PROGRESS REPORT

FORAGE CROP INVESTIGATIONS

1959

BREEDING AND STRAIN TESTING

Field Husbandry Department
Ontario Agricultural College
Guelph

FORAGE PROGRESS REPORT 1959

The data from all O.A.C. trials are compiled in this report for use of members of the Field Husbandry Department and those associated with the testing programs. Data from some co-operative trials at Kemptville and Ridgetown are included in summary form so that all information will be collected together for interpretive purposes.

This report is not complete but does contain the main data collected from current projects and those compiled in 1959.

CONTENTS

(Year refers to year trial was seeded, and number in brackets is experiment number)

DEPARTURES OF 1959 GROWING SEASON

WEATHER RECORDS FROM NORMAL

TEMPERATURE		APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Harrow	Max.	-1.3	-0.3	-1.3	-3.5	-0.5	-1.2
	Min.	1.6	2.2	0.9	0.9	6.9	3.4
Ridgetown	Max.	4.0	3.7	1.3	0.5	3.6	3.3
	Min.	2.4	4.6	1.1	0.4	5.6	3.4
Guelph	Max.	2.6	2.6	1.1	1.8	4.1	3.3
	Min.	1.2	3.6	1.6	0.7	6.6	4.6
Kemptville	Max.	3.4	3.2	-0.1	1.4	3.3	3.3
	Min.	1.2	1.2	1.5	0.6	5.0	3.2
Ottawa	Max.	2.7	3.6	0.7	3.0	5.0	3.3
	Min.	0.8	1.0	3.1	1.0	6.1	3.6
New Liskeard	Max.	-5.1	-1.0	-3.1	0.0	3.1	1.7
	Min.	-11.1	-15.4	-2.2	-1.5	6.1	3.5
Kapuskasing	Max.	-0.9	3.4	2.4	3.9	1.7	1.2
	Min.	1.9	4.1	1.9	4.2	2.2	3.0
Gore Bay	Max.	-0.1	-	-8	0.4	3.0	3.9
	Min.	-1.0	2.0	1.2	-0.7	6.9	4.0
Fort Frances	Max.	+1.1	0.4	4.3	2.6	3.6	0.0
	Min.	-1.2	-0.8	1.7	3.2	2.0	0.0

RAINFALL						
Harrow	1.8	0.7	-1.7	1.2	2.1	0.2
Ridgetown	0.9	0.9	-2.6	-0.2	-0.2	-0.5
Guelph	0.2	-0.6	-1.9	0.0	-0.7	-0.2
Kemptville	-1.2	-2.6	-0.6	1.5	2.3	0.2
Ottawa	-1.4	-1.7	-1.9	0.0	1.2	1.0
New Liskeard	-	0.1	-0.8	-	1.2	-
Kapuskasing	-	0.1	-0.8	-	1.2	-
Gore Bay	0.9	-0.4	-0.8	-0.7	1.7	0.6
Fort Francis	-1.7	2.3	-1.6	1.5	1.0	0.1

1959 GROWING SEASON WEATHER RECORDS

2

TEMPERATURE		APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER
Harrow	Max.	54.8	68.1	77.6	80.3	81.4	73.5
	Min.	37.8	49.6	58.6	63.1	66.9	57.8
Ridgetown	Max.	56.7	68.5	78.0	82.4	83.7	75.4
	Min.	37.9	50.4	57.4	61.5	65.3	57.3
Guelph	Max.	53.3	66.2	75.2	80.7	81.4	73.2
	Min.	33.6	46.5	54.2	57.6	62.2	53.6
Kemptville	Max.	54.9	69.7	76.4	82.8	82.1	73.4
	Min.	33.0	45.3	55.2	58.6	60.6	51.3
Ottawa	Max.	52.5	68.9	75.9	82.8	82.8	72.1
	Min.	32.0	44.2	56.1	58.5	61.1	51.5
New Liskeard	Max.	40.8	61.2	69.3	76.8	77.9	66.6
	Min.	13.2	21.0	45.3	51.6	56.8	46.6
Kapuskasing	Max.	41.3	61.0	71.8	78.4	73.0	62.4
	Min.	21.3	38.0	47.0	55.4	51.8	44.6
Gore Bay	Max.	47.7	-	-	78.1	78.4	68.2
	Min.	26.3	40.5	49.6	54.0	60.5	51.4
Fort Frances	Max.	49.1	62.7	75.8	80.2	77.9	64.0
	Min.	27.2	40.4	52.8	56.4	56.1	45.3

RAINFALL						
Harrow	4.3	3.1	1.3	3.5	4.3	2.7
Ridgetown	3.9	4.0	0.3	2.7	2.2	2.4
Guelph	2.9	2.5	1.2	3.5	2.2	2.8
Kemptville	1.4	0.7	2.0	5.0	4.9	3.4
Ottawa	1.2	1.1	1.5	3.5	4.2	4.1
New Liskeard	N.M.	2.3	2.5	N.M.	4.1	N.M.
Kapuskasing	2.2	4.3	0.9	2.8	4.7	3.3
Gore Bay	3.2	1.9	1.7	1.3	3.8	3.7
Fort Frances	0.4	4.9	2.3	5.1	4.9	3.2

NORMAL GROWING SEASON WEATHER RECORDS FOR CERTAIN ONTARIO STATIONS

TEMPERATURE		APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
Harrow	Max.	56.1	68.4	78.9	83.8	81.9	74.7	62.5
	Min.	36.2	46.8	57.7	62.2	60.0	54.4	43.5
Ridgetown	Max.	52.7	64.8	76.7	81.9	80.1	72.1	60.2
	Min.	35.5	45.8	56.3	61.1	59.7	53.9	43.6
Guelph	Max.	50.7	63.6	74.1	78.9	77.3	69.9	57.3
	Min.	32.4	42.9	52.6	56.9	55.6	49.0	38.7
Kemptville	Max.	51.5	66.5	76.5	81.4	78.8	70.1	57.1
	Min.	31.8	44.1	53.7	58.0	55.6	48.1	36.8
Cttawa	Max.	49.8	65.3	75.2	79.8	77.8	68.8	55.4
	Min.	31.2	43.2	53.0	57.5	55.0	47.9	36.8
New Liskeard	Max.	45.9	62.2	72.4	76.8	74.8	64.9	52.5
	Min.	24.3	36.4	47.5	53.1	50.7	43.1	33.8
Kapuskasing	Max.	42.2	57.6	69.4	74.5	71.3	61.2	47.9
	Min.	19.4	33.9	45.1	51.2	49.6	41.6	31.9
Gore Bay	Max.	47.8	59.3	71.3	77.7	75.4	64.3	54.7
	Min.	27.3	38.5	48.4	54.7	53.6	47.4	37.3
Fort Frances	Max.	48.0	62.3	71.5	77.6	74.3	64.0	52.1
	Min.	28.4	41.2	51.1	53.2	54.1	45.3	35.0

RAINFALL							
Harrow	2.5	2.4	3.0	2.3	2.2	2.5	1.8
Ridgetown	3.0	3.1	2.9	2.9	2.4	2.9	2.6
Guelph	2.7	3.1	3.1	3.5	2.9	3.0	2.4
Kemptville	2.6	3.3	2.6	3.5	2.6	3.2	2.8
Ottawa	2.6	2.8	3.4	3.5	3.0	3.1	2.7
New Liskeard	1.7	2.2	3.3	3.6	2.9	3.3	2.3
Kapuskasing	1.7	2.3	2.8	3.3	3.2	3.2	2.1
Gore Bay	2.3	2.3	2.5	2.0	2.1	3.1	2.8
Fort Frances	2.1	2.6	3.9	3.6	3.9	3.3	2.1

ALFALFA VARIETY (DuPUITS TYPE) TRIAL, 1956 (302)

Lbs. D.M./acre of alfalfa + orchard

	3 yr Total	Season Total 1957	1958	1959	2 year average 1957-1958 Cut 1	After	Total	1959 Cut 1	Cut 2	Cut 3
Hay								June 18	July 20	Aug. 24
Alfa	20473	9754	7017	4102	4330	4056	8386	2968	496	638
DuPuits	20959	9663	6953	4343	4282	4026	8308	3128	505	710
Cardinal	20810	9221	6905	4684	4068	3995	8063	3318	638	728
Vernal + DuPuits	20993	8938	6582	5073	4128	3632	7760	3518	654	901
Canadian Grimm	19420	8103	5614	5703	4038	2821	6859	3851	796	1056
Vernal	19032	7712	5572	5748	3839	2803	6642	3880	744	1124
Silage								June 8	July 20	Aug. 24
Alfa	22178	9745	6949	5484	4166	4181	8347	3736	999	749
DuPuits	22187	9835	6770	5582	4005	4298	8303	3734	1008	840
Cardinal	22579	9352	7004	6223	3985	4193	8178	4189	1189	845
M-53	22383	9760	6603	6020	4063	4119	8182	4162	1013	845
Canadian Grimm	20823	8430	6529	5864	3993	3487	7480	3547	1204	1113
Vernal	19761	7945	5615	6201	3796	2984	6780	4042	1220	939
Pasture								May 28	July 8	Aug. 24
Alfa	17962	7115	5727	5120	2356	4065	6421	2037	1768	1315
DuPuits	17604	6793	5751	5060	2299	3973	6272	1997	1783	1280
Cardinal	17722	6605	5849	5268	2324	3903	6227	2071	1975	1222
Vernal + DuPuits	17565	6665	5665	5235	2352	3813	6165	2022	1864	1349
Canadian Grimm	16252	5700	5336	5216	2180	3338	5518	2051	1890	1275
Vernal	16296	5934	4878	6114	2166	3240	5406	2429	2100	1585

ALFALFA VARIETIES (DuPUITS TYPE), 1956 (302). % ALFALFA

	1957				1958			1959		
	Cut 1	Cut 2	Cut 3	Cut 4	Cut 1	Cut 2	Cut 3	Cut 1	Cut 2	Cut 3
Hay										
Alfa	64	76	87	89	58	91	91	51	50	44
DuPuits	52	75	81	87	53	86	91	45	49	55
Cardinal	57	75	81	89	55	89	91	57	65	65
Vernal + DuPuits	58	73	78	88	52	90	92	59	65	63
Canadian Grimm	51	68	80	85	57	85	90	64	66	84
Vernal	64	61	75	79	46	83	89	69	73	68*
Silage										
Alfa	63	75	81	90	71	90	91	60	59	63
DuPuits	58	66	79	89	67	88	90	59	59	71
Cardinal	56	71	79	90	66	91	92	64	64	69
M-53	59	69	78	89	66	88	90	66	65	70
Canadian Grimm	52	59	67	88	61	86	88	68	60	80
Vernal	60	62	72	84	55	86	88	69	56	71
Pasture										
Alfa	72	80	62	79	79	89	85	65	63	73
DuPuits	66	71	55	81	76	89	87	60	59	70
Cardinal	63	69	59	84	78	90	85	76	63	60
Vernal + DuPuits	69	70	60	84	77	90	87	59	59	81
Canadian Grimm	62	64	53	78	74	84	84	66	65	82
Vernal	67	64	56	77	77	87	86	83	79	82

* 1 plot at 30%

ALFALFA VARIETIES, KEMPTVILLE, 1956

Yields in pounds D.M. per acre

	2 year mean 1957-58			1959			3 year mean 1957-58-59			% alfalfa June 1959
	Hay	After	Total	Hay	After	Total	Hay	After	Total	
M-50	5119	3791	8910	4233	2810	7043	4824	3464	8288	95
M-53	5126	3597	8723	3924	2974	6898	4725	3389	8114	95
Vernal	5208	3526	8734	3830	1970	5800	4749	3007	7756	75
DuPuits	4886	3606	8492	4039	2833	6872	4604	3348	7952	90
Alfa	5127	3259	8385	4436	3048	7484	4896	3189	8085	90
Cardinal	4968	3249	8217	4031	2810	6841	4656	3103	7759	90
Can. Grimm	4630	3244	7874	3506	2704	6210	4255	3064	7319	40
S.C. 3503	4897	2090	6987	4142	1482	5624	4645	1887	6532	
Mean	4995	3295	8290	4018	2579	6597	4669	3056	7725	

only 1 sig diff between Vernal + last over 3 yrs
only 1 sig diff bet Ver + DuPuits over 3 yrs

ALFALFA STRAIN MANAGEMENT TRIAL, RIDGETOWN, 1958

1959 Yields in Lbs. D.M. per acre

Pasture Management	June 3 First Cut	July 21 (approx.) Second Cut	Total*
Alfa	4425.7	2769.6	7195.3
DuPuits	4239.5	2749.6	6989.1
Cardinal	4260.3	2339.5	6599.8
Vernal	4196.1	2015.3	6211.4
Narragansett	3930.5	2145.9	6076.4
Grimm	4002.2	2065.1	6067.3
Ranger	3900.9	2118.0	6018.9
Rhizoma	3907.0	1893.8	5800.8
L.S.D. @ 5%	N.S.	278.3 lbs.	

Hay Management	June 18	Aug. 7	
Alfa	5341.4	1934.4	7275.8
DuPuits	5068.3	1809.9	6878.2
Cardinal	5144.0	1704.0	6848.0
Narragansett	4981.4	1772.7	6754.1
Vernal	5202.5	1434.6	6637.1
Rhizoma	4780.2	1842.2	6622.4
Ranger	4903.1	1460.6	6363.7
Grimm	4606.9	1604.2	6211.1
L.S.D. @ 5%	N.S.	N.S.	

* 2 cuts in 1959

Seeding Rate - Alfalfa 10 lbs. per acre.
Danish Orchard 6 lbs. per acre.

SEEDLING YEAR DATA AND WINTER INJURY OR FLOODING DAMAGE IN AN ALFALFA STRAIN TRIAL AT O.A.C. (509)

History

April 18, 1958 - broadcast seeded. Establishment good.

July 23, 1958 - all plots except the birdsfoot trefoil were clipped for weed control.

Sept. 2, 1958 - heights taken.

Oct. 30, 1958 - all plots harvested. Several severe frosts had occurred previous to this date.

Dec.-March - an unusually long winter with sustained low temperatures and a continuous snow cover. Practically no thawing but some rainfall.

April, 1959 - slow melting, considerable flooding in some areas.

May 5, 1959 - stands were graded for survival. Because not all areas were flooded equally gradings were placed on a relative rather than on an absolute basis. In a low area the best plot even though it had suffered considerable damage was graded as a 1 or 2. In the higher areas where there was less flooding the poorest stand in the vicinity was graded as a 7 or 8 or 5. Here a 1 represented a perfect stand. When this procedure was used it was found that the grades for any one variety were quite reasonably consistent.

The gradings represent the combined effect of low temperature and flooding and it is impossible to determine the individual effect of the two factors.

SEEDLING YEAR DATA AND WINTER INJURY - FLOODING DAMAGE

Variety	Winter and flooding damage Noted May, 1959	Height in inches September 2, 1958	Yield in lbs. dry matter Oct. 30, 1958
Teton	2.0	5	855
Viking (birdsfoot trefoil)	2.5	7	1340
A 600	2.5	11	1698
Rhizoma	2.5	10	1348
Rambler	3.0	10	1376
Vernal	3.0	11	1576
A 253	3.0	10	1263
Grimm	3.5	11	1103
Tuna	4.0	10	1169
A 242	4.0	13	1944
Ladak	4.0	11	1439
A 248	4.0	11	1318
Narragansett	4.0	13	1542
Purdue Syn. C.	4.0	10	1572
Saskatchewan 2	4.0	13	1517
A 223	4.0	14	1742
A 225	4.5	14	1627
Sask. 1	4.5	11	1366
New York A	4.5	13	1685
New York C	4.5	13	1846
New York B (Cayuga)	4.5	13	1516
Sask. 5	4.5	10	1368
A 224	5.0	11	1723
A 216	5.0	13	1698
Sask. 3	5.0	11	1283
A 234	5.0	12	1690
Ranger	5.0	13	1321
Atlantic	5.5	12	1284
A 239	5.5	13	1642
DuPuits	5.5	15	1843
Sask. 4	5.5	11	1413
Alfa	5.5	15	1799
Buffalo	6.0	13	1243
Cardinal (501)	7.0	15	1748
Williamsburg	8.0	14	1275

ALFALFA STRAIN TRIAL, 1959

The following strains were seeded on 11E.

Alfa	Rhizoma	Ranger
Tourneur 505	Rambler	Williamsburg
Cardinal	Vernal	Atlantic
F.D. 100	Narragansett	Buffalo
DuPuits	Grimm	Teton
N.Y. A	Sask. Ladak	A 600
N.Y. B	Sask. Forage	A 248
Tuna	Sask. Wilt	A 253
Ladak	Sask. Seed	A 224
Viking birdsfoot trefoil	Sask. Recovery	A 216

ALFALFA SEED LOTS, 1956 (306)

Seed Lot	G. No.	1957 Total	1958 Total	2 year ave. Total	1959 June	3 year ave. Cut 1
Vernal	690	5623	5404	5539	5501	4649
Can. Grimm	688	5630	5448	5514	5265	4355
" "	686	5453	*	-	5263	-
" "	685	6402	*	-	5108	-
" "	684	5112	*	-	5084	-
" "	711	4472	*	-	4964	-
" "	694	5152	5027	5042	4953	4118
Washington Comm.	705	5353	4731	5018	5200	4123
N. Dakota Grimm	704	5229	4807	5090	5196	3993
African	651	2988	0	-	0	-

* not harvested

Summary:

The trial was seeded primarily to check the performance of Washington Common and North Dakota Grimm to see if commercial seed from these areas is as suitable for Ontario as Canadian Grimm and Vernal.

Both of these seed lots did not provide crops of the value as those from Vernal. Vernal was superior each year averaging 526 and 656 lbs. more hay per acre in the first cutting than Washington Common and North Dakota Grimm, respectively. The difference was greatest in 1958.

Six different lots of Canadian Grimm were included to provide an indication of the variability among lots sold under the same designation. The variation in performance was striking. Some lots such as G.688 were reasonably good although none yielded as much as Vernal in the third crop year. Certain lots such as G.694 and G.711 were inferior to Vernal each year, and another lot G.685 was variable in performance. This variability among lots indicates that non-pedigreed Canadian Grimm is an inferior seed to pedigreed Vernal for farm use where consistency in performance as well as superior performance is required.

ALFALFA SEED LOTS (TTT) 1957 (307). % GROUND COVER IN 1959.
AVERAGE OF MAY AND AUGUST RATINGS.

	Class of Seed	No. of Lots	No. lots with survival: Low	Medium	High	% Survival Ave.
Vernal	Cert.	3	0	0	3	48
	Com.#1	2	0	2	0	34
Ranger	Cert.	3	0	3	0	32
	Com.#1	9	2	5	2	27
Can. Grimm	Com. #1	24	5	13	6	3[illegible]
Non-Pedigreed	Blends	5	2	3	0	24
DuPuits	Cert.	2	2	0	0	11
Utah Grimm	Com.#1	1	1	0	0	1[illegible]
California Common	Com.#1	1	1	0	0	4

The winter of 1958-1959 was unusually severe and severe killing occurred under ice sheets. In most years on good alfalfa fields the differences in survival would be much less than above. However, where winter conditions are severe the ratings shown will be what can be expected even on good alfalfa fields. On fields of fair, or variable drainage where ice sheets are common these results will occur quite frequently.

- Vernal is superior in survival ability.

- Ranger and Canadian Grimm were similar.

- Canadian Grimm was variable in performance. Most lots were similar to Ranger but a few superior and just as good as Vernal. <u>But 20% of the non-pedigreed Canadian Grimm lots were inferior to pedigreed Vernal and Ranger</u>. <u>The risk</u> of getting the poor lot <u>is too high</u> to justify use of this seed for long-term stands.

- DuPuits is not as hardy as Vernal. This was previously recognized hence the recommendation of DuPuits for only the best alfalfa land, only part of the acreage on a farm, and for two year stands only.

- <u>Pedigreed seed is clearly superior</u>.

ALFALFA SEED LOTS, 1957 (307). % GROUND COVER

Data collected in May and August, 1959

G. No.	May	August	Mean
Non-Pedigreed Canadian Grown			
1042	38	29	30
1044	30	28	29
1218	55	44	50
1236	48	38	43
1256	28	19	24
1257	32	24	28
1258	8	14	11
1259	38	25	32
1260	19	15	17
1261	16	26	21
1262	48	46	47
1263	20	21	21
1264	25	28	27
1265	15	21	18
1266	46	33	40
1267	54	39	47
1268	30	24	27
1269	29	25	27
1271	8	10	9
1285	46	40	43
1288	52	39	46
1289	42	35	39
1290	15	24	20
1291	38	28	33
Mean	32	28	30
California Common			
1286	2	5	4
Utah Grimm			
1287	9	10	10
DuPuits - Certified			
1045	8	11	10
689	10	11	11
Mean	9	11	11

* formulations in the test 307 file

G. No.	May	August	Mean
Ranger - Certified			
1043	35	29	32
1047	39	26	33
1195	39	25	32
Mean	38	27	32
Ranger - #1 Seed			
1046	44	39	42
1092	44	26	35
1093	53	43	48
1270	28	15	22
1272	25	19	22
1273	5	8	7
1274	28	26	27
1275	11	18	15
1276	23	21	22
Mean	29	24	27
Blends*			
1278	26	24	25
1279	42	26	34
1280	51	41	46
1281	49	36	43
1283	49	34	42
1284	49	44	47
Mean	44	34	39
Elnar			
1277	40	25	33
1292	42	28	35
1295	24	21	23
1296	16	16	16
1297	10	16	13
Mean	26	21	24
Vernal - Certified			
1048	52	35	44
1250	63	39	51
1282	56	40	48
Mean	57	38	48
Vernal - #1 Seed			
1073	29	25	27
1094	44	35	40
Mean	37	30	34

ALFALFA SEED LOTS, 1957 (307). SURVIVAL AND YIELD FROM A SELECTED GROUP OF SEED LOTS FROM ADJACENT PLOTS

	Seed Class	G. No.	% Ground Cover* Ave. 1959	Lbs. D.M./acre Jun.19/59
Vernal	Certified	-	50	4068
California Common	Com. #1	1286	5	0
Ranger	Com. #1	1092	25	2337
Canadian Grimm	Com. #1	1288	30	2669
California Common	Com. #1	1286	0	0
Canadian Grimm	Com. #1	1218	38	2755
Non-pedigreed	Blend	1296	23	3037
Vernal	Com. #1	1094	53	4456
Vernal	Com. #1	1073	45	4307
Canadian Grimm	Com. #1	1257	55	3221
California Common	Com. #1	1286	5	0
Canadian Grimm	Com. #1	1264	25	3000
Canadian Grimm	Com. #1	1236	50	4118
California Common	Com. #1	1286	0	0
Canadian Grimm	Com. #1	1042	53	5271
DuPuits	Certified	689	13	1802
Ranger	Certified	1047	60	4252

* ground cover on the specific plot for which yield is reported

ALFALFA BLENDS, 1957

Lbs. D.M./acre at Kemptville and % ground cover at O.A.C. in 1959

	1958			1959			1958-1959 Totals			% Ground Cover O.A.C.
	Hay	After	Total	Hay	After	Total	Hay	After	Total	
Vernal	3804	1196	5000	5070	1791	6861	8874	2987	11861	48
G.1280*	4385	1061	5446	3822	1729	5551	8207	2790	10997	46
Can. Grimm	4012	1098	5110	3840	1753	5593	7852	2851	10703	43
G.1279	3261	1034	4295	4547	1644	6191	7808	2678	10486	34
G.1278	2876	931	3807	4705	1719	6424	7581	2650	10231	25
G.1281	2898	989	3887	4343	1796	6139	7241	2785	10026	43
G.1283	2812	889	3701	4447	1247	6194	7259	2636	9895	42
Ver. Brome	3535	1127	4662	4485	1440	5925	8020	2567	10587	-
Mean	3448	1041	4489	4407	1702	6109	7855	2743	10598	

Notes:

Vernal was superior in winter survival at Guelph and in yield at Kemptville. The best of the blends in the table above contained 80% Vernal. Blends with non-pedigreed Vernal and Ranger were inferior to those with pedigreed Vernal and Ranger. California Common was inferior to DuPuits in pure stands as shown in the large table and in blends. Utah Grimm was inferior to Canadian Grimm in pure stands and in blends.

The results of these trials and the results from test 306 indicate that California Common, Washington Common, Utah Grimm and North Dakota Grimm are not satisfactory for Ontario.

1956 CO-OPERATIVE HAY-PASTURE TRIALS - ALFALFA

1959 RESULTS

Plots in Kent, Haldimand, Stormont were reported on in 1959. In two locations the stand of Vernal was better than that of DuPuits or Canadian Grimm. In Kent the alfalfa made up about 30% of the sward in each plot. Yields reported in Stormont show production from Vernal, DuPuits, Canadian Grimm to follow that order. In Haldimand Canadian Grimm was reported as producing 5250 lbs./acre while Vernal produced 4500 lbs./acre and DuPuits produced 3000 lbs./acre. DuPuits had been badly winterkilled on this plot.

ALFALFA VARIETIES FOR FIELDS OF FAIR OR VARIABLE DRAINAGE 1958 (309)

	Co-operator	Mailing Address	Township	Lot	Conc.	Telephone
REGION A						
Essex	Lloyd Little	R.R.#2, Maidstone	Maidstone	17	9	Pl.Park 3-r-42
Lambton	Geo. McCormick	R.R.#2, Watford	Warwick	W½11	2-N	Forest 625 r 221
Welland	Harold Brown	R.R.#3, Welland	Pelham	14	14	Twining 22816
Lincoln	Greenmelk Co.	Smithville	S.Grimsby	-	-	Smithville 141
REGION B						
Wentworth	Edgar Gowland	Vinemount	Saltfleet	12	6	Twining 42271
Halton	Sam Finnie	R.R.#1, Hornby	Trafalgar	4	7	Triangle 86260
Manitoulin	Wm. Johnston	Gore Bay	Gordon	9	WR	306-21
Bruce	Cecil Holland		Kincardine	5	3	
N. Simcoe	Hunter Russell	Midhurst				
Durham	Marshall Fallis	R.R.#3, Millbrook	Callan			Millbrook 207 r 12
Durham	Garnet Richard	Bowmanville	Darlington			
Len. & Add.	Don Paul	Napanee				
REGION C						
Grenville	Morley Anderson	R.R.#3, Mountain	S.Gower	5	2	Kempt.648 r 12
Dundas	Hugh Blaine	R.R.# , Mountain	Mountain	15	8	S.Mountain 645 r 33
REGION D						
N.Wellington	Elmer Culp	Arthur	W.Luther	13	5	
Dufferin	C. Shields	Shelbourne				
REGION E						
Parry Sound	Cecil Pink	Burks Falls	Armour	5	7	901 r 3
Rainy River	A.W. Leveridge	Devlin	Lash	NE¼25		
REGION F						
Temiskaming	N.L. Station					
Cochrane S.	F.L. Plummer	Monteith				

VARIETIES IN TEST:

DuPuits + Climax
Alfa + Climax
Can. Grimm + Climax
Ranger + Climax
Rhizoma + Climax
Narragansett + Climax
Vernal + Climax
Vernal + Viking + Climax
Viking + Climax

Plot size, 1 acre.

ALFALFA VARIETY TEST FOR SOILS OF FAIR OR VARIABLE DRAINAGE, 1958 (309)

Y459

Report on vigor, stand and persistence to the summer of the first harvest year

Growth and Vigor

DuPuits and Alfa were reported to have the best growth and vigor of the varieties on test. In 3 out of 10 reports Alfa was reported more vigorous than DuPuits. In one location DuPuits showed more vigor than Alfa. The remainder showed equal vigor for the 2 varieties.

Narragansett was reported more vigorous than Vernal in two of eight reports. Vernal showed more vigor than Narragansett in 3 locations and the two varieties showed equal vigor and growth in 3 locations. In general they showed more growth than other non-flemish types.

Growth of Ranger, Rhizoma, Narragansett and Vernal were reported equal in one location.

Ranger was reported to have better vigor than Vernal in one location, better than Rhizoma in two locations, and equal to Rhizoma and Narragansett in one location. In the other 4 locations it equalled Rhizoma in vigor.

Rhizoma was reported to have more growth than Ranger in one location but equal growth in 4 locations. In the other 3 locations growth was less than Ranger. In general both Rhizoma and Ranger appeared to have less growth than Vernal and Narragansett.

Grimm was reported to have the least vigor in 7 out of 8 locations; (Vernal was indicated having less vigor than Grimm in the other location).

The Viking trefoil, Vernal alfalfa mixture gave fair growth but would yield less than Vernal alone in all cases. Viking was reported as low in production in 2 out of 4 cases. In 3 locations out of 6 the Viking plot had poor vigor.

Stand

The stands of DuPuits and Vernal were about the same in most locations. These two varieties had a stand equal to the best in 10 out of 17 locations. Each was reported to have the worst stand of the group in one case.

Narragansett and Rhizoma were reported to have stand equal to the best in 8 out of 17 locations and to have the poorest stand of the group in one location each. Alfa was reported to have a stand equal to the best in the group in 7 out of 16 cases and the poorest stand in 1 location.

Ranger was reported as equal to the best stand in 6 of the 17 locations, and the poorest in 5 locations.

Grimm had stands equal to the best in 2 locations and equal to the poorest in 4 locations. It was rated 5 (low) in 4 cases, 6 (lower) in 3 cases and 7 (lowest) in 4 cases.

According to this information the chances of getting a good stand for the first harvest year of alfalfa are best with Vernal and DuPuits; next best with Narragansett, Alfa and Rhizoma, followed by Ranger.

Grimm provides the poorest chance for obtaining a good stand which remains to the first harvest year. The stand of alfalfa in the Vernal, Viking mixture was reduced in every case in comparison to Vernal alone. The trefoil was reported as sparse in one location.

In the plot of pure Viking trefoil the stand was reported as sparse in only two locations.

Persistence

Ability to survive in damp conditions was evaluated for the first harvest year. Out of 4 locations DuPuits and Alfa were reported as going as far into wet areas as any varieties in the test. Narragansett was reported best in this respect in one location. Vernal was reported as second in 3 locations while Narragansett, Rhizoma, Ranger, Alfa and DuPuits were reported as second best in one location each. Narragansett and Ranger were each listed 3rd in one test. Rhizoma was listed as 4th in one test and second last in another as far as ability to survive under damp conditions is concerned.

Grimm was reported at the bottom of the list in 2 locations and next to the bottom in the third location. Ranger was listed at the bottom in one location.

This information indicates that DuPuits, Vernal, Alfa and Narragansett have (in the first harvest year) survived as well as any varieties in the test in low areas and that these varieties are followed by Rhizoma and Ranger. Grimm appears to have suffered more than any other variety.

The birdsfoot trefoil has persisted in the wetter areas on all tests; however, yellowing was present on several and plants were killed out on the wettest areas. The trefoil in general survived wetter conditions than the alfalfa varieties.

RED CLOVER, DIPLOID AND TETRAPLOID STRAINS

SEEDED IN 1958 ON RANGE 18D, O.A.C.

	Yields in pounds D.M. per acre		Percent ground cover
	May	Aftermath	September 25
Canadian Strains			
Lasalle	4440	1620	60
Common	3560	960	15
Altaswede	4030		40
Mean	4010		
Swedish Diploids			
Silo	3410		25
Hermes	3790		20
Merkur	3600		25
Resistenta	3750		15
Mean	3640		
Swedish Tetraploids			
Svalov 034	3900		35
Ulva 036	3650		55
Svalov 045	3760		30
Ultuna	3620		20
Merkur	3570		10
Rea	3970		20
Resistenta x Ultuna	3720		35
Hersnap x Ultuna	4080		45
Merkur x Ultuna	3500		15
Mean	3750		
General Mean	3770		29

THE BIRDSFOOT TREFOIL BREEDING PROGRAM - 1959

A. In 1958 O.P. seed was collected from about 1500 plants. Each progeny was graded for seed size and the lower seed weights were discarded. In 1959 about 800 European-type lines and 180 Empire-type lines were seeded for observation on seedling vigor. These were not replicated but frequent checks were used. About 200 lines were chosen for further study in 1960.

B. In 1958 about 800 progeny lines were tested for seedling vigor in the field, (3C). About 175 top-grade European and 85 top-grade Empire progenies were selected for further study in 1959. In 1959 these superior lines were seeded using three or four replicates where possible.

C. The winter of 1958-1959 was severe and a large number of nursery plants were damaged or killed. About 400 showed superior winter resistance and excellent spring vigor in 1959. Seed was collected from these during the summer and graded for size in the fall.

D. In the fall of 1959 a survey was made of all lines on which data had been collected in 1957-1959. A large number of lines were then discarded because of small seed size or low grades for seedling vigor. Lines taken from the A and B sections above were then tested for seedling vigor in the greenhouse and this test included about 700 lines.

At this stage data had been collected for about 3000 plants on seedling vigor and/or seed size. Plans were made for eliminating all but 400-500 of these and of subjecting the ones retained to a further test in 1960 in which each of the 450 lines would be seeded in a 4-replicate test and graded for seedling vigor and yield. The following groups would comprise the experiment.

1. A group of 200 lines (see A and B above) selected out of the original 1500 plants mentioned on the basis of seed size and field seedling vigor.

2. A group of about 190 (see D above) selected on the basis of greenhouse seedling vigor.

3. A group of about 70 (see C above) selected out of the winter-hardy types on the basis of seed size. These had not been tested for seedling vigor.

4. A few lines known from previous yield trials to be much superior to the average.

5. A small group of heavy-seeded individuals chosen from the heritability study whose female parents were known to be of superior quality.

6. A small miscellaneous group including some inter-specific hybrids.

The entire seeding will consist essentially of about 350 European selections and 110 Empire lines. In addition 64 strains will be tested as a part of the correlation study.

BIRDSFOOT TREFOIL

Heritability Study

Objective: To obtain an estimate of heritability for seed size and seed yield in birdsfoot trefoil.

Material: 72 Viking and Mansfield parents were chosen whose seed size ranged from 0.9 to 1.9 grams per 1000 seeds and seed yield from 3 to 30 grams per plant.

20 progeny were grown from each parent using open-pollination seed. These were started in the greenhouse and transplanted to the field in May. Five replicates were used and in each replicate a plot consisted of four progeny plus, where available, a propagule of the parental clone.

Procedure: Seed was harvested over a period of about three weeks and on any one harvesting date only the mature seed was collected. Unripe pods were left to ripen and to be harvested at a later date. A small amount of shattering occurred and the number of shattered pods was recorded.

The dried material was threshed and seed yield obtained along with the weight of 100 seeds per plant.

Observations: Range in seed size in the population was 0.80 to 1.82 per 1000 seeds.
Range in average seed size of progeny was 1.04 to 1.46 per 1000 seeds.
Range in seed yield was 0 to 6 grams.
Range in average seed yield of progeny was 0.8 to 2.2.

Comment:
1. Preliminary estimates of heritability for seed size on a fraction of the population was 0.40.
2. No parent graded in the lower 50% for seed size produced offspring whose average placed them in the upper 35% for seed size.
3. Selection for seed size based on phenotype appears possible and reasonably reliable.

BIRDSFOOT TREFOIL

Correlation Studies

Objective: To study the possibility of detecting desirable lines of birdsfoot trefoil by selection for seed size and for seedling vigor in the greenhouse.

Material: 64 lines including both Viking and Mansfield varieties were selected for study. These were known to represent a rather wide range in both seed size and vigor.

Procedure: These were grown in three locations, namely, in flats in the greenhouse, on good alfalfa soil on 11E and on less well drained soil on 8C. In the greenhouse 20 seeds were planted per plot and in the field 300 seeds per 11 foot row. Four replicates were used for all tests.

In the greenhouse, yields were taken when the plants were 6-7 weeks old and in the field the rows were harvested in July and in October.

The 64 strains were divided into four groups on two different bases:
(A) seed size, (B) greenhouse seedling vigor.
The data were then analyzed for differences between and within groups and between sites.

Observations: Some of the more pertinent observations were as follows:

A. On the basis of seed size:

(i) The 32 heavier seeded lines significantly outyielded the 32 lighter seeded lines in the field.

(ii) The 16 heaviest seeded lines significantly outyielded the next group of 16.

(iii) There were significant differences in yield within the high seed weight group.

(iv) There was no group x location interaction.

B. On the basis of greenhouse seedling vigor:

(i) The 32 heavier greenhouse lines significantly outyielded the 32 lighter greenhouse lines in the field.

(ii) There were significant differences within both the high weight group and the medium high weight group.

(iii) There was no group x location interaction.

Comments: The data obtained were confined exclusively to yields in the seedling year but they do indicate that selection for seed weight and for seedling vigor in the greenhouse may be a useful guide in the isolation of lines that yield well in the field.

The experiment is being continued for the purpose of obtaining yields in the "first crop year", i.e. in the year following seeding.

The hypothesis that seed size and seedling vigor in the greenhouse may be useful criteria in the isolation of high yielding lines appears to be worthy of further experimental study.

The sixteen best yielders in the field were:

17-9, 13-10, 9-9, 78-2, 8-5, 2-17, 5-18, 6-14,
12-23, 5-17, 88-8, 6-19, 3-20, 83-8, 77-21, 11-15.

Range in yield: 2630-3916 units.
Mean yield: 3127 units.
Average superiority of best three lines over mean is 19%.

PROGENY YIELD TRIAL, 15D - SEEDED IN 1958

Progenies yielding over 10% more than Viking:

73-16, 10-23, 17-9, 82-3.

Progenies yielding 7-10% more than Viking:

13-10, 96-20, 1-7, 89-19, 3-18, 97-11, 62-2, 74-2.

Progenies yielding 5-7% more than Viking:

17-7, 97-11, 18-12, 5-17, 62-9, 71-8.

Range in yield: 10.4 to 16.1 units

Viking yield: 12.9 units.

Average superiority of best three lines over Viking is 19%.

BIRDSFOOT TREFOIL STRAIN TRIAL, O.A.C., 1957

Yields in Pounds D.M. per Acre

	1958			1959			1958-1959 Total		
	Hay	After	Total	Hay	After	Total	Hay	After	Total
Viking	3600	5070	8670	3840	2550	6390	7440	7620	15060
Roskilde	3200	4750	7950	3690	2540	6230	6890	7290	14180
Mansfield	2980	4740	7720	3650	2600	6250	6630	7340	13970
Otafte	2980	4640	7620	3710	2420	6130	6690	7060	13750
Cascade	2960	4860	7820	3410	2390	5800	6370	7250	13620
Granger	3050	4420	7470	3280	2680	5960	6330	7100	13430
Empire	2980	4340	7320	4120	1950	6070	7100	6290	13390
Tana	2980	4370	7350	3560	2430	5990	6540	6800	13340
European	2850	4520	7370	3130	2490	5620	5980	7010	12990
Mean	3070	4630	7700	3590	2450	6050	6660	7080	13740

BIRDSFOOT TREFOIL VARIETIES, KEMPTVILLE, 1956*

Yields in Pounds D.M. per Acre

	1958			1959				1958-1959 Total			% Trefoil Just Hay 1959
	Hay	After	Total	Hay	Aftermath		Total	Hay	After	Total	
Empire	5848	2297	8145	6226**	-	3099//	9325	5974	2562	8536	50
Viking	4764	2896	7660	4698	2980/	1401	9079	4742	3391	8133	60
Mansfield	4577	2927	7504	3985	3100	1301	8386	4380	3418	7798	70
Hybrid	5036	2415	7451	5119	2591	1181	8891	5064	2867	7931	70
G 701	5745	2308	8053	6034**	-	2916	8950	5841	2511	8352	50
G 765	4388	2958	7346	3365	2844	1461	7670	4047	3407	7454	70
G 770	4248	2818	7066	3385	2981	1452	7818	3960	3357	7317	70
Mean	4944	2660	7604	4687	2899☆	1830	8588	4858	3073	7932	

* Seeded with Climax timothy

☆ Mean of 5 strains only

** Cut July 13, others June 29.

/ August 18

// September 28

EXPERIMENT 203. TIMOTHY VARIETY TEST, 1956. SUMMARY - 1957, 1958 and 1959.

Average Yield (1957, 1958, 1959) - Timothy + Vernal

Variety	Cut 1		Aftermath		Season Total		
	Medium[1]	Late[2]	Medium[1]	Late[2]	Medium[1]	Late[2]	Mean
Common	5669	5656	3241	2582	8910	8238	8574
S-51	5525	5352	3249	2684	8774	8036	8405
Climax	5571	5455	3241	2530	8812	7985	8398
Essex	5271	5427	3354	2618	8625	8045	8335
Drummond	5382	5460	3209	2587	8591	8047	8319
S-48	5437	5297	3295	2597	8732	7894	8313
Mean							

Cut 1: C.V. for varieties - 7.35%
No significant differences among varieties or between cutting times.
Interaction of varieties and times of cut non-significant, also.
Percent of timothy in aftermath very low.

Timothy Component - Cut 1

Variety	% Timothy		Yield			% Leaf[3]		% Protein[3]	
	Medium[1]	Late[2]	Medium[1]	Late[2]	Mean	Medium[1]	Late[2]	Medium[1]	Late[2]
Common	41.9	40.8	2375	2306	2341	48.0	37.4		
Climax	45.4	38.2	2528	2086	2307	48.4	36.8		
Essex	30.7	35.8	1616	1941	1812	49.0	37.8		
Drummond	33.0	34.4	1775	1876	1792	51.0	39.0		
S-48	30.4	32.0	1655	1696	1676	55.4	44.2		
S-51	28.6	29.7	1579	1589	1584	55.0	41.4		
Mean									
L.S.D. for varieties 5%			389	389	275	4.9	4.9		
1%			525	525	371	6.5	6.5		
Diff. between cutting times			N.S.			Sig. @ 1% level			
Varieties x cutting times			N.S.			N.S.			
C.V. for varieties			24.4%			10.6%			

1 Medium cut taken when Climax in bloom
2 Late cut taken when S-48 in bloom
3 Summary of data for 1957 and 1959 only

Yields (lbs./acre) - Seasonal Mean for 1957, 1958, 1959 for two locations
Timothy Variety Tests seeded 1956 - Cut 1

Variety	Eau Claire	Mindemoya
Climax	4854	5018
Milton	4846	4853
Drummond	4792	4780
S-48	4740	4925
S-51	4753	4195
Medon	4674	5046

EXPERIMENT 203. TIMOTHY VARIETY TEST, 1956. SUMMARY - 1957, 1958 and 1959

In overall performance, Common and Climax are quite similar. With alfalfa, S-51 yielded very well but the mixture contained 10% less grass than did the mixtures with Common and Climax.

When the yields of the mixtures are considered, differences among varieties are non-significant. However, when one considers the pounds of grass in each mixture, varietal differences are highly significant. This emphasizes the importance of testing varieties in mixtures. Additional work on this problem is being carried out.

EXPERIMENT 211. TIMOTHY VARIETY TEST, 1958.

First Cut Yields (lbs./acre) - 1959

Variety	Timothy + Vernal			Pure Stands			Mean
	Medium[1]	Late[2]	Mean	Medium	Late	Mean	
Climax	4908	6036	5472	5158	5298	5228	5326
Common	4909	5311	5110	5035	5176	5105	5107
Essex	4939	5158	5048	4612	5007	4810	4905
Drummond	4921	4951	4936	4576	5158	4867	4844
S-51	4774	4610	4692	4441	4148	4295	4454
S-48	4734	4898	4816	3724	3478	3601	4087
Mean	4864	5161	5012	4591	4711	4651	4796
L.S.D. for varieties 5%			386			314	245
1%			515			417	325
C.V. for varieties			8.15%				

Differences between methods of planting - N.S.
Differences between cutting times - N.S.
Interactions:
Cutting times x methods of planting - N.S.
Varieties x methods of planting - Sig. @ 1% level
Varieties x cutting times - Sig. @ 5% level
Varieties x cutting times x methods of planting - N.S.

1 Medium cut - June 17, 1959
2 Late cut - June 30, 1959

First Cut Yields of Grass (lbs./acre) - 1959

Variety	Pure Stands			Mixtures		
	Medium	Late	Mean	Medium	Late	Mean
Climax	5158	5298	5228	1239	823	1031
Common	5035	5176	5105	848	1223	1036
Drummond	4576	5158	4867	980	934	957
Essex	4612	5007	4810	749	446	598
S-51	4441	4148	4295	1298	532	915
S-48	3724	3478	3601	456	378	417
Mean	4591	4711	4651	929	723	826
L.S.D. for varieties 5%			314			321
1%			417			432
C.V. for varieties - 11.1%						

EXPERIMENT 211. TIMOTHY VARIETY TEST, 1958.

In the analysis of variance:
Differences between cutting times - N.S.
Interactions:
Cutting times x planting methods - N.S.
Varieties x planting methods - Sig. @ 1% level
Varieties x cutting times - Sig. @ 1% level
Varieties x cutting times x planting methods - N.S.

Mean Yields of Varieties (lbs./acre) - 1959

Variety	With Vernal		Alone
	Total	Grass	
Climax	5472	1031	5228
Common	5110	1036	5105
Drummond	4936	957	4867
Essex	5048	598	4810
S-51	4692	915	4295
S-48	4816	417	3601
Range (Highest-Lowest)	780	619	1627
L.S.D. for varieties 5%	386	321	314
1%	515	432	417

% Leaf - 1959

Variety	With Vernal			Alone			Mean
	Medium	Late	Mean	Medium	Late	Mean	
S-48	76	71	73	68	64	66	69
Essex	70	62	66	54	46	50	56
S-51	64	58	61	52	49	50	55
Drummond	62	56	59	52	44	48	52
Climax	62	54	58	46	40	43	49
Common	56	48	52	42	36	39	44
Mean	65	58	62	52	46	49	54
L.S.D. for varieties 5%			5			3	3
1%			7			5	4

Differences between methods of planting - Sig. @ 1% level
Differences between cutting times - Sig. @ 1% level
Interactions: Cutting times x planting methods - N.S.
Varieties x planting methods - N.S.
Varieties x cutting times - N.S.
Varieties x cutting times x planting methods - N.S.
C.V. for varieties - 9.2%.

EXPERIMENT 211. TIMOTHY VARIETY TEST, 1958

Interactions of varieties with methods of planting and with cutting times were found in both analyses of yield. These results emphasize the importance of the testing procedure used to evaluate varieties. When grown with alfalfa, the range for total yield was less than $\frac{1}{2}$ of the range among the same varieties evaluated in pure stands. Note that the range in the total yields of the mixtures is only slightly greater than the range for the grass component. For these 6 varieties, total yield levels were quite similar under both planting methods although different conclusions may be drawn on the basis of L.S.D. values. On the basis of the grass component of the mixtures, one sees quite a different picture. With a different group of varieties, the interactions might be more obvious.

Because of the extremely variable aftermath recovery, no date on aftermath yields were collected.

For leafiness, the interactions were non-significant.

This experiment is being continued.

EXPERIMENT 213. PRELIMINARY STRAIN TEST. 1958

Cut 1

Variety	Yield (lbs./acre)*
Climax	5128
Weibull's T48	5077
Weibull's T41	4987
O-233	4932
S-48	3469

* Cut 1 taken on June 18th, 1959.

S-48 yielded significantly less than the other four varieties. These four varieties were quite similar to Climax in appearance. However, Climax could be distinguished in the plots by its wider leaves.

CO-OPERATIVE HAY-PASTURE FARM PLANTING, 1956

1959 RESULTS

Reports on the five timothy plots were summarized in 1959. In two cases (Elgin and South Simcoe) Climax gave higher yield of hay than any other plot. In 2 locations (Ontario and Prescott) yields of Common and Climax were reported equal. In Peel, Common gave higher yield than Climax.

In Ontario, Elgin and Prescott, Climax was reported to be later than Common. No report was given for Peel or South Simcoe in this regard. Climax was reported leafier than Common in Prescott and South Simcoe.

The two S varieties were considerably later than Common or Climax in all cases. Alfalfa was not as thin in these two varieties as with Common and Climax in Elgin and Peel (others not reported). The S-48 and S-51 were noted as being short in height in Prescott and South Simcoe. No differences were noted between S-48 and S-51 except that in Ontario, S-48 was noted as finer than S-51 and S-51 was slightly earlier than S-48. Both these varieties dried up in South Simcoe and produced very little.

In Peel spittle bugs were noted as being present in greater numbers on the S-48 and S-51 plots than on the Climax and Common.

Summary: S-48 and S-51 yield about the same. They are later and have fewer heads than Common and Climax. Climax is apparently slightly later than Common and slightly leafier but the two are much the same in yield. Yield of S-48 and S-51 is considerably less than Common or Climax. S-48 and S-51 are less competitive with alfalfa than Common or Climax.

SUMMARY OF YIELD DATA FROM BROMEGRASS STRAIN TEST (HAY-PASTURE MANAGEMENT)

Seeded in 1955, Range 17D. Pounds Dry Matter/Acre*

	1958 Hay July 8	1956-1957 Average Hay	After	Total	3 Year Average Hay Yield	% Grass 1958 Hay
			Brome + Alfalfa (Vernal)			
Saratoga	5408	5255	3076	8331	5306	
Lyon	5211	5212	2980	8192	5212	
Southland	5220	5176	3003	8179	5191	
Achenbach	5300	5103	2703	7806	5169	
Canadian Brome	4933	4392	2714	7106	4573	
Mean	5214	5028	2895	7923	5090	
L.S.D.	N.S.					
C.V. (%)	7.7					
			Brome Component			
Saratoga	1877	2572	362	2934	2340	34.5
Lyon	1543	2396	171	2567	2112	29.3
Southland	1473	2493	183	2676	2153	28.2
Achenbach	1950	2749	156	2905	2483	36.9
Canadian Brome	1505	2144	163	2307	1924	30.8
Mean	1670	2470	207	2677	2204	31.9
L.S.D.	N.S.					N.S.
C.V. (%)	24.2					22.2
			Alfalfa Component			
Saratoga	3531	2683	2714	5397	2966	
Lyon	3668	2816	2809	5625	3100	
Southland	3747	2683	2820	5503	3038	
Achenbach	3350	2354	2547	4901	2686	
Canadian Brome	3428	2248	2551	4799	2642	
Mean	3644	2558	2688	5246	2919	

* see page 34, 1957 Progress Report (Breeding and Strain Testing) for complete 1956 and 1957 data

BROME VARIETIES IN ASSOCIATION WITH ALFALFA, 1956 (202)

Lbs. D.M./acre of Alfalfa + Brome

	1957					1958					2 year average		
		Aftermath			Season		Aftermath			Season		After	
	June	July	Aug.	Total	Total	July 3	July 31	Sept. 12	Total	Total	Hay	Total	Total
Vernal + Saratoga	5220	3365	1326	4691	9911	6411	1975	1292	3272	9683	5816	3982	9798
Can. Brome	5332	3285	1280	4565	9897	6412	2006	1316	3322	9734	5872	3944	9816
Lyon	5354	3416	1423	4839	10193	6531	2141	1452	3593	10124	5943	4216	10159
Achenbach	5080	3394	1313	4707	9787	6872	2176	1509	3685	10557	5976	4196	10172
Wisc. 55	5023	3398	1368	4766	9789	6877	2106	1501	3607	10484	5950	4187	10137
Wisc. 63	5675	3360	1394	4754	10429	7007	2004	1473	3477	10484	6341	4116	10457
S-4475	5540	3533	1298	4831	10371	6215	2037	1360	3397	9612	5878	4114	9992
Climax	5338	3204	1318	4522	9860	6813	2057	1213	3270	10083	6076	3896	9972
DuPuits + Saratoga	4995	3571	1694	5265	10260	5663	2262	1536	3798	9461	5329	4532	9861
Can. Brome	5498	3611	1768	5379	10877	5843	2369	1669	4038	9881	5671	4709	10379
Lyon	5286	3764	1821	5585	10871	6331	2356	1550	3906	10237	5809	4746	10554
DuPuits Alone	4374	3535	1687	5222	9596	5384	1513	1055	2568	7952	4879	3895	8774
Alfa + Lyon	6110	3715	1696	5411	11521	6190	2392	1499	3891	10081	6150	4651	10801
Can. Grimm + Can.Brome	5177	3488	1322	4810	9987	6043	2254	1519	3773	9816	5610	4292	9906
Lyon	5539	3522	1307	4829	10368	6354	2313	1544	3857	10211	5947	4343	10290
Rambler + Lyon	6421	2016	463	2479	8900	5789	921	493	1414	7203	6105	1947	8052
Viking + Frode	5151	1749	954	2703	7853	4478	662	450	1112	5590	4815	1908	6722
Mean	5360	3290	1378	4668	10028	6189	1973	1320	3293	9482	5775	3981	9755
L.S.D. 5%						870	404	354					
C.V. (%)						9.9	14.4	18.8					

	1959					3 year average			Percent ground cover		
	Hay	Aftermath			Season		After				
	June 16	Aug. 5	Sept. 29	Total	Total	Hay	Total	Total	Legume	Grass	Total Oct.8 1959
Vernal + Saratoga	5826	2250	1257	3507	9333	5819	3823	9642	14	58	72
Can. Brome	4831	2135	1211	3346	8177	5525	3744	9269	28	54	82
Lyon	5208	2324	1251	3575	8783	5698	4002	9700	14	40	56
Achenbach	5254	2549	1449	3998	9252	5735	4130	9865	12	39	51
Wisc. 55	5131	2617	1358	3975	9106	5677	4116	9793	19	48	66
Wisc. 63	5843	2348	1466	3814	9657	6175	4015	10190	22	56	78
S-4475	5056	2274	1246	3520	8576	5604	3916	9520	18	50	68
Climax	5805	2353	1364	3717	9523	5986	3836	9822	17	53	70
DuPuits + Saratoga	5031	1821	717	2538	7569	5230	3867	9097	20	39	59
Can. Brome	4622	1691	514	2205	6827	5321	3874	9195	7	46	55
Lyon	4032	1923	647	2570	6602	5216	4020	9236	11	20	31
DuPuits alone	2571	804	280	1084	3655	4110	3815	7925	1	0	1
Alfa + Lyon	4358	1632	438	2070	6428	5553	3791	9344	6	34	39
Can.Grimm + Can.Brome	5332	2238	1046	3284	8616	5517	3756	9273	16	53	69
Lyon	5290	2430	1031	3461	8751	5728	4049	9777	18	51	69
Rambler + Lyon	4841	1643	722	2365	7206	5684	2086	7770	9	79	88
Viking + Frode	4174	1053	858	1911	6085	4601	1909	6510	25	73	98
Mean	4894	2005	991	2996	7890	5481	3652	9133	16	49	62
L.S.D. 5%	663	579	272						12	21	9
C.V. (%)	9.5	20.3	19.3						53.6	29.3	11.0

BROME VARIETIES IN ASSOCIATION WITH ALFALFA, 1956 (202)

Pounds Dry Matter/Acre of Grass Component

	1957					1958					2 Year Average		
	Hay	Aftermath			Season		Aftermath			Season			
	June	July	Aug.	Total	Total	Hay	July 31	Sept. 2	Total	Total	Hay	After	Total
Vernal + Saratoga	3669	1695	568	2253	5922	3513	392	238	630	4143	3591	1442	5033
Can. Brome	3008	1445	256	1701	4708	2627	409	161	570	3197	2818	1136	3954
Lyon	2830	1141	270	1411	4241	1762	193	124	317	2079	2296	864	3160
Achenbach	975	352	94	446	1421	979	172	145	317	1296	977	382	1359
Wisc. 55	2392	890	180	1070	3462	1774	196	79	275	2049	2083	673	2756
Wisc. 63	3491	1266	507	1773	5263	3277	404	234	638	3915	3384	1206	4590
S-4475	2974	1597	410	2007	4981	3125	452	195	647	3772	3050	1327	4377
Climax	2648	756	206	962	3610	2870	170	108	278	3148	2759	620	3379
DuPuits + Saratoga	1842	700	100	800	2642	1428	149	75	224	1652	1635	512	2147
Can. Brome	1178	466	33	499	1677	916	115	47	162	1078	1047	331	1378
Lyon	929	174	20	194	1123	492	47	16	63	555	711	129	840
DuPuits alone	-	-	-	-	-	-	-	-	-	-	-	-	-
Alfa + Lyon	1485	348	19	367	1852	295	28	34	62	357	890	215	1105
Can.Grimm + Can.Brome	3091	1331	257	1588	4679	2674	501	152	653	3327	2883	1121	4004
Lyon	3612	896	186	1082	4693	1945	189	78	267	2212	2779	675	3454
Rambler + Lyon	5820	1420	333	1753	7574	4242	333	173	506	4748	5031	1130	6161
Viking + Frode	4962	1638	867	2505	7467	3994	418	316	734	4728	4478	1620	6098
Mean	2807	1006	269	1275	4082	2113	245	136	396	2641	2460	836	3296
L.S.D. 5%						1345	149	127					
C.V. (%)						44.7	42.7	65.7					

	1959					3 Year Average			Pounds of Legume 1959				
	Hay	Aftermath			Season				Hay	Aftermath			Season
	June	Aug.	Sept.	Total	Total	Hay	After	Total	June	Aug.	Sept.	Total	Total
Vernal + Saratoga	4077	629	254	883	4960	3753	1255	5008	1474	1596	960	2556	4030
Can. Brome	3609	533	226	759	4368	3081	1010	4091	1196	1587	1005	2592	3788
Lyon	2913	186	102	288	3201	2502	672	3174	2118	1977	1100	3077	5195
Achenbach	2460	298	192	490	2950	1471	418	1889	2291	2085	1200	3285	5576
Wisc. 55	2801	753	131	884	3085	2322	743	3065	2170	1659	1148	2807	4977
Wisc. 63	4490	474	251	725	5215	3753	1045	4798	1314	1840	1196	3036	4350
S-4475	3462	595	197	792	4254	3187	1149	4336	1542	1651	1037	2688	4230
Climax	3315	208	109	317	3632	2944	519	3463	2366	2057	1190	3247	5613
DuPuits + Saratoga	2911	485	94	579	3490	2060	534	2594	1303	1134	501	1635	2943
Can. Brome	2864	685	135	820	3684	1653	494	2147	1726	979	355	1334	3060
Lyon	1475	150	273	423	1898	965	227	1192	2176	1567	315	1883	4059
DuPuits alone	-	-	-	-	-	-	-	-	410	211	81	292	702
Alfa + Lyon	1813	287	113	400	2213	1198	276	1474	1964	1193	258	1451	3415
Can.Grimm + Can.Brome	4032	574	168	742	4774	3266	994	4260	1300	1656	878	2534	3834
Lyon	2937	360	139	499	3436	2831	616	3447	2225	1921	849	2770	4995
Rambler + Lyon	3230	285	133	418	3648	4431	892	5323	1315	1265	573	1838	3153
Viking + Frode	3479	569	410	979	4458	4145	1406	5551	585	488	409	857	1442
Mean	3117	442	183	625	3742	2679	765	3444	1616	1460	768	2228	3844
L.S.D. 5%	1126	352	N.S.						949	681	264		
C.V. (%)	25.4	55.0	93.0						41.3	32.8	24.2		

BROME VARIETIES IN ASSOCIATION WITH ALFALFA, 1956 (202)

% Grass in Mixture

	1957			1958			1959			% Weeds 1959			% Crude Protein 1958 Hay
	Hay	1st After	2nd After	Hay	1st After	2nd After	Hay	1st After	2nd After	Hay	1st After	2nd After	
Vernal + Saratoga	70.3	50.1	42.8	52.3	20.2	18.3	68.5	29.7	19.0	5.2	1.3	3.5	6.9
Can. Brome	56.4	44.0	20.0	40.6	20.2	12.3	75.1	26.9	17.8	0.5	0.6	1.3	8.7
Lyon	52.9	33.4	19.0	27.2	8.9	8.6	56.5	9.3	8.0	3.2	8.5	4.7	8.3
Achenbach	19.2	10.4	7.1	14.0	7.7	9.1	48.0	12.1	13.2	8.5	7.3	4.1	7.6
Wisc. 55	47.6	26.2	13.2	26.7	9.3	5.3	54.6	28.9	10.0	3.2	8.6	5.9	8.1
Wisc. 63	61.5	37.7	36.3	45.4	20.0	15.7	77.0	20.2	16.3	0.7	1.6	1.4	7.5
S-4475	53.7	45.2	31.6	50.3	21.7	14.4	68.8	26.7	16.0	1.1	1.3	1.1	8.6
Climax	49.6	23.6	15.6	41.8	8.2	8.5	57.2	9.3	7.9	2.4	3.8	4.7	7.4
DuPuits + Saratoga	36.9	19.6	5.9	25.4	6.5	4.7	58.1	26.8	17.1	16.2	13.3	19.3	7.7
Can.Brome	21.4	12.9	1.9	15.5	5.0	3.0	62.0	44.2	30.7	0.7	2.2	5.7	9.0
Lyon	17.6	4.6	1.1	7.7	2.1	1.4	37.5	10.6	34.2	10.9	22.4	17.7	8.4
DuPuits alone	-	-	-	-	-	-	-	-	-	82.4	74.2	67.1	-
Alfa + Lyon	24.3	9.4	1.1	4.8	1.1	2.1	42.4	19.3	21.0	12.6	18.6	21.2	10.4
Can.Grimm + Can.Brome	59.7	38.1	19.5	44.1	22.1	9.9	75.3	26.7	16.2	0.0	0.4	0.0	8.2
Lyon	65.2	25.4	14.2	29.8	8.1	4.9	54.3	14.7	13.5	2.7	6.3	4.3	8.5
Rambler + Lyon	90.6	70.4	72.1	70.8	38.4	34.8	66.5	18.1	18.8	6.1	5.8	2.5	6.7
Viking + Frode	96.3	93.7	90.9	87.6	76.5	68.7	83.3	57.7	43.4	3.1	3.6	4.2	5.5
Mean	51.5	34.0	24.5	36.5	16.2	13.9	61.6	23.8	18.9	9.4	10.6	9.9	8.0
L.S.D. 5%													1.5
C.V. (%)													9.8

PROVINCIAL UNIFORM BROME STRAIN TRIAL

	Region B			Region C		Region F	Prov.
	Dayton	Verner	Guelph	Ottawa**	Appleton	Kapuskasing	Ave.
FIRST CROP YEAR	July 29	July 25	July 2	June 25	July 10	July 21	
Canadian Brome	3502	3827	1634	4378	3720	2051	3185
Saratoga	3924	4390	2799	5778	3840	1926	3777
Lincoln	3765	4398	3164	5182	3740	2151	3733
Lyon	3794	4252	2736	5033	3040	2095	3492
Manchar	3598	4195	2863	5471	2940	1498	3428
Mean	3714	4212	2640	5168	3456	1944	3522
L.S.D. 0.05	N.S.	345	420	770	N.S.	N.S.	
C.V.	-	-	13.2	-	-	36.8	
SECOND CROP YEAR		July 15	June 15		N.S.*	July 13/	
Canadian Brome	4403	5549	5659			5072	5170
Saratoga	4659	6669	7087			5526	5985
Lincoln	4194	6160	7061			4189	5401
Lyon	3631	5752	6878			3978	5060
Manchar	4778	6074	6205			5342	5600
Mean	4333	6041	6289			4821	5371
L.S.D. 0.05	N.S.	562	518			N.S.	
C.V.	18.8	5.8	6.8			19.2	
AVERAGE							
Canadian Brome	3952	4688	3647			3562	3962
Saratoga	4212	5530	4943			3726	4603
Lincoln	3979	5279	5113			3170	4385
Lyon	3712	5002	4807			3037	4140
Manchar	4188	5134	4534			3420	4319
Mean	4025	5127	4464			3383	4250
L.S.D. 0.05	N.S.	767					
C.V.	-	4.9					

* not harvested

** Ottawa - 1959 - total of 2 cuts

/ Kapuskasing:

Saratoga and Manchar have displayed a much faster rate of growth than either Lyon or Lincoln. Manchar started to head earliest followed by Canadian Brome and Saratoga.

Recovery after cutting was slow due to the dry seasonal conditions. Saratoga, Manchar and Canadian Brome recovered faster than Lyon and Lincoln, but with the improvement of moisture conditions in August, these differences were minimized. Aftermath was too short to warrant a second cut.

Fertilization consisted of 120 lbs. NH_4NO_3/acre in the spring and 80 lbs. after hay cutting.

The analysis was done on 3 replications only, due to abnormally high discrepancies in replication 1.

SUMMARY OF DATA FROM PROVINCIAL BROMEGRASS STRAIN TRIAL SEEDED IN PURE STANDS IN 1957 AT GUELPH

	Yield lbs.D.M./acre					1959			
	Hay 1958	Hay 1959	2 Year Average	After-math*	Disease*	% Crude Protein	% Stem	% Leaf	lbs./ac. Leaf
Canadian Brome	1634	5659	3647	5	5	9.8	52.6	47.6	2695
Saratoga	2799	7087	4943	1	2	8.7	55.6	44.4	3155
Lincoln	3164	7061	5113	3	3	8.7	57.8	42.2	2986
Manchar	2863	6205	4534	4	4	8.8	63.9	36.1	2236
Lyon	2736	6878	4807	4	3	8.4	56.4	43.6	3004
Mean	2639	6289	4464			8.9	57.3	42.7	2815
L.S.D. 5%	420	518				N.S.		6.9	579
1%	572	707						9.4	790
C.V. (%)	13.2	6.8				14.6		11.0	14.0

* 1 (best) - 5 (poorest)

POUNDS OF DRY MATTER PER ACRE IN 1959 OF THREE BROME STRAINS SEEDED IN PURE STANDS IN 1958 AT GUELPH

	lbs./acre
Saratoga	6728
Lincoln	6368
Can. Common	5248

TOTAL PLOT YIELDS (LBS. D.M./ACRE) IN 1958 FOR BROME-ALFALFA COMPETITION
MANAGEMENT TRIAL, 1957, GUELPH (206)

HAY MANAGEMENT

	June 26			July 21			October 30			Aftermath			Total		
	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean
Saratoga	5549	5856	5679	1968	2563	2256	1494	1776	1629	3462	4339	3885	9011	10195	9564
Lincoln	5569	5752	5637	1964	2630	2288	1547	1751	1642	3511	4381	3930	9080	10133	9567
Southland	5607	6209	5883	1987	2629	2299	1559	1750	1648	3546	4379	3947	9153	10588	9830
Can.Common	5384	6046	5692	1984	2685	2325	1415	1787	1595	3399	4472	3920	8783	10518	9612
S-4506	6253	5885	6044	2093	2606	2340	1561	1739	1643	3654	4345	3983	9907	10230	10027
Climax	5736	5719	5704	2051	2565	2298	1569	1721	1638	3620	4286	3936	9356	10005	9640
Frode	5782	6111	5922	2067	2679	2364	1601	1855	1721	3668	4534	4085	9450	10645	10007
Alone	5829	6069	5924	2036	2699	2358	1391	1752	1565	3427	4451	3923	9256	10520	9847
Mean	5713	5955	5834	2019	2632	2325	1517	1766	1642	3536	4398	3967	9249	10353	9801
Alfalfa															
L.S.D. 5%		N.S.		2.2	2.2			99							
1%					332			156							
C.V. (%)		39.7			17.4			11.5							
Grasses															
L.S.D. 5%		N.S.			N.S.			68							
1%					N.S.			91							
C.V. (%)		9.1			4.7			5.1							
Interaction															
L.S.D. 5%		N.S.			N.S.			68							
1%								91							

YIELD OF GRASS COMPONENT (LBS. D.M./ACRE) IN 1958 FOR BROME-ALFALFA COMPETITION AND MANAGEMENT TRIAL, 1957, GUELPH (206)

HAY MANAGEMENT

	June 26			July 21			October 30			Aftermath			Total		
	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean
Saratoga	684	162	421	155	34	94	487	40	262	642	74	356	1326	236	777
Lincoln	566	191	377	90	32	61	413	85	248	503	117	309	1069	308	686
Southland	733	112	421	120	24	72	502	34	267	622	58	339	1355	170	760
Can.Common	487	72	278	148	18	83	263	26	144	411	44	227	898	116	505
S-4506	482	87	283	143	20	81	322	113	217	465	133	298	947	220	581
Climax	319	61	189	52	12	32	245	3	124	297	15	156	616	76	345
Frode	493	76	283	327	98	212	762	334	545	1089	432	757	1582	508	1040
Alone	-	-	-	-	-	-				-	-	-	-	-	-
Mean	538	109	323	148	34	91	430	90	260	578	124	351	1116	233	674
Alfalfa															
L.S.D. 5%		116			25			14							
1%		182			40			22							
C.V. (%)		64.0			49.7			96.1							
Grasses															
L.S.D. 5%		97			32			10							
1%		129			43			13							
C.V. (%)		36.7			43.6			46.5							
Interaction															
L.S.D. 5%		97			32			100							
1%		N.S.			43			N.S.							

TOTAL PLOT YIELDS (LBS. D.M./ACRE) IN 1958 FOR BROME-ALFALFA COMPETITION AND MANAGEMENT TRIAL, 1957, GUELPH (206)

PASTURE MANAGEMENT

	May 26			July 10			August 20			October 30			Total		
	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean
Saratoga	4334	4170	4235	2108	2691	2390	1786	1776	1781	1861	1913	1879	10089	10550	10285
Lincoln	4340	4290	4297	2140	2649	2385	1733	1915	1824	1817	1961	1882	10030	10815	10388
Southland	4253	4222	4221	1956	2795	2366	1560	2150	1855	1845	1986	1908	9614	11153	10350
Can.Common	4187	4287	4220	2169	2631	2390	1820	2148	1984	1803	1897	1843	9979	10963	10437
S-4506	4087	4330	4192	2165	3022	2583	1540	2015	1778	1790	1965	1870	9582	11332	10423
Climax	4190	4329	4243	2060	2572	2306	1697	1955	1826	1941	2007	1966	9888	10863	10341
Frode	4006	4243	4108	2032	2560	2287	1551	1901	1726	2060	2181	2112	9649	10885	10233
Alone	4244	4367	4288	2153	2735	2434	1768	2060	1914	1740	1949	1837	9905	11111	10473
Mean	4205	4280	4242	2100	2707	2402	1682	1990	1836	1857	1982	1920	9844	10959	10400
Alfalfa															
L.S.D. 5%		N.S.			N.S.			N.S.			55				
1%											87				
C.V. (%)		12.3			51.8			22.9			5.5				
Grasses															
L.S.D. 5%		N.S.			N.S.			N.S.			72				
1%											96				
C.V. (%)		6.3			12.4			12.6			4.6				
Interaction															
L.S.D. 5%		N.S.			N.S.			N.S.			N.S.				

YIELD OF GRASS COMPONENTS (LBS. D.M./ACRE) IN 1958 FOR BROME-ALFALFA COMPETITION AND MANAGEMENT TRIAL, 1957, GUELPH (206)

PASTURE MANAGEMENT

	May 26			July 10			August 20			October 30			Total		
	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean	Vernal	DuPuits	Mean
Saratoga	518	101	309	164	19	91	64	19	42	478	38	257	1224	177	699
Lincoln	409	78	242	81	15	48	35	22	28	398	31	214	923	146	532
Southland	452	93	271	84	13	48	51	22	36	531	14	272	1118	142	627
Can.Common	270	36	152	117	22	69	44	15	30	287	15	150	718	88	401
S-4506	335	64	199	149	28	88	58	13	36	398	38	217	940	143	540
Climax	322	69	195	142	25	83	36	8	22	410	24	216	910	126	516
Frode	384	96	239	339	113	225	240	67	154	960	501	730	1923	777	1348
Alone	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mean	385	77	231	154	33	94	76	24	50	495	95	295	1110	229	670
Alfalfa															
L.S.D. 5%		102			45			25			187				
1%		161			70			46			293				
C.V. (%)		79.0			85.0			58.5			112.8				
Grasses															
L.S.D. 5%		62			35			19			117				
1%		82			46			25			155				
C.V. (%)		32.8			45.2			37.3			48.5				
Interaction															
L.S.D. 5%		N.S.			35			19			N.S.				
1%		N.S.			46			25			N.S.				

PERCENT GRASS IN MIXTURE IN 1958 FOR BROME-ALFALFA COMPETITION AND MANAGEMENT TRIAL, 1957, GUELPH (206)

	Vernal	DuPuits	Vernal	DuPuits	Vernal	DuPuits	Vernal	DuPuits
PASTURE MANAGEMENT								
	May 26		July 10		August 20		October 30	
Saratoga	12.1	2.5	8.7	0.8	4.4	1.3	25.3	2.0
Lincoln	9.5	1.9	4.4	0.6	2.7	1.3	21.0	1.5
Southland	10.8	2.3	5.6	0.6	5.4	1.0	28.3	0.7
Can. Common	6.5	8.5	6.0	0.9	3.0	0.7	15.8	0.8
S-4506	8.4	1.5	6.2	1.1	4.0	0.7	22.0	2.0
Climax	7.9	1.6	9.2	0.9	3.3	0.7	20.8	1.2
Frode	9.7	2.3	18.8	0.5	18.8	4.1	46.7	22.5
Alone	-	-	-	-	-	-	-	-
Mean	9.3	2.9	8.4	0.8	5.9	1.4	25.7	4.4
HAY MANAGEMENT								
	June 26		July 21				October 30	
Saratoga	12.6	2.7	7.1	1.4			32.5	2.3
Lincoln	10.9	3.3	4.6	1.2			27.5	5.0
Southland	14.0	1.8	6.2	1.0			32.5	2.0
Can. Common	9.4	1.2	7.5	0.7			19.0	1.5
S-4506	7.9	1.5	7.0	0.8			20.7	2.6
Climax	5.8	1.1	2.5	0.5			15.8	0.0
Frode	8.9	1.2	15.8	3.7			47.7	17.8
Alone	-	-	-	-			-	-
Mean	9.9	1.8	7.0	1.0			28.0	4.5

SUMMARY OF 1958 YIELD DATA BROME-ALFALFA SEED RATE STUDY, 1957 (207)

Pounds Dry Matter per Acre

		Hay June 26	Aftermath July 21	Aftermath Oct. 30	Aftermath Total	Season Total
		Brome + Alfalfa				
Vernal + Can. Common	5 lbs.	4803	1957	1431	3388	8191
	10 lbs.	4306	1885	1430	3315	7621
	Mean	4555	1921	1430	3351	7906
Vernal + Lincoln	5 lbs.	4140	1901	1493	3394	7534
	10 lbs.	4566	1880	1584	3464	8030
	Mean	4369	1891	1538	3429	7798
Vernal + Saratoga	5 lbs.	4636	1863	1533	3396	8032
	10 lbs.	4725	1818	1556	3374	8099
	Mean	4681	1841	1544	3385	8066
Seed Rates	5 lbs.	4537	1907	1523	3430	7967
	10 lbs.	4532	1861	1486	3347	7879
	Grand Mean	4535	1884	1504	3388	7923
L.S.D. Var. 5%		N.S.	56	N.S.		
L.S.D. Seed Rates 5%		N.S.	N.S.	N.S.		
C.V. Var. (%)		14.5	3.2	7.4		
C.V. Seed Rates (%)		9.6	4.6	4.5		
		Brome Component				
Vernal + Can. Common	5 lbs.	496	132	325	457	953
	10 lbs.	523	142	380	522	1045
	Mean	509	137	352	389	998
Vernal + Lincoln	5 lbs.	579	78	432	510	1089
	10 lbs.	774	161	625	786	1560
	Mean	677	104	529	633	1310
Vernal + Saratoga	5 lbs.	630	144	503	647	1277
	10 lbs.	1114	194	689	883	1997
	Mean	872	169	596	765	1637
Seed Rates	5 lbs.	568	118	420	538	1106
	10 lbs.	804	155	565	720	1524
	Grand Mean	686	137	492	629	1315
L.S.D. Var. 5%		N.S.	23	180		
L.S.D. Seed Rates 5%		106	24	54		
C.V. Var. (%)		40.1	18.7	40.3		
C.V. Seed Rates (%)		18.9	24.6	15.4		

% GRASS IN BROME-ALFALFA MIXTURE

		Hay	Aftermath	
		June 26	July 21	October 30
Vernal + Can. Common	5 lbs.	10.5	6.8	22.5
	10 lbs.	12.0	7.5	26.7
	Mean	11.2	7.2	24.6
Vernal + Lincoln	5 lbs.	13.9	4.1	28.4
	10 lbs.	16.9	7.0	39.2
	Mean	15.4	5.5	33.7
Vernal + Saratoga	5 lbs.	13.6	7.8	32.6
	10 lbs.	24.4	10.7	44.3
	Mean	19.0	9.2	38.3
Grand Mean		15.2	7.3	32.2

YIELD AND AGRONOMIC CHARACTERISTICS OF BROME VARIETIES IN A PURE STAND PLANTING AT GUELPH

Variety	Tons D.M. per acre 3 year ave. 1954-1956 Hay	After	Total	Spring Vigor 28/4/54*	24/5/56**	Disease 6/9/56	% Leaf 1956
Saratoga	3.64	0.77	4.41	2.1	1.0	2.3	43.1
Lincoln	3.84	0.77	4.61	2.6	1.5	1.5	40.3
Achenbach	3.83	0.78	4.62	2.8	1.2	1.3	43.9
Can. Brome	3.19	0.59	3.78	7.5	3.5	4.3	39.8

* 1 (good) to 10 (fair).
** 1 (good) to 5 (fair). Disease principally H. bromi

YIELD (POUNDS DRY MATTER PER ACRE) OF BROME VARIETIES GROWN WITH VERNAL ALFALFA AT GUELPH. 2 YEAR AVERAGE 1956-1957

	Hay	Aftermath	Total
	Brome Component		
Saratoga	2572	362	2934
Achenbach	2749	156	2905
Canadian Brome	2144	163	2307
	Alfalfa + Brome		
Saratoga	5255	3076	8331
Achenbach	5103	2703	7806
Can. Brome	4392	2714	7106

YIELD (POUNDS DRY MATTER PER ACRE) OF BROME + VERNAL AT KEMPTVILLE

	1957	1958			1959	3 year average
	June 25	June 18	Sept. 10	Total	June 19	Hay - June
Saratoga	5054	5848	1519	7367	5774	5559
Achenbach	5003	6374	1500	7874	5481	5619
Canadian Brome	4394	4494	870	5364	4099	4329

YIELD (POUNDS DRY MATTER PER ACRE) OF BROME + VERNAL MIXTURE IN FIRST HARVEST YEAR, 1958, GUELPH

	Brome + Vernal			Grass Component			% Grass	
Saratoga	4681	3385	8066	872	765	1637	19.0	23.8
Lincoln	4369	3429	7798	677	633	1310	15.4	19.6
Canadian Common	4555	3351	7906	509	489	998	11.2	15.9

VIGOR IN SEEDLING YEAR IN ALFALFA-BROME MIXTURES AT GUELPH

Variety	Test 1 1956	Test 2 1957				Test 3 1957			
	Aug.28	July 5	Aug.15	Oct.28	Total	July 4	Aug.14	Oct.28	Total
Saratoga	374	136	122	191	449	154	197	160	511
Lincoln		49	79	124	253	60	105	137	302
Canadian Brome	244	84	112	115	311	94	153	119	366

YIELD (POUNDS DRY MATTER PER ACRE) AT GUELPH OF BROME GROWN WITH ALFALFA

	2 year average 1957-1958			3 year average 1957-1959		
	Hay	After	Total	Hay	After	Total
	Brome Component					
DuPuits + Saratoga	1635	512	2147	2060	534	2594
Lyon	711	129	840	965	227	1192
Can. Brome	1047	331	1378	1653	494	2147
Vernal + Saratoga	3591	1442	5033	3753	1255	5008
Lyon	2296	864	3160	2502	672	3174
Can. Brome	2818	1136	3954	3081	1010	4091
	Brome + Alfalfa					
DuPuits + Saratoga	5329	4532	9851	5230	3867	9097
Lyon	5809	4746	10554	5216	4020	9236
Can. Brome	5671	4709	10379	5321	3874	9195
Vernal + Saratoga	5816	3982	9798	5819	3823	9642
Lyon	5943	4216	10159	5698	4002	9700
Can. Brome	5872	3944	9816	5525	3744	9269

COMPETITIVE ABILITY OF BROME VARIETIES WITH ALFALFA AT GUELPH
PERCENT BROME IN THE MIXTURES AT THE HAY STAGE

Brome Variety and Association	% Brome in the Mixture		
	1957	1958	1959
DuPuits + Saratoga	36.9	25.4	58.1
Canadian Brome	21.4	15.5	62.0
Vernal + Saratoga	70.3	52.3	68.5
Canadian Brome	56.4	40.6	75.1

YIELD (POUNDS DRY MATTER PER ACRE) AT GUELPH OF BROME STRAINS GROWN WITH TWO ALFALFAS UNDER PASTURE MANAGEMENT. FIRST HARVEST YEAR, 1959

	Mean of Vernal + DuPuits Mixtures				Season Total		
	May 26	July 10	Aug. 20	Oct. 30	Vernal	DuPuits	Mean
	Brome Component						
Saratoga	309	91	42	257	1224	177	699
Lincoln	242	48	28	214	923	146	532
Canadian Brome	152	69	30	150	718	88	401
	Alfalfa + Brome						
Saratoga	4235	2390	1781	1879	10089	10550	10285
Lincoln	4297	2385	1824	1882	10030	10815	10388
Canadian Brome	4220	2390	1984	1843	9979	10963	10437

EXPERIMENT 201. ORCHARDGRASS VARIETIES SEEDED 1956

Pasture (with Ladino) - Average of 1957, 1958, 1959

Variety	Cut 1A	Cut 1B (1957 only)	Cut 2	Cut 3	Cut 4	Season Total (lbs./acre)
Grass + Legume						
Pennlate	2047	2015	1373	764	998	5521
Frode	1996	1954	1375	742	1091	5493
Hercules	1962	2041	1339	728	1030	5396
Common	2108	1856	1233	695	1102	5389
S-143	1593	2012	1346	701	1245	5142
S-37	1623	2047	1305	719	1216	5140
Ott. 100	1607	2112	1399	743	966	5096
Frode (+ DuPuits)	2432	1609	1765	1035	1324	6650
S-37 (+ DuPuits)	2220	1519	1763	1033	1448	6489
Grass Component						
Pennlate	1532	1186	906	434	545	3330
Frode	1483	1082	811	438	675	3292
Hercules	1476	1111	784	400	598	3167
Common	1659	1046	774	408	713	3408
S-143	1010	1108	779	410	892	2903
S-37	1052	1015	734	413	828	2854
Ott. 100	1038	906	867	419	528	2689
Frode (+ DuPuits)	838	605	491	234	390	1924
S-37 (+ DuPuits)	696	457	413	236	491	1616

Silage (with DuPuits alfalfa) Average of 1957, 1958, 1959 Plus Aftermath

Variety	Cut 1	Cut 2	Cut 3	Cut 4	Season Total
Grass + Legume (lbs./acre)					
Common	4452	1585	1323	1586	8417
Hercules	4440	1557	1293	1584	8346
Frode	4396	1529	1339	1442	8226
Pennlate	4491	1480	1280	1419	8197
S-37	4255	1538	1361	1534	8177
Grass Component					
Common	1869	321	300	498	2841
Hercules	1781	310	266	440	2650
Frode	1880	355	340	424	2858
Pennlate	2020	331	327	410	2952
S-37	1420	333	267	576	2404

EXPERIMENT 201. ORCHARDGRASS VARIETIES SEEDED 1956

Hay (with Vernal) - Average of 1957, 1958, 1959 Plus Aftermath

Variety	Cut 1	Cut 2	Cut 3	Cut 4 1957	Season Total
Grass + Legume (lbs./acre)					
Frode	4860	1721	1351	308	8034
Ott. 100	4768	1769	1318	326	7963
Pennlate	4830	1738	1283	300	7952
Common	4791	1713	1295	350	7916
Grasslands	4482	1859	1365	535	7885
Hercules	4630	1720	1293	375	7768
S-37	4341	1814	1277	406	7568
Frode (+ DuPuits)	4904	2153	1604	954	8979
Grass Component					
Frode	2583	473	325	112	3418
Ott. 100	2161	426	383	102	3003
Pennlate	2655	435	344	80	3460
Common	2922	494	354	130	3812
Grasslands	1541	396	304	200	2308
Hercules	2484	405	308	109	3234
S-37	1843	445	301	177	2648
Frode (+ DuPuits)	2327	463	332	186	3184

Cut 1 (1959)

Variety	% Leaf	% Protein	
		Leaf	Stem
Grasslands	80	14.6	7.4
S-37	79	15.0	7.2
Ott. 100	64	15.2	7.4
Frode (+ DuPuits)	59	14.2	7.1
Pennlate	57	13.9	7.5
Frode	49	15.6	8.2
Common	48	14.6	6.8
Hercules	44	15.6	7.8
L.S.D. 5% level	15.6	N.S.	N.S.
1% level	21.2		

EXPERIMENT 201. ORCHARDGRASS VARIETIES SEEDED 1956

In most cases, the differences in total yield are rather small and probably are non-significant. Pennlate, Frode and Common are similar in yield production under the three managements - pasture, silage and hay. Pennlate is the leafiest of these three varieties and the leaves are distributed to the top of the stem giving this variety a very leafy appearance in the stand. This variety is worthy of our consideration but seed supplies will be quite low for at least two more years.

In 1959, the orchardgrass suffered frost damage and notes were taken on the extent of this damage in the pasture plots. These notes were taken on May 28. Frode and S-37 exhibited less damage when grown with DuPuits alfalfa than when grown with Ladino. Common, Frode and Hercules showed the most damage, while Pennlate and Ottawa 100 showed the least. It is possible that the degree of injury was associated with the stage of growth since the latter two varieties mature later than the first three.

1959 was the last year in which the experiment was conducted.

CO-OPERATIVE HAY-PASTURE FARM PLANTING, 1956

1959 RESULTS

Reports were received for Prescott and South Simcoe and Hastings locations. They indicate little or no difference in stand of Common or Frode. Frode appeared more vigorous than the other two varieties in Hastings. Common was reported to yield more in Prescott than the other varieties. S-37 was later and competed less with the alfalfa in all three locations. In Simcoe winterkill of Common and Frode was caused by manure applied on top of snow during last winter. As a result the S-37 plot with no winterkill yielded more than Common or Frode. In the other two locations S-37 yielded least.

ORCHARD STRAIN TRIALS SEEDED 1959

1. Provincial Trial 1959

Pennlate*
Ottawa 200
Frode
Tardus II
Latar

Trifolium 1631
Danish
Hercules

S-143

1. Pasture with Vernal.
   Ottawa, Kemptville, Guelph, Ridgetown.
2. Early hay or silage with DuPuits.
   Ottawa, Kemptville, Guelph, Ridgetown.
3. Medium hay with Vernal.
   Ottawa, Guelph, Ridgetown.

* In all 3 managements as Ridgetown; in pasture as Guelph, Kemptville.

Orchard establishment excellent at Guelph, alfalfa fair.

2. Guelph Trial 1959

Iowa 6
Potomac
Latar
Aurora
S-37
S-143

Management

A. Cutting
   1. Pasture cut when Iowa 6 (earliest) in boot.
   2. Pasture cut when each reaches boot stage.
   3. Hay cut bloom.

B. Nitrogen
   1. 50 lbs. N applied each spring.
   2. 150 lbs. N applied each spring.
   3. With alfalfa.

Establishment of orchard and alfalfa good.

3. Observation Rows 1959 - Guelph

1. Iowa 6
2. Potomac
3. Kentucky Syn.
4. Penn. early
5. Penn. medium
6. Trifolium All
7. Hammenhogs
8. Avon
9. Oron
10. Danish
11. Trifolium (Extra early)
12. Roskilde 11
13. Wisc. 52
14. Dorise
15. Esquire I
16. Esquire II
17. Ottawa 200
18. Frode
19. Tardus II
20. Ottawa 200
21. M.S.G. (Rep.1)
22. Barbantia (Rep.1)
23. S-26
24. Eagle Hill
25. Aurora
26. Latar
27. S-143
28. S-37
29. Trifolium 1631
30. Hercules
31. Akaroa
32. Coxa
33. Grasslands
34. Glasnevin
35. Barenza
36. Japanese (local variety)
37. Polycross (Hespeler)

SUMMARY OF FRODE - LICENSED AND RECOMMENDED

O.A.C. TRIAL SEEDED IN 1953

Variety	Date in Bloom June 1954	Date in Bloom June 1955	Leafiness Rating* % 1954	Leafiness Rating* % 1955	Tons Dry Matter/Acre 1954 June	Tons Dry Matter/Acre 1954 August	Tons Dry Matter/Acre 1954 Total
Frode	20	14	2.0	70.5	2.79	0.61	3.45
Danish	15	8	8.5	50.0	2.72	0.42	3.13

* 1 (good) to 10 (poor)

O.A.C. TRIAL SEEDED IN 1956
LBS. DRY MATTER PER ACRE OF ORCHARDGRASS PLUS ASSOCIATED LEGUME

	1957	1958	1959	Average
Pasture with Ladino				
Frode	7397	5110	3970	5492
Danish	7224	5238	3704	5389
Silage with DuPuits				
Frode	10713	8619	5345	8224
Danish	10705	8966	5581	8417
Hay with Vernal				
Frode	8745	7877	7479	8034
Danish	8917	7462	7368	7916

HAY WITH VERNAL - HAY CUT (1959)

	% Leaf	% Protein Leaf	% Protein Stem
Frode	49	15.6	8.2
Danish	48	14.6	6.8

KEMPTVILLE AGRICULTURAL SCHOOL SEEDED 1956

POUNDS DRY MATTER PER ACRE OF ORCHARDGRASS

	1957	1958			1959			3 year average
	June	June	Sept.	Total	June	Sept.	Total	Hay (June)
Frode	3446	3329	1943	5272	4087	1445	5532	3621
Danish	3414	3153	1569	4722	4314	1225	5539	3627

OTTAWA PASTURE YIELDS

POUNDS OF DRY MATTER OF ORCHARDGRASS

A. SEEDED 1956

	First Cut				Aftermath			Average
	1957	1958	1959	Average	1957 (3 cuts)	1958 (2 cuts)	1959 (3 cuts)	Total
Frode	1738	2015	1487	1747	4277	1630	2805	4551
Danish	1646	2098	1274	1673	4060	1420	2564	4237

B. SEEDED 1958

	Cut 1 June 8	Cut 2 July 14	Cut 3 September 9	Total
Frode	3528	1111	1951	6590
Hercules	3175	1019	1956	6150

EXPERIMENT 608. MEADOW FESCUE STRAINS, 1958.

Cut 1

Variety	Yield	Leafiness
	(lbs./acre)	(%)
Climax (Timothy)	5601	54.0
Mimer	5314	34.8
Common	4176	43.8
S-53*	4073	37.8
L.S.D. 5%	768	7.2
1%	1105	10.4
C.V.	10.0%	11.1%

* 25-40% of forage made up by weeds

Climax timothy appeared to produce more aftermath than the fescue strains. There were no apparent differences among the fescue strains in recovery.

This experiment was cut on June 17.

EXPERIMENT 607. ITALIAN AND WESTERWOLTH RYEGRASS STRAINS, 1959

Variety	August 5 Vigour Rating[1]	August 4 Vigour Rating[1]	August 4 Leafiness Rating[1]	% Headed
Mommersteeg's Westerwolth	4.5	6.0	5.0	75
Barenza Westerwolth	5.0	8.0	5.5	60
C.B. Westerwolth	5.0	5.0	5.0	75
Westerwolth Million	4.5	5.5	5.0	100
Westerwolth Landras	2.0	3.0	2.5	100
Melle Italian	6.5	7.5	8.5	0
N.Z. Cert. Mother Italian	5.5	7.0	9.0	0
H.I. Short Rotation Ryegrass	5.5	7.0	9.0	0
S-22	4.0	6.5	9.0	0
Mommersteeg's Italian	6.0	7.0	9.0	0

[1] Rating: 1-10. 10 = best; 1 = poorest.

Winter survival was less than 10% for all varieties.

Westerwolth ryegrass is a type selected from Italian for production in the seedling year. The variety Barenza would appear to be the best on the basis of this test.

There was very little difference among the varieties of Italian ryegrass.

On September 4, ½ of each plot was cut. There was essentially no aftermath production.

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