	3	1,938	..	....	..	....
Minnesota No. 13 (Nebraska grown).	A. E. McKenzie Seed Co.	..	....	..	....	22	559	3	1,917	..	....	..	....
Minnesota No. 13 (Minn. grown).	A. E. McKenzie Seed Co.	..	....	..	....	16	956	3	1,704	..	....	..	....
Stowell's Evergreen	Steele Briggs Seed Co.	..	....	..	....	22	678	3	1,684	..	....	..	....
Bailey	Dupuy and Ferguson	..	....	..	....	19	653	3	1,349	..	....	..	....
Longfellow	R. J. Johnston	..	....	..	....	16	1,753	3	750	..	....	..	....
Bailey	Darcy Bondy	..	....	..	....	14	940	3	716	..	....	..	....
Cold Resistant Golden Glow.	University of Wisconsin	..	....	..	....	12	1,234	3	275	..	....	..	....
Alta Corn	Dakota Improved Seed Co.	..	....	..	....	12	1,863	3	123	..	....	..	....

It will be noticed in table 3 that the yields of both green and absolute dry matter are much higher in 1924 than in 1925. This is due to the fact that the 1924 planting was made on an exceptionally rich piece of bottom-land that had also received a heavy application of barnyard manure.

Perhaps the most striking thing about the yielding powers of the different lots, as represented by the average dry matter secured in 1924-25, is the wide divergence in yields secured from lots having the same variety name but secured from different sources. Thus, Northwestern Dent may vary as much as two weeks and a half in time of maturity and almost a ton in yield of dry matter per acre depending on the source from which it is secured. Many other varieties show the same tendency and indicate the necessity of a classification of corn which will give some recognition to the time of maturity of the different strains of the so-called varieties.

Another noteworthy feature of table 3 is the fact that a high yield of green material is not always associated with a correspondingly high yield of absolute dry matter per acre. A variety or strain of corn that will come reasonably near to maturity seems to be preferable to an apparently heavier yielding lot that sometimes does not even form ears. For the Ottawa district, varieties of the Longfellow type and maturity requirements seem to be quite satisfactory.

SOYBEANS

Seventeen varieties of soybeans were tested at the Harrow, Ont. Experimental Station in 1924, while twenty varieties were included in the test in 1925. In both years, the yields of fodder and of beans was obtained, the results for 1925 and the average for the two years being given in table 4. Apparently both weather and soil conditions were very favourable for production of fodder and beans in 1925 and the yields for that year are somewhat above the average. Further testing is necessary in order that definite conclusions as to the relative merits of the varieties can be drawn.

TABLE 4.—SOYBEANS—YIELD PER ACRE OF BEANS AND FODDER FOR 1925 AND AVERAGE FOR TWO YEARS, 1924–1925

Variety	Source	Days to maturity	Seasonal group	Relative position in group	Fodder				Seed			
					Green weight		Moisture-free dry weight		As harvested		Moisture-free dry weight	
					1925	Average 2 years, 1924–25	1925	Average 2 years, 1924–25	1925	Average 2 years, 1924–25	1925	Average 2 years, 1924–25
					tons lb.	tons lb.	tons lb.	tons lb.	bush.	bush.	bush.	bush.
No. 92 Ste. Annes	Macdonald College, Que	111	2	1	3 425	3 247	.. 1,485	.. 1,477	13·9	13·3	11·9	11·7
Mandarin	United States Dept. of Agriculture	116	3	1	4 542	.. ....	1 188	.. ....	18·2	.. ..	16·0	.....
O. A. C. No. 81	Ontario Agricultural College, Guelph	118	3	2	5 713	4 1,133	1 511	1 298	20·6	17·8	17·9	15·8
Yellow 210	China	118	3	3	4 476	3 1,880	1 1,894	1 1,892	22·2	18·3	19·5	16·3
Summerland	Experimental Farm, Summerland, B.C.	119	3	3	6 1,156	5 745	1 673	1 438	16·6	15·1	14·6	13·4
Yellow 17	China	120	3	4	5 1,049	4 1,306	1 546	1 286	23·5	20·2	20·9	18·0
Black (China)	China	120	3	4	5 1,283	4 1,693	4 1,399	1 259	17·6	16·8	15·2	14·8
Chinaton Echo	China	120	3	4	5 1,621	4 1,507	1 761	1 192	20·0	17·4	17·4	15·4
Italian	(?)	120	3	4	7 335	.. ....	1 1,406	.. ....	30·9	.....	27·0	.....
O. A. C. No. 211	J. O. Duke, Ruthven, Ont.	121	4	1	5 116	.. ....	1 703	.. ....	22·5	.....	19·0	.....
Early Korean	China	121	4	1	6 1,078	5 647	1 617	1 425	24·3	21·3	21·1	18·7
Green	J. Noble, Harrow, Ont.	121	4	1	5 1,331	4 1,325	1 620	1 340	25·2	22·4	22·0	19·8
Manchu	Dakota Improved Seed Co.	122	4	2	6 1,758	5 1,172	1 1,140	1 765	31·2	24·8	27·0	21·8
Ito San	J. Noble	122	4	2	7 900	5 1,758	1 1,120	1 720	27·4	22·2	24·0	19·6
Black Eyebrow	Dakota Improved Seed Co	122	4	2	7 1,465	6 73	1 1,238	1 802	34·5	26·7	30·0	23·6
Golden	J. Noble	123	4	3	7 238	5 1,444	1 1,238	1 842	32·9	25·5	29·0	22·7
A. K	United States Dept. of Agriculture	128	5	1	7 779	.. ....	1 1,441	.. ....	29·7	.....	26·0	.....
Hoosier	United States Dept. of Agriculture	132	5	2	8 1,589	.. ....	2 179	.. ....	35·4	.....	30·0	.....
Hollybrook	Dakota Improved Seed Co.	133	5	3	6 1,058	5 962	1 1,103	1 849	24·7	20·1	20·0	16·9
Black Beauty	China ?	136	6	1	8 361	.. ....	1 1,629	.. ....	30·1	.....	25·0	.....

NOTE.—Add 10 p.c. moisture to yields of moisture-free dry-weight seed to obtain air-dry-weight yields.

BROOM CORN

Four varities of Broom Corn were grown at the Harrow, Ont. Experimental Station in 1924 and 1925 for the purpose of finding whether or not this crop could be successfully grown for raising brush for brooms and whisks. The varieties tested gave brush which might be suitable for making whisks. None of them, however, gave brush sufficiently long and desirable for the making of brooms. The seed of some extra-long brush varieties is being imported, and an endeavour will be made to develop types with sufficiently long brush for the manufacture of brooms.

SUNFLOWERS

Ten lots of sunflowers were tested in 1924, and eleven lots in 1925, ten of which were the same as those tested in 1924. These different lots were tested for yield of dry matter and general suitability. Table 5 gives the yield of both green material and total dry matter obtained from the various lots under test.

TABLE 5.—SUNFLOWER VARIETIES

Variety	Source	Green yield per acre, 1924		Yield dry matter per acre, 1924		Green yield per acre, 1925		Yield dry matter per acre, 1925		Average green yield per acre, 1924–25		Average yield dry matter per acre, 1924–25	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Manchurian	C.P.R.	30	1,205	2	1,404	24	309	4	174	27	757	3	789
Russian Giant	Dakota Improved Seed Co.	25	1,904	2	1,009	31	1,131	4	182	28	1,518	3	596
Manteca	C.P.R.	35	1,565	2	1,632	27	798	3	107	31	1,182	2	1,870
Black	C.P.R.	30	1,317	2	194	28	1,123	3	1,363	29	1,220	2	1,779
Mixed	C.P.R.	30	1,889	1	1,843	29	1,174	3	1,531	30	532	2	1,687
Mammoth Russian	K. McDonald & Son	24	1,193	1	1,911	28	813	3	1,314	26	1,003	2	1,613
Ottawa No. 76	C.E.F., Ottawa	25	1,562	2	37	25	1,602	3	705	25	1,582	2	1,371
Mammoth Russian	C.P.R.	31	704	2	483	25	1,442	3	54	28	1,073	2	1,269
Manchurian	A. E. McKenzie	24	1,399	2	293	23	1,931	3	245	24	656	2	1,269
Mennonite	Rosthern Experimental Farm	21	347	1	1,485	16	442	1	1,977	18	1,395	1	1,731
Mammoth Russian	Wm. Ewing	..	....	..	....	30	687	4	82	..	....	..	....

The yields of dry matter secured as indicated by the average for 1924 and 1925 show that there is not a great deal of choice betwen the larger-growing types of sunflowers.

The published feeding-results to date do not indicate much difference between the feeding-values of sunflowers cut from the time that blossoming has commenced until the head is well on to maturity. This being the case, the variety that will develop as far as the blossoming stage and that will produce the heaviest yield of dry matter per acre would seem to be the best variety to grow. In most cases the Mammoth Russian (also called Giant Russian, Russian Giant, etc.) and Manchurian types will be found to be the best of the varieties of which seed is available commercially.

FIELD ROOTS

Mangels

The classification of mangel varieties offered for sale in Canada was continued in 1924 and 1925. The same general principle was followed as was outlined in the 1923 Annual Report of the Forage Plant Division. A few minor corrections have been made in the different ratios established in 1923 for the mangel types, but the types as established still remain approximately the same.

Table 6 gives the relative yields and purity analyses of one hundred and seventy lots of mangels tested in 1924 and of one hundred and forty lots tested in 1925. The various types reported are those established by the classification submitted in 1923. The colours of skin and flesh were determined by direct comparison with those contained in Ridgeways Classification and Nomenclature of Colours.

TABLE 6.—VARIETY

Variety	Source	Relative yield, 1924	Relative yield, 1925	Average relative yield, 1924–1925	Predominating type	Colour of skin
						Above ground
Giant Yellow Intermediate.	John A. Bruce.....	84·1	132·3	108·2	Intermediate.	Olive yellow to olive ocher, grading to pale smoky gray.
Barres Oval.....	General Swedish Seed Co.	81·2	125·4	103·3	Intermediate.	Olive yellow to olive ocher, grading to pale smoky gray.
Yellow Intermediate....	Central Experimental Farm, Ottawa.	100·0	100·0	100·0	Intermediate.	Olive yellow to olive ocher, grading to pale smoky gray.
(Mammoth) Long Red..	Harris McFayden.....	71·0	126·6	98·8	Long.....	Nopal red, grading into pale smoky gray.
Yellow Glove.....	K. McDonald & Sons...	106·2	88·6	97·4	Globe.....	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Rose Sugar.....	John A. Bruce.....	79·9	114·9	97·4	Half Long....	Old rose, grading into Japan rose and pale smoky gray.
Giant Sugar.....	Wm. Rennie.....	79·8	112·8	96·3	Half Long....	Old rose, grading into Japan rose and pale smoky gray.
Peerless.....	A. E. McKenzie.....	80·5	111·8	96·2	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Half Sugar.....	K. McDonald & Sons...	87·4	104·4	95·9	Half Long....	Old rose, grading into Japan rose and pale smoky gray.
Rosted Barres.....	Hjalmar Hartmann & Co.	77·1	114·6	95·9	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Red Half Sugar.....	Harris McFayden Co...	82·3	106·8	94·6	Half Long....	Old rose, grading into Japan rose and pale smoky gray.
Red Globe.....	John A. Bruce.....	81·7	106·5	94·1	Globe.....	Nopal red, grading into pale smoky gray.
Giant White Feeding...	J. Buce.....	83·3	103·4	93·4	Half Long....	Lime green, grading into pale smoky gray.
Danish Sludstrup.....	Graham Bros.....	72·1	114·4	93·3	Intermediate.	Olive yellow to olive ocher, grading to pale smoky gray.
Royal Giant Sugar Beet	Steele Briggs.....	78·8	107·2	93·0	Half Long....	Old rose, grading into Japan rose and pale smoky gray.
Leviathian.....	Wm. Rennie.....	109·3	76·5	92·9	Intermediate.	Nopal red, grading into pale smoky gray.
Improved Giant Sugar..	Wm. Rennie.....	90·2	95·1	92·7	Intermediate.	Old rose, grading into Japan rose and pale smoky gray.
Yellow Leviathian.....	John A. Bruce.....	64·0	120·7	92·4	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Large Yellow Globe....	John A. Bruce.....	66·1	118·6	92·4	Globe.....	Flame scarlet, grading into pale smoky gray.
Giant Yellow Intermediate.	Steele Briggs.....	100·9	82·5	91·7	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant White Sugar.....	Wm. Rennie.....	81·6	101·3	91·5	Half Long....	Lime green, grading into pale smoky gray.
Eckendorffer Yellow....	Hjalmar Hartmann & Co.	69·9	113·1	91·5	Tankard.....	Olive yellow to olivs ocher, grading into pale smoky gray.
Jumbo (white) Sugar Beet.	Wm. Rennie.....	92·6	90·1	91·4	Half Long....	Lime green, grading into pale smoky gray.
Long Red Mammoth...	Graham Bros.....	67·4	114·4	90·9	Long.....	Nopal red, grading into pale smoky gray.
Perfection Mammoth Long Red.	Wm. Rennie.....	92·6	88·7	90·7	Half Long....	
Yellow Globe.....	Dupuy & Ferguson...	51·1	130·1	90·6	Globe.....	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Yellow Globe....	Wm. Rennie.....	70·8	109·7	90·3	Globe.....	Olive yellow to olive ocher, grading into pale smoky gray.

TEST MANGELS

Colour of skin — Below ground	Colour of flesh	Colour of top	Remarks
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	5·13% Long, 2·56% Tankard, 0·85% Globe, 7·69 Prongy, 0·85% cracked, 4·27% off coloured, 1·97% multiple topped.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	6·67% Globe, 2·86% Long, 2·86% Tankard, 4·76% cracked, 3·81% off coloured, 0·95% multiple topped.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	4·27% Globe, 1·71% Long, 0·85% Tankard, 4·27% Prongy, 3·42% cracked, 2·56% off coloured, 0·85% multiple topped.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	12·37% Intermediate, 6·19% prongy, 1·03% cracked.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	8·96% Intermediate, 1·49% Tankard, 1·49% cracked, 2·24% off coloured.
White grading into old rose.	White	Forest green, with lower parts of stems showing tinge of old rose.	13·43% Intermediate, 4·48% Long, 2·24% Tankard, 2·99% off coloured, 4·48% prongy, 3·73% cracked.
White grading into old rose	White	Forest Green, with Lower parts of stems showing tinge of old rose.	9·56% Long, 8·82% Intermediate, 3·69% Tankard, 2·94% Globe, 0·74% cracked, 0·74% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	4·10% Long, 3·28% Globe, 1·64% Tankard, 2·46% off coloured, 1·64% multiple topped.
White grading into old rose.	White	Forest green with lower parts of stems showing tinge of old rose.	13·71% Intermediate, 5·65% Tankard, 1·61% Long, 7·26% prongy, 1·61% cracked, 4·03% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	8·47% Long, 6·78% Tankard, 0·85% Globe, 1·69% prongy, 5·93% cracked, 1·69% off coloured.
White grading into old rose.	White	Forest green, with lower parts of stems showing tinge of old rose.	18·46% Intermediate, 1·54% Long, 4·62% off coloured, 3·08% prongy, 0·77% cracked.
Nopal red	White with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	7·50% Intermediate, 2·50% Tankard, 1·67% cracked, 1·67% off coloured.
White	White	Forest green	8·82% Intermediate, 2·94% Long, 2·94% Half Sugar Rose, 1·47% Tankard, 0·74% Globe, 2·21% prongy, 0·74% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	11·22% Long, 6·12% Tankard, 6·12% prongy, 0·91% off coloured, 13·27% multiple topped, 2·04% cracked.
White grading into old rose.	White	Forest green with lower parts of stem showing tinge of old rose.	9·52% Intermediate, 3·17% Long, 0·79% Tankard, 3·17% prongy, 2·38% cracked
Nopal red	White with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	6·61% Long, 2·48% Tankard, 5·79% Globe, 3·81% prongy, 1·65% cracked, 1·65% multiple topped, 1·65% off coloured.
White grading into old rose.	White	Forest green with lower parts of stems showing tinge of old rose.	37·39% Intermediate, 5·22% Long, 1·74% prongy, 0·87% cracked, 0·87% off coloured.
Wax yellow	White	Inner leaves showing stem and veins with cadmium yellow. Remaining part, green.	8·70% Globe, 6·96% Long, 1·74% Tankard, 8·70% prongy, 0·87% cracked, 6·09% off coloured, 6·96% multiple topped.
Flame scarlet	White with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	21·48% Intermediate, 7·41% Tankard, 0·74% off coloured.
Wax yellow	White	Inner leaves shnwing stems and veins with cadmium yellow. Remaining part, green.	16·15% Long, 4·62% Tankard, 2·31% Globe, 4·62% prongy, 2·31% cracked, 10·77% off coloured.
White	White	Forest green	12% Intermediate, 8% Long, 5·60% Globe, 5·60 %Tankard, 0·80% cracked.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	1·61% Long, 4·03% cracked.
White	White	Forest green	27·05% Intermediate, 4·92% Long, 2·46% Tankard, 1·64% Globe, 4·10% prongy, 1·64% off coloured.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	11·11% Half-long, 6·35% Intermediate, 0·79% Half-long Yellow, 2·38% prongy, 1·59% cracked, 1·59% multiple topped. 21·09% Long, 2·34% Intermediate, 4·69% prongy, 0·78% cracked, 1·56% multiple topped.
Cadmium orange	White, with traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	11·22% Tankard, 23·47% Intermediate, 9·18% cracked.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	23·31% Intermediate, 3·01% Tankard.

TABLE 6.—VARIETY TEST

Variety	Source	Relative yield, 1924	Relative yield, 1925	Average relative yield, 1924–1925	Predominating type	Colour of skin: Above ground
Barres Half Long	General Swedish Seed Co.	92·7	87·9	90·3	Intermediate.	Olive yellow to olive ochre, grading into pale smoky gray.
Yellow Eckendorffer	General Swedish Seed Co.	84·4	95·4	89·9	Tankard	Olive yellow to olive ochre, grading into pale smoky gray.
Yellow Leviathian	Steels Briggs	73·1	105·9	89·5	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Gatepost	John A. Bruce	85·8	92·2	89·0	Long	Nopal red, grading into pale smoky gray.
Giant Red Sugar	John A. Bruce	77·6	98·9	88·3	Intermediate.	Nopal red, grading into pale smoky gray.
Giant Sugar Beet or Half Sugar White.	Dupuy & Ferguson	82·5	93·0	87·8	Half Long	Lime green, grading into pale smoky gray.
(Mammoth) Long Red.	Halifax Seed Co	74·4	100·8	87·6	Long	Nopal red, grading into pale smoky gray.
Mammoth Prize Long Red.	K. McDonald	86·2	88·8	87·5		Nopal red, grading into pale smoky gray.
Giant White Half Sugar	Wm. Ewing	71·5	102·5	87·0	Half Long	Lime green, grading into pale smoky gray.
Red Globe	Wm. Ewing	71·6	100·6	86·1	Globe	Nopal red, grading into pale smoky gray.
Champion Yellow Globe	Graham Bros	81·9	89·4	85·7	Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Golden Tankard	Halifax Seed Co	82·1	89·0	85·6	Intermediate.	Flame scarlet, grading into pale smoky gray.
White Red Top Half Sugar.	Hjalmar Hartmann Co.	84·2	87·0	85·6	Half Long	Old rose grading into Japan rose, and pale smoky gray.
Eclipse	A. E. McKenzie	70·3	100·6	85·5	Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
Elvethan Mammoth	Hjalmar Hartmann Co.	65·1	105·8	85·5	Long	Nopal red, grading into pale smoky gray.
Danish Sludstrup	Wm. Ewing	77·6	92·7	85·2	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Long Yellow	Dupuy & Ferguson	71·7	98·5	85·1	Long	Olive yellow to olive ocher, grading into pale smoky gray.
Devon Yellow Globe	Suttons, England	72·0	98·1	85·1	Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Svalof Original Alfa	General Swedish Seed Co.	79·8	90·2	85·0	Half Long	Lime green, grading into pale smoky gray.
Mammoth Red Intermediate.	John A. Bruce	84·3	85·5	84·9	Intermediate.	Nopal red, grading into pale smoky gray.
Long Red Mammoth	Wm. Ewing	71·5	98·3	84·9	Long	Nopal red, grading into pale smoky gray.
Ideal	Wm. Rennie	80·0	89·8	84·9	Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
Monarch Sugar	A. E. McKenzie	84·3	85·2	84·8	Half Long	Lime green, grading into pale smoky gray.
Golden Tankard	Wm. Rennie	85·2	83·9	84·6	Intermediate.	Flame scarlet, grading into pale smoky gray.
Golden Globe	Suttons	61·5	106·4	84·0	Globe	Flame scarlet, grading into pale smoky gray.
Yellow Intermediate	Suttons	70·0	97·3	83·7	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.

MANGELS—*Continued*

Colour of skin Below ground	Colour of flesh	Colour of top	Remarks
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	4·84% Long, 2·42% prongy, 1·61% cracked, 4·03% off coloured, 1·61% multiple topped.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	0·94% Intermediate, 0·94% cracked, 2·83% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	5·13% Tankard, 2·56% Long, 2·56% Globe, 2·56% Half Long, 1·92% cracked, 5·13% off coloured.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	16·22% Intermediate, 5·41% prongy, 0·90% Tankard, 0·90% Half Sugar White.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	15·91% Half Long, 3·79% Globe, 1·52% Tankard, 0·76% Long, 3·79% off coloured.
White	White	Forest green	25·38% Intermediate, 14·62% Globe, 1·54% Rose Intermediate, 0·77% Yellow Intermediate, 5·38% prongy, 3·08% multiple topped, 2·31% cracked.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	8·45% Half Long, 2·82% Tankard, 0·70% Globe, 0·70% Intermediate, 4·93% prongy, 0·70% cracked, 0·94% Tankard, 2·83% multiple topped.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	25·47% Long, 20·75% Half Long, 6·60% Intermediate, 0·90% Half Long Rose, 0·94% Intermediate Rose, 0·94% Yellow Intermediate, 0·94% Intermediate White, 0·94% prongy.
White	White	Forest green	19·71% Intermediate, 8·76% Long, 1·46% Tankard, 2·19% prongy, 1·46% cracked.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	0·82% Tankard, 0·82% Flat, 0·82% prongy, 1·64% cracked, 13·93% Intermediate.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	12·41% Intermediate, 0·69% Tankard, 2·07% cracked, 0·69% multiple topped.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	13·85% Long, 2·31% Tankard, 2·31% Globe, 2·31% prongy, 1·54% off coloured, 0·77% cracked, 1·54% multiple topped.
White, grading into old rose.	White	Forest green with lower parts of stems showing tinge of old rose.	6·67% Long, 2·22% Intermediate, 1·48% Tankard, 0·74% Globe, 5·19% prongy, 1·48% cracked, 2·22% off coloured.
Flame scarlet	White, with wide cadmium yellow rings.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	2·73% Intermediate, 1·82% cracked, 0·91% multiple topped.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	14·29% Intermediate, 0·75% Intermediate White, 1·50% Globe, 8·27% prongy, 0·75% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	11·02% Long, 4·24% Globe, 9·32% prongy, 7·63% off coloured, 1·69% Swiss Chard, 2·54% multiple topped, 1·69% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	5·80% Half Long, 0·72% Tankard, 4·49% prongy, 2·17% off coloured, 1·45% cracked.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	17·91% Intermediate, 8·21% Tankard, 3·73% cracked.
White	White	Forest green	11·11% Intermediate, 6·35% Globe, 5·56% Long, 0·79% Tankard, 3·97% prongy.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	6·30% Long, 4·72% Globe, 3·15% Tankard, 0·79% prongy, 3·94% cracked, 0·79% off coloured.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	5·33% Intermediate, 3·33% prongy, 0·67% Globe.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	0·78% Globe, 0·78% Tankard, 1·55% off coloured.
White	White	Forest green	14·39% Intermediate, 6·82% Half Long Rose, 4·55% Long, 0·76% Globe, 5·30% prongy, 1·52% cracked.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	4·97% Tankard, 3·11% Long, 1·86% Long.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	6·02% Intermediate, 2·25% Tankard, 3·76% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	3·97% Globe, 3·31% Long, 2·65% Tankard, 1·99% off coloured.

TABLE 6.—VARIETY TEST

Variety	Source	Relative yield, 1924	Relative yield, 1925	Average relative yield, 1924-1925	Predominating type	Colour of skin: Above ground
Giant White Feeding	Wm. Rennie	75·2	91·9	83·6	Half Long	Lime green, grading into pale smoky gray.
New Ideal	Steele Briggs	86·7	79·1	82·9	Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
White Green Top Half Sugar.	Hjalmar Hartmann Co.	62·8	101·2	82·0	Half Long	Lime green, grading into pale smoky gray.
Mammoth Long Red	Suttons	62·5	101·0	81·8	Long	Nopal red, grading into pale smoky gray.
Fjerritslev Barres	Hjalmar Hartmann Co.	72·2	91·4	81·8	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Sugar White	Graham Bros.	75·1	88·0	81·6	Half Long	Lime green, grading into pale smoky gray.
Danish Sludstrup	Dupuy & Ferguson	78·5	83·8	81·2	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Red Globe	Dupuy & Ferguson	69·9	92·0	81·0	Globe	Nopal red, grading into pale smoky gray.
Golden Tankard	Dupuy & Ferguson	80·0	82·0	81·0	Intermediate.	Flame scarlet, grading into pale smoky gray.
Mammoth Long Red	Steele Briggs	54·9	106·8	80·9	Long	Nopal red, grading into pale smoky gray.
Improved Tankard Cream.	Wm. Rennie	72·9	88·5	80·7		Lime green, grading into pale smoky gray.
Giant White Sugar	Steele Briggs	67·6	93·5	80·6	Half Long	Lime green, grading into pale smoky gray.
Giant Sugar Rose	Graham Bros.	73·3	87·4	80·4	Half Long	Old rose, grading into Japan rose, and pale smoky gray.
Golden Giant Intermediate.	Dupuy & Ferguson	71·4	88·5	80·0	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Golden Tankard	A. E. McKenzie	86·8	72·5	79·7	Tankard	Flame scarlet, grading into pale smoky gray.
Giant Yellow Globe	Steele Briggs	64·2	94·3	79·3	Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Sugar Mangold	Suttons, England	77·5	81·1	79·3	Half Long	Lime green, grading into pale smoky gray.
Prize Mammoth Long Red.	Steele Briggs	66·7	91·6	79·2	Long	Nopal red, grading into pale smoky gray.
Red Eckendorffer	General Swedish Seed Co.	71·9	86·2	79·1	Tankard	Nopal red, grading into pale smoky gray.
Sludstrup Barres	Hjalmar Hartmann Co.	67·3	90·5	78·9	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Golden Tankard	John A. Bruce	58·6	97·7	78·2	Intermediate.	Flame scarlet, grading into pale smoky gray.
Taaroje Barres	Hjalmar Hartmann Co.	85·2	71·0	78·1	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
(Giant) Long Red	A. E. McKenzie	72·4	82·4	77·4	Long	Nopal red, grading into pale smoky gray.
Eckandorffer Red	Hjalmar Hartmann & Co.	86·4	67·0	76·7	Tankard	Nopal red, grading into pale smoky gray.
Long Yellow	Wm. Ewing	72·3	80·9	76·6	Long	Olive yellow to olive ocher, grading into pale smoky gray.
Golden Tankard	Wm. Ewing	84·1	68·3	76·2	Tankard	Flame scarlet, grading into pale smoky gray.
Manitoba Giant Yellow.	A. E. McKenzie	62·0	90·1	76·1	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Select Giant White Sugar.	Ralph Moore	65·0	87·2	76·1	Half Long	Lime green, grading into pale smoky gray.
Special Yellow Globe	Suttons	75·7	76·5	76·1	Globe	Flame scarlet, grading into pale smoky gray.

MANGELS—*Continued*

Colour of skin Below ground	Colour of flesh	Colour of top	Remarks
White	White	Forest green	25·20% Intermediate, 7·09% Long, 2·36% Globe, 2·36% prongy, 0·79% Tankard.
Wax Yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	3·16% Red Tankard, 1·05% Long.
White	White	Forest green	20·51% Tankard, 2·56% Red Tankard, 19·66% Intermediate, 2·56% Globe, 2·56% prongy, 1·71% cracked.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	4·32% Intermediate, 2·88% prongy, 2·16% cracked, 2·16% multiple topped.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	2·90% Long, 3·62% Tankard, 2·17% Globe, 2·90% cracked, 1·45% off coloured.
White	White	Forest green	16·43% Intermediate, 2·14% Globe, 2·14% Long, 1·43% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	25·41% Tankard, 4·10% Long, 2·46% Globe, 6·56% prongy, 2·46% cracked, 0·82% multiple topped, 3·28% off coloured.
Nopal red	White, with begonia rose rings.	Forest green. Stems with varying intensities of begonia rose.	7·56% Intermediate, 2·52% cracked, 0·84% off coloured.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	9·91% Tankard, 1·80% Globe, 0·90% prongy, 0·90% cracked.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	5·63% Intermediate, 2·11% prongy, 0·70% Tankard.
White	White	Forest green	25·85% Half Long, 10·20% Intermediate, 10·20% Long, 2·04% Tankard, 3·40% cracked, 0·68% prongy, 0·68% Globe.
White	White	Forest green	20% Intermediate, 8·33% Long, 4·17% Tankard, 1·67% Globe, 5% prongy, 4·17% cracked.
White, grading into old rose.	White	Forest green, with lower parts of stems showing tinge of old rose.	21·68% Intermediate, 5·59% Long, 3·50% Tankard, 2·10% cracked, 1·40% prongy.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	10·83% Long, 2·50% Tankard, 0·83% prongy, 2·50% cracked, 2·50% off coloured.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow.	21·26% Intermediate, 5·51% Globe, 1·57% Long, 2·36% cracked, 1·57% prongy.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	7·91% Intermediate, 1·44% Tankard, 1·44% off coloured.
White	White	Forest green	22·61 Intermediate, 6·09% Long, 0·87% Globe, 0·87% Tankard, 3·48% cracked, 1·74% prongy.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	8·66% Half Long, 4·72% Intermediate, 1·57% prongy, 1·57% cracked.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	1·72% Intermediate, 0·86% cracked, 0·86% multiple topped, 0·86% off coloured.
Wax yellow	White	Inner leaves showing stem and veins with cadmium yellow. Remaining part, green.	8·87% Long, 4·84% Tankard, 0·81% Globe, 1·61% prongy, 10·48% cracked, 1·61% off coloured, 1·61% multiple topped.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	6·96% Globe, 6·09% Tankard, 4·35% Long, 2·66% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	7·32% Tankard, 2·44% Globe, 1·62% Long, 2·44% pzongy, 8·94% cracked.
Nopal red	White, with begonia rose rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	13·22% Half Long, 4·96% Intermediate, 1·65% Tankard, 0·83% Globe, 1·65% cracked, 1·65% prongy.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	1·41% Globe, 1·41% Intermediate, 0·70% off coloured, 0·70% cracked.
Wax yellow	White	Inner leavee showing stems and veins with cadmium yellow. Remaining part, green.	5·76% Half Long, 2·16% Intermediate, 5·76% prongy, 2·88% off coloured, 0·78% cracked.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow.	23·39% Intermediate, 3·73% Globe, 0·75% off coloured, 4·48% cracked, 0·75% prongy.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	7·14% Half Long, 2·68% Globe, 0·89% Tankard, 4·46% cracked, 1·79% prongy.
White	White	Forest green	16·79% Intermediate, 3·82% Long, 2·29% Globe, 5·34% cracked, 6·11% prongy.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	15·32% Intermediate, 2·42% Tankard, 1·61% cracked, 0·81% off coloured.

TABLE 6.—VARIETY TEST

Variety	Source	Relative yield, 1924	Relative yield, 1925	Average relative yield, 1924–1925	Predominating type	Colour of Skin — Above ground
Red Tankard	K. McDonald & Sons	67·3	84·5	75·9	Tankard	Nopal red, grading into pale smoky gray.
Yellow Intermediate (No. 5312).	Macdonald College	62·8	88·8	75·8	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant White Feeding Sugar.	Steele Briggs	80·2	71·1	75·7	Half Long	Lime green, grading into pale smoky gray.
Yellow Intermediate	A. E. McKenzie	73·1	78·2	75·7	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Yellow Half Long Intermediate.	Wm. Rennie	69·4	80·0	74·7	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Yellow Leveathian	Wm. Rennie	83·9	64·1	74·0	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Yellow Globe	Wm. Ewing	57·4	86·6	72·0	Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Elvethan Long Red	Suttons	57·4	86·3	71·9	Long	Nopal red, grading into pale smoky gray.
Giant Yellow Intermediate.	Halifax Seed Co	83·3	58·8	71·1	Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
Yellow Globe	Steele Briggs	58·0	82·8	70·4	Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Golden Tankard	Sutton's	67·0	70·6	68·8	Intermediate.	Flame scarlet, grading into pale smoky gray.
Golden Flesh Tankard	Steele Briggs	70·4	66·7	68·6	Tankard	Flame scarlet, grading into pale smoky gray.
Red Intermediate	Sutton's	76·5	59·6	68·1	Intermediate.	Flame scarlet, grading into pale smoky gray.
(Improved) Mammoth Long Red.	Dupuy-Ferguson	47·8	87·5	67·6	Long	Nopal red, grading into pale smoky gray.
Giant Yellow Intermediate.	Wm. Ewing	64·4	67·0	65·7	Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
Gatepost Intermediate	Sutton's	62·5	63·5	63·0		Olive yellow to olive ocher, grading into pale smoky gray.
Giant Yellow Intermediate.	K. McDonald & Sons	58·8	64·4	61·6	Tankard	Olive yellow to olive ocher, grading into pals smoky gray.
Devon Yellow Intermediate.	Sutton's	62·5	50·1	56·3	Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
Champion or Gatepost	Halifax Seed Co	46·2	66·2	56·2	Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Mammoth Golden Giant	Graham Bros	103·0				
Select Giant Rose Sugar Beet.	Wm. Ewing	91·9				
Giant Half Sugar	Dupuy & Ferguson	91·4				
Barres Stryno, B.L. 748	Danske Landboforenings, Froforsyning.	88·8				
Wiboltts Rose Giant Half Sugar No. 1918.	Scabdivanian Seed Co., and R. Wiboltt.	88·6				
Giant Yellow Ovoid	Steele Briggs	87·5				
Yellow Intermediate, U.B.C. No. 1.	University of British Columbia.	87·2				
Giant Rose Sugar	A. E. McKenzis	87·1				
Svalof Red	General Swedish Seed Co.	86·8				
Barres Tystofte B. S. 749	Danske Landboforenings, Froforsyning.	85·1				
Danish Sludstrup	Fred. J. James	85·0				
Stryno Barres	Hjalmar Hartmann	83·8				
White Half Sugar	Harris McFayden	83·3				
Wiboltts Sludstrup Yellow.	Scandivanian Seed Co. and R. Wiboltt.	81·5				
Fodderaukkerroe (S.M.) B. S. 760.	Danske Landboforenings, Froforsyning.	81·3				
Yellow Intermediate	United Seed Growers	80·9				
Danish Sludstrup	K. McDonald & Sons	79·0				

MANGELS—*Continued*

Colour of Skin / Below ground	Colour of flesh	Colour of top	Remarks
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	0·85% Intermsdiate, 2·54% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	0·75% Long, 0·75% Globe, 0·75% Tankard, 3·76% cracked.
White	White	Forest green	19·35% Intermediate, 8·87% Long, 4·03% prongy, 3·23% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	1·65% Globe, 1·65% Tankard, 2·48% prongy, 4·96% off coloured, 4·96% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	20·31% Long, 0·78% Tankard, 9·38% prongy, 0·78% off coloured, 0·78% multiple topped, 4·69% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	8·26% Long, 3·31% Tankard, 1·65% Globe, 4·13% cracked, 2·48% off coloured, 2·48% multiple topped.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	13·43% Intermediate, 2·24% Tankard, 2·24% cracked, 0·75% multiple topped, 0·75% off coloured.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	8·09% Intermediate, 5·15% prongy, 0·74% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	20·51% Intermediate, 5·98% Long, 2·56% Globe, 5·13% prongy, 0·85% cracked, 0·85% multiple topped, 0·85% off coloured.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	13·14% Intermediate, 4·38% Tankard, 1·57% cracked, 0·73% multiple topped.
Flame scarlet	White, with cadmium yellow rings	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	3·70% Tankard, 1·48% Long, 2·22% cracked, 1·48% Globe.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow.	31·11% Intermediate, 4·44% Globe, 1·11% Long, 2·22% prongy, 1·11% cracked, 1·11% off coloured.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	7·89% Long, 1·54% Tankard, 3·85% Globe, 0·77% cracked, 0·77% off coloured.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	12·16% Intermediate, 1·35% multiple topped, 0·68% Sugar Beet, 0·68% prongy, 0·68% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	11·20% Intermediate, 4% Globe.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirsly forest green. Very slight tint of cadmium yellow on young leaves.	8·66% Long, 28·35% Intermediate, 7·09% Globe, 1·57% prongy, 0·79% off coloured, 0·79% multiple topped.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	16·67% Intermediate, 5% Long, 2·50% cracked.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leavee.	14·02% Intermediate, 7·48% Globe, 1·87% Long, 0·93% prongy, 2·80% cracked, 1·87% off coloured, 0·93% multiple topped.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	18·58% Half Long, 7·08% Globe, 4·42% Long, 6·19% Tankard, 3·54% cracked, 2·65% multiple topped, 0·88% prongy.

TABLE 6.—VARIETY TEST

Variety	Source	Relative yield, 1924	Relative yield, 1925	Average relative yield, 1924-1925	Predominating type	Colour of skin: Above ground
White Intermediate	Experimental Farm, Summerland, B.C.	78·6				
Giant Half Sugar White	United Seed Growers	75·4				
Yellow Ovoid, U.B.C. No. 5.	University of British Columbia.	75·1				
Sludstrup	J. M. Steves, Steveson, B.C.	75·0				
Danish Sludstrup	United Seed Growers	74·2				
Long White	Dupuy & Ferguson	72·2				
Wiboltta Taaroje Yellow Short Ovoid No. 1829.	Scandinavian Seed Co.	68·7				
New Yellow Mangel, Best of All.	Dupuy & Ferguson	67·7				
Wiboltta Dana Ovoid Giant, No. 612, No. 4923.	Scadinavian Seed Co.	67·6				
Giant Yellow Globe	United Seed Growers	67·1				
Barres Sludstrup	General Swedish Seed Co.	65·7				
Barres Sludstrup	Danske Landfoborenings-ers, Froforsyning.	64·4				
Prizewinner	Sutton's, England	62·1				
New Smithfield Yellow Globe.	Webb & Sons		131·8		Globe	Olive yellow to olive ocher, grading into pale smoky gray.
O.A.C. Yellow Intermediate.	Ralph Moore		125·5		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Devon Champion Yellow Globe.	Garton's, England		115·2		Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Half Sugar Giant Rose No. 1588.	Trifolium, Copenhagen		109·4		Intermediate.	Old rose, grading into Japan rose and pale smoky gray.
Select Giant Rose Intermediate Sugar.	Wm. Ewing		109·2		Half Long	Old rose, grading into Japan rose and pale smoky gray.
Yellow Fleshed or Golden Tankard.	Webb & Sons		106·3		Intermediate.	Flame scarlet, grading into pale smoky gray.
New Century	Cannell & Sons		101·9		Globe	Flame scarlet, grading into pale smoky gray.
Svalof Original Rubra	General Swedish Seed Co.		103·9		Half Long	Old rose, grading into Japan rose and pale smoky gray.
Mammoth Golden Globe.	Graham Bros.		100·9		Globe	Flame scarlet, grading into pale smoky gray.
Q. Q. Mangel	Cannell & Sons		99·7		Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
Barres Stryno No. 1553.	Trifolium, Copenhagen		96·0		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Non Such	Gartons		95·7		Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Mammoth Long Red	Cannell & Sons		95·5		Long	Nopal red, grading into pale smoky gray.
Yellow Intermediate	Cannell & Sons		95·1		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Yellow Oval	Steele Briggs		93·1		Intermediate.	Olive yellow to olive ocher, grading into pals smoky gray.
Prizewinner Yellow Globe.	Sutton's		92·1		Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Golden Tankard	Cannell & Sons		91·1		Intermediate.	Flame scarlet, grading into pale smoky gray.
Long Yellow	John A. Bruce		90·8		Long	Olive yellow to olive ocher, grading into pale smoky gray.
Large Yellow Globe	Garton's		89·7		Globe	Olive yellow to olive ocher, grading into pale smoky gray.

MANGELS—*Continued*

Colour of skin Below ground	Colour of flesh	Colour of top	Remarks
Cadmium orange...	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	10·95% Intermediate, 1·46% Tankard, 5·11% cracked.
Wax yellow.....	White.....	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	2·80% Long, 1·87% Tankard, 0·93% Globe, 7·48% prongy, 6·54% cracked, 3·74% off coloured, 1·87% multiple topped.
Cadmium orange...	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	17·36% Intermediate, 1·65% Tankard, 1·65% cracked, 0·83% prongy.
White, grading into old rose.	White.....	Forest green with lower parts of stems showing tinge of old rose.	23·78% Half Long, 1·40% Long, 1·40% Globe, 2·10% prongy, 1·40% cracked, 0·70% off coloured.
White, grading into old rose.	White.....	Forest green with lower parts of stems showing tinge of old rose.	17·56% Intermediate, 6·11% Tankard, 3·05% Long, 2·29% Globe, 2·29% cracked, 3·82% prongy, 7·63% off coloured.
Flame scarlet.....	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	5% Globe, 3·33% Tankard, 1·67% cracked, 1·67% multiple topped.
Flame scarlet.....	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	13·46% Tankard, 1·92% Intermediate, 0·96% cracked.
White, grading into old rose.	White.....	Forest green with lower parts of stems showing tinge of old rose.	16·18% Intermediate, 2·04% Long, 0·74% Tankard, 4·41% prongy, 0·74% cracked, 1·47% off coloured.
Flame scarlet.....	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	7·59% Intermediate, 0·69% Tankard, 6·90% cracked.
Cadmium orange...	White, some trace of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	9·09% Globe, 0·91% cracked, 0·91% off coloured, 0·91% multiple topped.
Wax yellow.....	White.....	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	3·01% Tankard, 1·50% Long, 0·75% Globe, 0·75% prongy, 3·01% cracked, 4·51% off coloured, 3·76% multiple topped.
Cadmium orange...	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	7·86% Intermediate, 3·57% cracked, 1·43% Tankard, 2·14% off coloured, 0·71% multiple topped.
Nopal red.....	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	18·62% Half Long, 4·16% Intermediate, 2·07% prongy, 0·69% cracked.
Wax yellow.....	White.....	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	12·03% Long, 7·52% Tankard, 5·26% Globe, 3·76% prongy, 0·75% cracked, 2·26% off coloured, 0·75% multiple topped.
Wax yellow.....	White.....	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	8·80% Long, 4% Tankard, 3·20% Globe, 11·20% prongy, 0·80% cracked, 5·60% multiple topped, 11·20% off coloured.
Cadmium orange...	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	22·46% Intermediate, 4·35% Tankard, 4·35% cracked, 2·17% prongy.
Flame scarlet.....	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	12·70% Tankard, 3·17% Long, 2·38% Globe, 1·59% cracked.
Wax yellow.....	White.....	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	17·02% Half Long, 1·42% Intermediate, 0·71% Globe, 4·96% prongy, 3·55% off coloured, 0·71% cracked.
Cadmium orange...	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	32·77% Intermediate, 4·20% Tankard, 3·36% cracked.

TABLE 6.—VARIETY TEST

Variety	Source	Relative yield, 1924	Relative yield, 1925	Average relative yield, 1924–1925	Predominating type	Colour of skin
						Above ground
Red Intermediate	Cannell & Sons		87·5		Intermediate.	Nopal red, grading into pale smoky gray.
Mammoth Long Red	Webb & Sons		87·0		Long	Nopal red, grading into pale smoky gray.
Barres Sludstrup	Royal Danish Agricultural Society.		86·1		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Superlative	Sutton's		85·8		Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Barres Stryno	Royal Danish Agricultural Society.		85·4		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Sludstrup Barres	Hjalmar Hartmann & Co.		83·9		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Sugar Beet or Half Sugar Rose.	Dupuy & Ferguson		83·4		Half Long	Old rose, grading into Japan rose and pale smoky gray.
Danish Sludstrup	Wm. Rennie		82·8		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Yellow Globe	A. E. McKenzie		82·5		Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Barres Tystofte	Royal Danish Agricultural Society.		82·3		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Prizetaker Yellow Globe	A. E. McKenzie		82·2		Globe	Olive yellow to olive ocher, grading into pale smoky gray.
Perfection	Webb & Son		79·0		Globe	Flame scarlet, grading into pale smoky gray.
Sunrise	Garton's		77·6		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Barres Sludstrup No. 1557.	Trifolium		75·9		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
Giant Yellow Globe	Halifax Seed Co		75·5		Intermediate.	Olive yellow to olive ocher, grading into pale smoky gray.
White Knight	Garton's		73·9		Tankard	Olive yellow to olive ocher, grading into pale smoky gray.
New Combination	Garton's		69·0		Intermediate.	Ox blood red, grading into pale smoky gray.
Half Sugar Malyculyst V.	Royal Danish Agricultural Society.		66·2		Half Long	Old rose, grading into Japan rose and pale smoky gray.
Red Intermediate	Webb & Sons		64·6		Intermediate.	Flame scarlet, grading into pale smoky gray.
New Lion Intermediate.	Webb & Sons		63·1		Tankard	Olive yellow to olive ocher, grading into pale smoky gray.

MANGELS—*Concluded*

Colour of skin — Below ground	Colour of flesh	Colour of top	Remarks
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	10·57% Tankard, 6·50% Long, 2·44% Globe, 0·81% prongy, 2·44% cracked, 0·81% multiple topped.
Nopal red	White, with begonia rose rings.	Forest green leaves. Stems with varying intensities of begonia rose.	14·06% Intermediate, 4·69% prongy, 1·56% cracked.
Wax yellow	White	Forest green, with lower parts of stems showing tinge of old rose.	18·52% Long, 1·48% Globe, 1·48% Tankard, 1·48% prongy, 2·22% cracked.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	15·28% Intermediate, 4·17% Tankard, 2·08% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	9·73% Long, 2·65% Tankard, 3·54% prongy, 12·39% cracked, 1·77% Globe.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	2·92% Long, 1·17% Globe, 1·75% off coloured, 0·58% prongy.
Wax yellow	White	Forest green, with lower parts of stems showing tinge of old rose.	5·44% Intermediate, 4·76% Long, 2·04% Globe, 1·36% Tankard, 4·08% prongy, 3·40% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	8·70% Long, 0·72% Tankard, 2·17% prongy, 0·72% cracked, 2·17% off coloured, 0·72% multiple topped.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	27·27% Intermediate, 2·27% Tankard, 0·76% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	6·87% Long, 2·29% prongy, 4·58% cracked, 0·76% off coloured.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	7·20% Intermediate, 4·80% Tankard, 0·80% Long, 2·40% cracked.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones much more than older ones.	8·52% Tankard, 2·84% Intermediate, 3·98% cracked.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	7·46% Tankard, 3·73% Long, 3·73% Globe, 0·75% off coloured.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	4% Long, 2·40% Tankard, 0·80% Globe, 4% prongy, 1·60% cracked, 3·20% multiple topped.
Cadmium orange	White, traces of cadmium yellow below ground.	Entirely forest green. Very slight tint of cadmium yellow on young leaves.	7·84% Long, 5·88% Globe, 1·96% Tankard, 1·96% off coloured, 0·65% prongy.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	13·95% Globe, 8·53% Intermediate, 5·43% cracked.
Ox blood red	Carmin with white rings.	Stems, carmin. Leaves, maroon.	11·54% Long, 2·88% Tankard, 4·81% cracked.
White, grading into old rose.	White	Forest green with lower parts of stem showing tinge of old rose.	21·55% Intermediate, 1·72% Long, 6·90% cracked, 2·59% prongy.
Flame scarlet	White, with wide cadmium yellow rings.	Forest green. Stems of all leaves tinged with cadmium yellow. Young ones more than older ones.	4·07% Long, 6·50% Tankard, 3·25% Globe, 0·81% prongy, 4·88% cracked, 1·63% multiple topped.
Wax yellow	White	Inner leaves showing stems and veins with cadmium yellow. Remaining part, green.	6·67% Intermediate, 5% Globe, 0·83% cracked.

An examination of table 6 will indicate the wide range that exists in both the yielding-capacity and purity of type in the different lots of seed for sale. In this respect there has been a considerable improvement in the past few years but there is still room for a great deal more to be done along the same line.

The yield of the C.E.F. selection of Yellow Intermediate has been taken as a hundred for each year and all other varieties ranged either above or below depending on their relative yielding-capacity. This relative yield puts all varieties on a percentage basis and is very easily understood.

Three intermediate varieties again stand at the top from the standpoint of average yield of dry matter for the two years under test. The fact, however, that the other mangel types also have representatives near the head of the column indicates that with a soil type suitable to all varieties, as was the case with the mangel ground at the Central Experimental Farm, the question of strain has a definite bearing on yield. Any one of many of the varieties tested would give a profitable yield under suitable soil and climatic conditions.

Swedes

Swedes have never been a marked success on the experimental grounds available for the Forage Plant Division on the Central Farm. A combination of unsuitable soil, aphids, and disease has resulted most years in unprofitable yields. There has, however, been a fairly well-marked difference in the yielding capacity of the varieties and strains tested.

There is much more similarity of type between the different lots of swedes offered for sale than in the case of mangels. The relative proportion of the root growing underground is essentially the same for the various morphological types consequently there is not the same adaptation to particular soil conditions as exists in the case of either carrots or mangels.

The amount of pull necessary to harvest the various swede varieties is also more a function of the distribution, shape, and number of rootlets, than the depth that the main tap root may have extended into the ground.

Among the most satisfactory yielders in our tests conducted during the seasons of 1924 and 1925 at the Central Farm were Derby Green Top, Canadian Gem, Hall's Westbury, Kangaroo, Bangholm and Hartley's Bronze Top.

Carrots

In connection with the classification of field roots being conducted by the Forage Plants Division, fifty-two lots of field carrots were grown in 1924 and forty lots in 1925. A great many measurements and other definite records were secured from both the 1924 and 1925 plantings. Yield records were of course taken and both the harvested weights and the total dry matter per acre are reported in table 7.

TABLE 7.—VARIETY TEST CARROTS

Variety	Source	Green yield 1924	Yield dry matter 1924	Green yield 1925	Yield dry matter 1925	Average green yield 1924–25	Average yield dry matter 1924–25
		tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.
Large White Vosges	Graham Bros.	15 367	1 1,431	32 1,353	1 1,234	23 1,860	1 1,333
Mammoth Short White	Wm. Rennie	12 1,333	1 825	28 1,565	1 1,702	20 1,449	1 1,264
White Belgian	John A. Bruce	11 1,200	1 359	26 1,192	2 98	19 196	1 1,229
White Belgian	Graham Bros.	12 867	1 1,277	27 348	1 938	19 1,608	1 1,108
Improved Short White	K. McDonald & Sons,	11 733	1 478	36 269	1 1,346	23 1,501	1 912
Improved White Vosges	K. McDonald & Sons	12 1,933	1 993	29 1,394	1 655	21 664	1 824
Mammoth Intermediate White.	John A. Bruce	12 1,867	1 845	27 1,214	1 786	20 541	1 816
Improved Intermediate, White.	Dupuy & Ferguson	12 1,100	1 600	33 1,676	1 715	23 388	1 658
Long Red Surrey	Steele Briggs	11 833	1 995	18 1,001	1 313	14 1,917	1 654
Yellow Belgian	Wm. Ewing	11 667	1 1,155	19 1,840	1 91	15 1,254	1 623
Improved Intermediate White.	Wm. Ewing	11 900	1 324	30 92	1 903	20 1,496	1 614
White Belgian	Hjalmar, Hartmann & Co.	10 1,640	1 28	27 1,366	1 1,109	19 503	1 569
Large White Belgian	Wm. Rennie	12 1,633	1 597	25 343	1 521	18 1,988	1 559
Champion	Harris McFayden	9 333	1 348	18 236	1 768	13 1,285	1 558
White Belgian	Trifolium, Copenhagen	10 400	1 281	25 337	1 710	17 1,369	1 496
White Belgian	Wm. Ewing	10 600	1 287	24 986	1 699	17 793	1 493
Danish Champion	K. McDonald	10 833	1 462	23 1,166	1 476	17	1 469
Large White Belgian	Steele Briggs	10	1 334	22 1,738	1 544	16 869	1 439
Oxheart	Graham Bros.	11 1,433	1 699	21 545	1 165	16 989	1 432
Improved Danvers	Graham Bros.	10 1,567	1 439	20 207	1 410	15 887	1 425
White Belgian	Dupuy & Ferguson	11 600	1 470	24 881	1 338	16 1,741	1 404
Half Long White	General Swedish Seed Co.	8 1,080	1 82	23 995	1 723	16 38	1 403
White Intermediate	Macdonald College	11 1,067	1 332	26 868	1 469	18 1,968	1 401
Mammoth Half Long White	A. E. McKenzie	8 1,400	1 434	23 1,993	1 366	16 697	1 400
Danish Champion	C.E.F., Ottawa	10 133	1 303	19 1,949	1 465	15 41	1 384
Mammoth White Intermediate	Wm. Rennie	12 600	1 541	23 944	1 161	17 1,772	1 351
New Yellow Intermediate	Halifax Seed Co.	10 533	1 466	23 1,910	1 203	17 222	1 335
New Yellow Intermediate.	Wm. Ewing	12 233	1 428	18 1,297	1 194	17 1,763	1 311
White Belgian	Halifax Seed Co.	11 833	1 356	23 1,910	1 203	17 1,372	1 280
Oxheart	Harris McFayden	10 67	1 123	19 390	1 300	14 1,229	1 212
Improved Danvers Half Long.	Dupuy & Ferguson	8 1,233	.. 1,968	17 350	1 402	12 1,792	1 185
James	Harris McFayden	7 1,167	1 11	17 696	1 280	12 932	1 146
James B.L. 781	Danske, Landboforeningus Troforsyning.	8 800	1 115	16 987	1 87	12 894	1 101
Long Orange	John A. Bruce	8 300	1 298	10 1,052	.. 1,532	9 686	.. 1,915
Champion	General Swedish Seed Co.	11 533	1 1,481	.. ....	.. ....	.. ....	.. ....
White Intermediate	University of British Columbia.	12 1,267	1 1,239	.. ....	.. ....	.. ....	.. ....
White Intermediate	Experimental Farm, Summerland, B.C.	13 1,800	1 1,008	.. ....	.. ....	.. ....	.. ....
Long Orange Belgian	A. E. McKenzie	12 533	1 986	.. ....	.. ....	.. ....	.. ....
White Half Long	Harris McFayden	11 1,933	1 793	.. ....	.. ....	.. ....	.. ....
White Belgian	A. E. McKenzie	12	1 628	.. ....	.. ....	.. ....	.. ....
Wiboltt's Yellow Champion	Scandivanian Seed Co. and R. Wiboltt.	9 1,467	1 494	.. ....	.. ....	.. ....	.. ....
White Belgian Green Head No. 1745 (w.).	Scandivanian Seed Co. and R. Wiboltt.	9 1,567	1 417	.. ....	.. ....	.. ....	.. ....
Champion	Hjarmar, Hartmann & Co.	9	1 34	.. ....	.. ....	.. ....	.. ....
Large White Vosges	Dupuy & Ferguson	9 1,467	.. 1,970	.. ....	.. ....	.. ....	.. ....
Wiboltt's Improved Nantes	Scandivanian Seed Co. and R. Wiboltt.	7 733	.. 1,831	.. ....	.. ....	.. ....	.. ....
Large White Vosges	John A. Bruce	12 1,367	.. ....	.. ....	.. ....	.. ....	.. ....
Champion 1535	Trifolium, Copenhagen	.. ....	.. ....	21 77	1 235	.. ....	.. ....
Danish Champion	Hjalmar Hartmann Co.	.. ....	.. ....	18 1,965	1 5	.. ....	.. ....
Long Orange Belgian	John A. Bruce	.. ....	.. ....	18 1,589	1 537	.. ....	.. ....
Yellow Belgian	Cannell & Sons	.. ....	.. ....	28 1,475	1 1,712	.. ....	.. ....
Imroved Short White	Steele Briggs	.. ....	.. ....	31 1,637	1 1,148	.. ....	.. ....
Ontario Champion	Graham Bros.	.. ....	.. ....	28 831	1 901	.. ....	.. ....

The yields secured in 1925 were much superior to those obtained in 1924. This is due largely to the fact that both soil and climatic conditions were more favourable.

The intermediate types seem to be more satisfactory and much nicer to harvest than the extremely long or very short sorts.

A small planting of the better of the intermediate varieties would appear to be worthy of more general adoption. They are relished by practically all classes of live stock and are claimed to be particularly beneficial to horses.

FLESHY ANNUAL PASTURE CROPS

Fleshy annual pasture crops have a regular place in the rotation on many European farms. In Canada, however, such crops are as yet not grown nearly as generally as their evident value would appear to warrant.

In the following table are tabulated the yields secured from a number of such crops grown at the Central Farm in 1924 and 1925. Only the green yields are recorded for 1924, but in 1925 absolute dry-matter determinations were made and all yields compared on that basis.

The crops under test were all seeded in rows thirty inches apart and at the rate of four pounds of seed per acre. The plots were divided into two parts, and one section was harvested a little over a month earlier than the other. The yields from the two sections are recorded separately.

TABLE 8—FLESHY ANNUAL PASTURES

Variety	Source	Green yield 1924		Harvested Aug. 27				Harvested Oct. 6			
				Green yield, per acre, 1925		Yield dry matter, 1925		Green yield, 1925		Yield dry matter, 1925	
		tons	lb.	tons	lb.	tons	lb.	tons	lb.	tons	lb.
Giant Drum Head Cabbage	Cannell & Sons	..	....	14	460	1	948	36	234	3	669
Improved 1000 Headed Kale	Sutton's, England	14	1,492	16	881	1	1,480	26	1,482	3	559
Green Marrow Stem Kale	Cannell & Sons	..	....	14	72	1	761	31	382	3	188
Large Seeded Winter Common Essex Rape	Vilmorin-Andrieux & Co., France.	..	....	19	720	1	1,894	24	486	2	1,278
Small Seeded Turnip Rape or German Winter Rape	Vilmorin-Andrieux & Co	..	....	12	1,701	1	1,031	26	272	2	809
Marrow Stem Kale	Sutton's, England	..	....	14	1,186	1	620	26	896	2	790
Large Seeded Winter Umbrella Rape	Vilmorin-Andrieux & Co	..	....	18	881	1	1,416	25	616	2	663
1000 Headed Kale	Sutton's, England	16	137	12	1,991	1	909	17	569	2	603
Broad Leafed Essex Rape	Garton's, England	..	....	22	44	2	70	21	1,417	2	576
Drum Head Savoy Cabbage	Cannell & Sons	..	....	12	1,459	1	610	19	193	2	255
Rape Kale	Cannell & Sons	..	....	11	167	1	498	19	855	2	554
Curled Sheep Kale	Sutton's, England	18	138	13	136	1	492	18	763	1	1,819
Green Stemmed Marrow Kale	E. Webb & Sons	18	461	..	....	..	....	..	....	..	....
French Marrow Kale	Sutton & Sons	18	268	..	....	..	....	..	....	..	....
Green Stemmed Marrow Kale	Sutton & Sons	16	718	..	....	..	....	..	....	..	....
Purple Stemmed Marrow Kale	E. Webb & Sons	16	267	..	....	..	....	..	....	..	....

It is interesting to note that in 1925 the Giant Drum Head cabbage gave the highest average yield of dry-matter. This particular variety of cabbage appears to offer a profitable source of succulent fall pasture.

The marrow-stemmed Kale grows somewhat taller than the rape varieties and has a coarser more succulent stem.

Green fodder from each of these fleshy pastures appears to be relished by cattle and sheep and is eaten greedily by poultry.

ANNUAL HAY CROPS

The use of annual hay crops is becoming more prevalent as a means of obviating the effects of winter-killing of biennial or perennial hay crops. There are also sections of Canada where an annual hay crop such as oats, or oats and peas, seems to furnish the most profitable source of fodder.

In order that more information regarding such crops may be available, the Forage Crop Division conducts each year, tests of the different crops which promise to be of value as annual hays.

Table 9 gives the yield of hay secured in both 1924 and 1925, with the average for the two years, of a great variety of plants tested singly and in various combinations.

TABLE 9.—ANNUAL HAY CROPS

Seeding	Seeding rate per acre	Yield hay, 1924 (15 p.c. moisture)	Yield hay, 1925 (15 p.c. moisture)	Average yield hay, 1924 and 1925 (15 p.c. moisture)
	lb.	tons lb.	tons lb.	tons lb.
Hubam clover	15			
Banner oats	80	1 1,844	3 1,412	2 1,628
Hubam clover	15			
Rye (O.A.C. No. 61)	80	1 1,700	3 217	2 959
Hubam clover	15			
Japanese millet	20	3 524	4 429	3 577
Hubam clover	15			
Golden millet	20	3 405	4 312	3 1,359
White sweet clover	15			
Japanese millet	20	2 592	4 244	3 418
White sweet clover	15			
Golden millet	20	2 888	3 158	2 1,523
Yellow sweet clover	15			
Rye (O.A.C. No. 61)	80	2 157	3 403	2 1,280
Yellow sweet clover	15			
Japanese millet	20	3 1,321	3 1,542	3 1,432
Yellow sweet clover	15			
Golden millet	20	3 153	3 1,983	3 1,068
Crimson clover	15			
Banner oats	80	1 1,879	3 401	2 1,140
Crimson clover	15			
Japanese millet	20	2 1,596	4 787	3 1,192
Crimson clover	15			
Golden millet	20	1 1,349	3 1,229	2 1,289
Barley	100	1 1,815	2 537	2 176
Hubam clover	20	1 1,464	4 135	2 1,800
White sweet clover	20	1 1,093	4 883	2 1,988
Golden millet	30	2 1,192	4 74	3 633
Common millet	30	1 1,754	2 1,704	2 729
Japanese millet	30	3 1,366	5 506	4 936
Hungarian millet	30	1 1,649	3 544	2 1,097
Siberian millet	30	1 1,268	2 1,733	2 501
Hog millet	30	1 622	2 1,023	1 1,823
Teff grass	7	3 594	4 105	3 1,350
Yellow sweet clover	20	.....	2 62	.....
Banner oats	78			
Arthur peas	45	.. ....	2 825	.. ....
Common vetch	15			
Rye	90	.. ....	2 663	.. ....
Sudan grass	30	.. ....	3 20	.. ....
Banner oats	68			
Arthur peas	60	.. ....	2 1,974	.. ....
Banner oats	68			
Chancellor peas	40	.. ....	2 1,583	.. ....
Banner oats	68			
McKay peas	60	.. ....	2 1,556	.. ....
Gold Rain oats	59½			
Arthur peas	60	.. ....	3 376	.. ....
Gold Rain oats	59½			
Chancellor peas	40	.. ....	3 539	.. ....
Gold Rain oats	59½			
McKay peas	60	.. ....	2 976	.. ....
Victory oats	68			
Arthur peas	60	.. ....	2 1,132	.. ....
Victory oats	68			
Chancellor peas	40	.. ....	2 1,267	.. ....
Victory oats	68			
McKay peas	60	.. ....	2 1,587	.. ....
Banner oats	102	.. ....	2 1,759	.. ....
Gold Rain oats	93½	.. ....	2 1,764	.. ....
Victory oats	102	.. ....	2 1,707	.. ....

The summer of 1924 was too dry for the best results with the crops under test. However, one or two single plantings and a few combinations seemed to thrive better than their associates under the adverse conditions experienced. The sweet clover-millet combination seems to be outstanding in this respect.

The hay secured for the combinations of oats and peas appeared to be of excellent quality and it would seem that such combinations should be a profitable source of fodder.

Teff grass, an importation from South Africa, is an annual grass of excellent quality but unfortunately it appears to be weak in the stem and consequently lodges badly. Thin seeding will overcome this to some extent and an attempt is being made to select a stronger-stemmed type.

ALFALFA

Tables 10 and 11 give the yields secured from alfalfa of different varieties or of the same variety secured from different sources. Table 10 records the yields secured from plantings of the different lots concerned in 1923, whereas table 11 tabulates the results of the seeding of similar lots in 1924. All of the different lots were seeded at the rate of twenty pounds to the acre.

TABLE 10.—ALFALFA VARIETIES. SOWN 1923

Variety	Source	Field-cured hay (15 p.c. moisture), 1924		Field-cured hay (15 p.c. moisture), 1925		Average yield field-cured hay (15 p.c. moisture), 1924–1925	
		tons	lb.	tons	lb.	tons	lb.
Alfalfa	R. McCannus	4	382	5	1,005	4	1,694
Alfalfa	W. F. Lennox	4	216	5	876	4	1,546
Cossack alfalfa	Paramount Alfalfa Farm	4	154	5	863	4	1,509
Alfalfa, Canadian Variegated	Steele Briggs	4	35	5	553	4	1,294
Cossack alfalfa	Dakota Improved Seed Co	4	525	4	1,730	4	1,128
Alfalfa	Charles L. Sheard	3	1,122	5	963	4	1,043
Grimm alfalfa	A. B. Lyman	3	1,042	5	670	4	856
Medicago falcata	Paramount Alfalfa Farm	3	1,634	4	1,883	4	759
Turkestan alfalfa	Steele Briggs	3	306	4	885	3	1,596
Shoobut alfalfa	S. Argentine	3	832	3	1,930	3	1,381
Alfalfa (French-grown)	Sutton's, England	2	1,311	4	464	3	888

TABLE 11.—ALFALFA VARIETIES. SOWN 1924

Variety	Source	First cut hay yield (15 p.c. moisture)		Second cut hay yield (15 p.c. moisture)		Total hay yield (15 p.c. moisture)	
		tons	lb.	tons	lb.	tons	lb.
Cossack alfalfa	Rife, Alberta	2	1,653	1	1,209	4	862
Grimm alfalfa	A. P. Lyman	2	1,284	1	671	3	1,955
Alfalfa, Le Beau	Michigan Agricultural College	2	905	1	835	3	1,740
Turkestan alfalfa	Steele Briggs	2	980	1	705	3	1,685
Canadian alfalfa	Steele Briggs	2	1,035	1	479	3	1,514
Alfalfa	R. McCannus	2	640	1	709	3	1,349
Alfalfa	Sutton's, England	2	465	1	874	3	1,339
Grimm Alfalfa	Sutton's, England	2	605	1	346	3	951
Shoobut alfalfa	S. Argentine	1	1,756	1	728	3	484
Medicago falcatta	Rife, Alberta	2	579	..	1,544	3	123

With the exception of *Medicago falcata* L., which could be easily distinguished by its yellow flowers and finer growth, and the Shoobut, which could be readily picked out by the sparse stand due to heavy winter-killing in the winter of 1923-24, it was difficult to distinguish between the various lots with regard to any morphological characteristics. All had practically parallel varia-

tions in blossom colour and when planted out as individual plants showed a similar range in the various types which go to make up the commercial mixtures sold under the names listed.

While the Cossack alfalfa was rather outstanding in 1925 the average of tests over a number of years does not indicate any marked superiority of this variety over the Grimm or variegated types for Ottawa conditions.

SWEET CLOVER

The increasing interest being manifest in sweet clover as a forage plant has resulted in the development of new strains. The relative yielding capacity and general desirability of these new strains being offered to the farmer, in comparison with the original commercial mixtures, is a problem of common interest.

Five of these newer strains were tested at the Central Farm in 1925 in comparison with commercial lots of both the biennial white-blossomed and the biennial yellow-blossomed sorts.

The yield of cured hay, based on an absolute dry-matter determination, is included in table 12.

TABLE 12.—VARIETY TESTS SWEET CLOVER

Variety	Source	Green yield per acre		Hay (15 p.c moisture) per acre	
		tons	lb.	tons	lb.
Maccor	Manitoba Agricultural College	12	925	3	761
Dwarf Sweet Clover	C. A. Honey	12	1,200	3	239
Yellow Sweet Clover	Steele Briggs	11	1,075	2	1,388
Zouave 778	Saskatoon University	9	1,825	2	1,329
Grundy Co	Morris Grain Co	10	925	2	1,191
White Sweet Clover	Steele Briggs	13	100	2	1,000
Arctic	A. E. McKenzie	8	1,025	1	1,758

Under conditions at the Central Farm in 1925 the Arctic sweet clover did not produce as profitable yields as the common white- or yellow-blossomed commercial lots. The Dwarf sweet clover from Mr. C. A. Honey and the strain being introduced by the Manitoba Agricultural College, under the name of Maccor, gave appreciably higher yields than the commercial lots. A single season's results, however, should not be accepted as final.

As to the quality of the hay secured from the different lots under test, there was not a marked difference. The important factor in securing desirable hay from any of the sweet clover varieties or strains appears to be dependent, to a large degree, on the method of harvesting. Careless handling during the harvesting operations almost invariably results in a hay of low feeding value due to the excessive loss of leaf.

RED CLOVER

From the standpoint of the plant-breeder the consideration of greatest importance at the present time in connection with the production of red clover is the source from which the seed is obtained. All of the red clover seed available in commercial quantities is from parents of a wide range of morphological types.

In as far as absolute purity of type of the resulting crops is concerned there is little choice between seed sources. When the question of hardiness is considered, however, there is a marked difference—seed from certain sources producing plants that are distinctly hardy while seed from other well-defined areas

produces a crop the greater part of which kills out during an average winter in the red clover growing districts of Canada.

Tables 13 and 14 give the results secured from duplicate plantings of red clover seed from different sources in both 1924 and 1925. The sources from which the seed was obtained are quite representative of the areas from which the greater part of the seed offered for sale in Canada is obtained.

TABLE 13.—TEST OF RED CLOVER FROM DIFFERENT SOURCES

Variety	Source	Hay yield (15 p.c. moisture), 1924	Hay yield (15 p.c. moisture), 1925	Hay yield (15 p.c. moisture), 1924–1925
		tons lb.	tons lb.	tons lb.
Red clover	Central Experimental Farm	3 1,927	3 1,184	3 1,556
Red clover	Montgomeryshire, Wales	3 1,919	3 859	3 1,389
Red clover	St. Clet, Quebec	3 839	3 1,259	3 1,049
Red clover	France	3 1,915	3 150	3 1,033
Altaswede	Alberta	3 1,409	3 594	3 1,002
Red clover	Kenora, Ontario	3 995	3 1,005	3 1,000
Red clover	Ontario	3 1,264	3 639	3 952
Late red clover	Sweden	3 1,384	3 406	3 895
English red clover	Sutton's	3 1,216	3 436	3 826
Early red clover	Sweden	3 1,141	3 255	3 698
Red clover	France	3 1,332	2 791	3 62
Red clover	Italy	3 527	2 258	2 1,393
Red clover	France	3 578	2 163	2 1,371
Red clover	Italy	3 1,395	1 642	2 1,019
Red clover	Italy	3 294	1 1,123	2 709
Red clover	Italy	2 1,666	1 920	2 293
Red clover, Bologna	Italy (Bologna)	2 1,268	1 508	1 1,886
Red clover	Italy	2 788	1 178	1 1,483
Red clover	St. Casimir, Quebec	3 1,678	.. ....	.. ....
Medium late red clover	Sweden	3 1,140	.. ....	.. ....
Red clover	Ontario	3 441	.. ....	.. ....
Red clover	Ontario	3 362	.. ....	.. ....
Red clover	Italy (Pisa)	2 1,127	.. ....	.. ....
Red clover	Ontario	2 1,111	.. ....	.. ....
Red clover	Chateauguay, Que	.. ....	3 1,666	.. ....
Red clover	Central Experimental Farm	.. ....	3 1,040	.. ....
Red clover	Transylvania	.. ....	3 855	.. ....
Red clover	Alfred, Ont	.. ....	3 818	.. ....
Giant Hybrid	England	.. ....	3 406	.. ....
Red clover	University of Saskatchewan	.. ....	2 1,882	.. ....
Red clover	Sicily	.. ....	2 1,083	.. ....

In addition to the yields reported, one test of French clover, and five tests of Italian clover were so badly winter-killed that it was impossible to harvest them.

On the whole it is quite evident in the light of the average hay yield secured for the two years that seed produced locally or under climatic conditions somewhat similar to ours is productive of the most profitable yields.

Practically all plants resulting from Italian seed are non-hardy under average conditions. A small percentage of French clovers, which resemble the American type of plant, seem to be fairly hardy. Most Swedish clovers seem to be quite satisfactory. The English clovers while less hardy than Swedish or Canadian-grown are usually better than the Southern European lots and following the less severe winters will produce profitable crops.

In conjunction with the yield tests, a definite investigation of the hardiness of the different lots was undertaken.

During the season 1924 and 1925 a total of 110 lots of red clover from different sources were tested in plots of individual plants. These plants were set out in rows three feet apart with six inches between plants in the row and

counted in the fall and spring to determine the comparative percentage of plants which killed out during the winter. Table 14 gives the results of this test.

TABLE 14.—WINTER HARDINESS OF RED CLOVERS FROM VARIOUS COUNTRIES

Country of origin	Number of samples tested	Average percentage winter-killed
Canada	21	13·9
Sweden	8	23·3
Germany	3	24·7
Finland	2	29·9
Poland	2	37·6
Roumania	4	39·2
Silicia	1	40·3
Holland	1	46·0
Denmark	7	46·7
Latvia	1	49·0
Switzerland	2	51·3
England	9	58·9
Hungary	3	67·7
Chili	6	70·6
France	10	68·5
New Zealand	2	71·9
Italy	25	74·7
Sicily	3	95·8

Canadian-grown clover is generally characterized by a coarser plant throughout, a larger and deeper-coloured blossom and a hairiness of stem not found to the same degree in lots from Europe. Altaswede, which as far as this Division can determine is similar to Late Swedish red clover, is of finer quality than common red and has stems either smooth or appressed hairy. Most of the clovers from Europe are fine in quality and have either a smooth stem or appressed hairy.

The data presented in table 14 demonstrate in a definite manner the greater hardiness of local-grown seed and the desirability of using such where possible in our farm seedings.

GRASS AND CLOVER MIXTURES

The most common practice in parts of Canada where biennial and perennial grasses and clovers are seeded is to secure, if possible, a crop of hay during the first year or two and then pasture until the seeding is ploughed up. It is evident, therefore, that what is desired is a single plant, or combination of plants, that will give the maximum of both hay and pasture when seeded under average conditions.

The Forage Plant Division has seeded, singly and in various combinations, for a number of years past, the most promising of our hay and pasture plants. The amounts of each ingredient of the various combinations was also varied.

Table 15 presents the yields secured from the various combinations seeded in 1922, 1923, and 1924. Both the green weights and their equivalent amounts of field-cured hay are given.

TABLE 15.—GRASS AND CLOVER MIXTURES

Seeding	Rate per acre	Sown 1922				Sown 1923				Sown 1924	
		Cut 1923		Cut 1924		Cut 1924		Cut 1925		Cut 1925	
		Green	Hay	Green	Hay (15 p.c. moisture)	Green	Hay (15 p.c. moisture)	Green	Hay (15 p.c. moisture)	Green	Hay (15 p.c. moisture)
	lb.	tons lb.	tons lb.	tons lb	tons lb.	tons lb.	tons lb	tons lb.	tons lb.	tons lb.	tons lb.
Alfalfa 6 Timothy 6 Red clover 10 Alsike 2 White Dutch clover 1	25	14 720	3 686	15 1,197	4 1,112	14 800	4 1,179	16 575	5 122	11 1,925	4 675
Alfalfa 4 Timothy 6 Red clover 7½ Alsike 1½ White Dutch clover 1	20	15 1,290	3 1,185	15 1,964	4 1,072	13 950	4 922	15 1,075	4 1,273	11 1,050	4 353
Alfalfa 3 Timothy 6 Red clover 5 Alsike 1 White Dutch clover 1	16	17 1,038	3 1,810	16 1,767	4 1,328	12 1,725	4 379	15 725	4 1,948	12 475	4 248
Timothy 8 Red clover 10 White Dutch clover 1	19	17 1,878	3 705	16 453	4 1,412	10 1,700	3 1,184	5 1,613	2 334	11 125	3 1,415
Timothy 8 Red clover 10 Kentucky blue grass 2 Red top 2 White Dutch clover 1	23	17 1,601	3 489	16 951	4 1,481	13 700	3 1,959	6 800	2 971	11 1,375	3 1,804
Timothy 8 Red clover 8 Alsike 2 White Dutch clover 1	19	17 1,082	2 1,660	14 416	4 518	14 1,300	4 1,261	6 1,763	2 1,354	11 875	3 1,632
Timothy 8 Red clover 8 Alsike 2 Kentucky blue grass 2 Red top 2 White Dutch clover 1	23	17 1,205	2 1,787	13 1,283	4 522	17 300	6 249	7 900	2 1,520	11 1,600	3 1,644
Timothy 8 Alsike 4 White Dutch clover 1	13	19 967	3 56	15 1,658	4 122	17 800	4 1,398	7 1,300	2 1,269	9 1,475	4 54

Timothy Alsike Kentucky blue grass Red top White Dutch clover	8 4 2 2 1	18	1,988	2	1,774	16	789	4	1,068	12	1,534	3	1,655	6	75	2	649	10	1,261	4	224
Timothy Meadow fescue Red clover White Dutch clover	6 4 10 1	15	1,688	3	236	15	1,443	4	1,335	13	700	4	909	7	425	2	1,036	12	1,188	4	294
Timothy Meadow fescue Red clover Kentucky blue grass Red top White Dutch clover	6 4 10 2 2 1	19	813	3	917	15	1,928	4	904	13	1,075	4	1,007	6	875	2	978	12	1,413	4	373
Timothy Meadow fescue Red clover Alsike White Dutch clover	6 4 8 2 1	19	1,645	3	1,204	16	513	4	1,391	14	250	4	1,854	6	100	2	405	10	450	3	1,447
Timothy Meadow fescue Red clover Alsike Kentucky blue grass Red top White Dutch clover	6 4 8 2 2 2 1	18	1,038	3	659	13	1,345	4	252	17	1,200	5	80	7	50	2	455	11	75	3	1,565
Timothy Orchard grass Red clover White Dutch clover	6 4 10 1	18	1,926	3	605	10	126	3	876	15	975	4	1,535	5	1,188	1	1,652	11	1,000	3	1,489
Timothy Orchard grass Meadow fescue Red clover Kentucky blue grass Red top White Dutch clover	6 2 2 10 2 2 1	15	1,442	2	1,728	16	269	4	1,491	11	1,975	3	1,911	6	500	1	1,939	11	875	3	1,175
Timothy Orchard grass Red clover Kentucky blue grass Red top White Dutch clover	6 4 10 2 2 1	16	544	3	467	10	371	3	799	13	1,925	4	991	5	1,325	1	1,611	11	875	3	1,692
Timothy Orchard grass Red clover Alsike White Dutch clover	6 4 8 2 1	14	629	2	1,336	11	878	3	1,573	12	375	3	1,740	5	700	1	1,509	11	1,150	3	1,821

TABLE 15.—GRASS AND CLOVER MIXTURES

Seeding	Rate per acre	Sown 1922				Sown 1923				Sown 1924	
		Cut 1923		Cut 1924		Cut 1924		Cut 1925		Cut 1925	
		Green	Hay	Green	Hay (15 p.c. moisture)	Green	Hay (15 p.c. moisture)	Green	Hay (15 p.c. moisture)	Green	Hay (15 p.c. moisture)
	lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.	tons lb.
Timothy 6 Orchard grass 4 Red clover 8 Alsike 2 Kentucky blue 2 Red top 2 White Dutch clover 1	25	17 1,938	3 303	15 250	4 1,086	12 950	4 826	5 1,613	1 1,638	10 1,925	3 1,164
Timothy 6 Orchard grass 2 Meadow fescue 2 Red clover 10 White Dutch clover 1	21	18	3 616	15 747	4 615	11 1,050	3 1,796	6 125	2 171	11 1,050	3 1,585
Timothy 6 Orchard grass 2 Meadow fescue 2 Red clover 8 Alsike 2 White Dutch clover 1	21	18 857	2 1,690	16 1,339	5 1,504	12 575	4 108	6 1,625	2 648	11 1,325	4 ....
Timothy 6 Orchard grass 2 Meadow fescue 2 Red clover 8 Alsike 2 Kentucky blue 2 Red top 2 White Dutch clover 1	25	18 1,835	2 1,886	14 1,975	5 135	13 1,225	4 1,040	6 1,688	2 311	11 988	4 16
Timothy 8 White-bloss. sweet clover 10 White Dutch clover 1	19	12 163	1 1,927	.....	.....	17 600	5 316	7 450	2 1,819	13 1,100	4 1,089
Timothy 6 Orchard grass 4 White sweet clover 10 White Dutch clover 1	21	14 598	2 228	6 1,658	2 1,632	14 1,250	4 929	4 500	1 1,133	14 350	4 404
Timothy 6 Meadow fescue 4 White sweet clover 10 White Dutch clover 1	21	14 996	2 316	5 1,562	2 539	16 375	4 878	5 1,625	2 207	6 1,750	2 891

Timothy Meadow fescue White sweet clover White Dutch clover	6 4 10 1	14	996	2	316	5	1,562	2	539	16	375	4	878	5	1,625	2	207	6	1,750	2	891
Timothy Meadow fescue Orchard grass White sweet clover White Dutch clover	6 2 2 10 1	14	567	2	405	7	1,202	3	33	15	325	4	....	4	1,325	1	1,367	7	1,700	2	1,598
Alfalfa White Dutch clover	20 1	11	1,979	1	1,595																
Field brome White sweet clover White Dutch clover	8 10 1	13	1,864	1	1,768					11	850	3	1,825					11	638	3	495
Timothy Yellow sweet clover White Dutch clover	8 10 1									11	1,450	3	1,996	6	688	2	1,071	10	1,300	3	819
Timothy Orchard grass Yellow sweet clover White Dutch clover	6 4 10 1									11	1,875	3	1,628	4	304	1	1,080	11	88	3	754
Timothy Meadow fescue Yellow sweet clover White Dutch clover	6 4 10 1									14	1,250	4	94	5	1,000	1	1,819	13	525	3	1,449
Timothy Orchard grass Meadow fescue Yellow sweet clover White Dutch clover	6 2 2 10 1									12	1,175	3	1,642	2	925	1	1,238	12	725	3	1,556
Field brome Yellow sweet clover White Dutch clover	8 10 1									6	800	2	560					10	550	2	1,381
Timothy Yellow sweet clover White sweet clover White Dutch clover	8 5 5 1									11	675	3	1,195	5	1,525	2	482	13	850	3	1,909
Yellow sweet clover White Dutch clover	20 1									7	1,450	2	1,088								
White sweet clover White Dutch clover	20 1									10	950	2	1,398								

Considering the table as a whole, the most striking feature seems to be the increased yield secured from the addition of a few pounds of alfalfa to any of the seedings. This observation is borne out by the unusually high yields secured from the areas seeded to hay on the general farm, where a few pounds of alfalfa seed is regularly added to the ordinary mixture.

A second point worthy of consideration is that within reasonable limits the exact number of pounds of seed planted does not seem to be very important. The amounts of any of the ingredients used may be varied considerably without the yield being influenced to any appreciable extent.

Under abnormal conditions the addition of the seed of special plants is often accompanied by profitable increases in yield. For example, in wet areas the addition of meadow fescue, red top and alsike clover, plants reasonably moisture-tolerant, will generally prove profitable.

WESTERN RYE GRASS

Western rye grass has established itself as a valuable hay and pasture crop for the sections of the Canadian prairies where moisture is not abundant enough to permit of the successful culture of timothy. Until very recent years only commercial mixtures were available to the grower, but since it was discovered that this grass was self-fertilized, a large number of pure lines have been isolated.

Eighty of the most promising of the strains developed at the Central Experimental Farm were again tested in 1925 as to their ability to yield paying crops of both fodder and seed. The results are presented in Table 16.

TABLE 16.—VARIETY TEST. WESTERN RYE GRASS

Number	Green weight per 1,000 plants	Hay per 1,000 plants	Seed per 1,000 plants	Number	Green weight per 1,000 plants	Hay per 1,000 plants	Seed per 1,000 plants
	lb.	lb.	lb.		lb.	lb.	lb.
4	110·000	70·55	8·06	78	108·910	60·61	6·47
5	90·476	55·12	6·69	81	110·000	62·61	8·23
6	89·108	57·74	8·96	82	80·000	49·11	6·13
7	115·566	69·63	7·62	83	93·137	61·24	7·63
8	88·095	56·31	7·13	84	106·481	61·40	5·94
9	103·365	65·60	9·13	86	117·500	64·92	8·04
10	96·153	58·10	8·69	87	84·112	54·40	7·97
11	116·822	69·11	6·97	88	99·009	54·70	6·83
12	80·808	50·18	4·93	89	90·476	56·74	9·10
13	85·585	52·84	5·37	90	102·500	60·16	5·79
14	90·000	53·08	7·92	91	110·576	61·09	4·33
15	98·130	57·94	8·15	93	94·059	56·84	9·38
16	68·877	43·70	7·46	96	105·769	64·87	9·60
17	59·090	40·85	6·50	97	122·549	62·15	7·28
19	71·078	43·80	6·60	97A	109·090	63·11	9·37
20	92·857	59·47	7·23	98	99·099	57·14	9·96
21	135·922	78·84	6·57	99	110·000	61·75	7·29
25	114·583	66·21	7·14	100	96·774	60·20	8·67
26	99·009	60·67	8·90	102	144·230	70·09	5·85
28	113·207	62·43	10·65	103	112·244	61·49	4·28
31	82·524	51·15	8·31	104	138·888	81·14	20·50
34	96·153	59·97	11·92	105	166·666	88·83	5·64
37	223·684	119·09	8·63	107	138·888	70·98	6·73
38	144·927	79·56	6·67	108	214·285	107·56	10·13
39	83·333	54·32	8·32	109	166·666	86·64	6·98
51	106·481	66·42	6·28	110	153·846	85·52	6·59
53	110·849	65·82	6·29	111	183·962	105·45	7·66
54	109·913	67·10	9·07	112	169·811	94·41	9·83
56	110·294	61·64	8·24	113	134·615	78·08	11·11
57	115·740	65·08	6·68	114	94·059	51·85	6·61
60	147·260	85·50	6·80	116	86·776	47·79	7·33
62	115·196	68·42	7·92	118	166·666	94·35	8·51
63	97·087	59·15	8·55	119	175·000	107·05	5·15
64	110·000	67·03	8·18	120	150·000	74·87	4·20
65	98·557	56·66	8·55	122	140·449	74·22	4·81
69	140·000	78·89	7·77	124	77·981	48·15	8·08
71	153·508	72·48	10·25	127	94·339	50·77	2·48
74	114·285	61·96	6·63	129	107·843	50·41	5·27
77	127·500	60·56	5·28	130	107·142	51·20	4·26

Strain No. 4, now known as Fyra was given general distribution for the first time in the spring of 1925, while the No. 5 strain, under the name of Grazer, entered commercial channels a few years previously. Both of these strains have proven more desirable than the commercial mixtures generally sold.

A study of the table of yields of these strains will reveal the fact that several strains reported appear to be considerably heavier yielding than either of the two lately distributed. It is therefore expected that within a very few years further strains will be generally available that will produce more profitable yields than their predecessors.

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