

PROGRESS REPORT
**FORAGE CROP
INVESTIGATIONS**
1963

BREEDING AND STRAIN TESTING



Crop Science Department
Ontario Agricultural College
Guelph

R. S. S. S.

FORAGE CROP INVESTIGATIONS - ONTARIO

1963 Report on Field Trials of Varieties and Mixtures



Central Experimental Farm, Ottawa

Experimental Farm, Kapuskasing

Kemptville Agricultural School, Kemptville.

Ontario Agricultural College, Guelph

Western Ontario Agricultural School, Ridgetown

Foreward

This report contains data from trials established to evaluate varieties and mixtures. It is not complete in that only data summarized to November 1, 1963, are included. This report is prepared for use by the members of the Forage Crop Sub-Committee, Ontario Committee on Field Crop Recommendations, and for those interested in the forage program in Ontario.

The data included cannot be considered as a complete evaluation of varieties and mixtures. Field trials are being conducted continuously and data from several years and several trials are necessary to determine the potential value of any variety or mixture to Ontario agriculture. To assist the reader, a brief summary of the varieties of each species and of the mixtures is included.

A federal-provincial program is in operation for variety and mixture testing. To facilitate the planning of new trials and the summarizing of the data, co-ordinators have been appointed for each species and for mixtures. These co-ordinators are as follows:

Alfalfa	Dr. W.E. Tossell, Crop Science Dept., O.A.C.
Red Clover	H.A. McLennan, Genetics and Plant Breeding Research Institute, C.E.F.
White Clover	L.P. Folkins, Genetics and Plant Breeding Research Institute, C.E.F.
Birdsfoot Trefoil	Dr. B.E. Twamley, Crop Science Dept., O.A.C.
Bromegrass	Dr. E.E. Gamble, Crop Science Dept., O.A.C.
Orchardgrass	Dr. W.R. Childers, Genetics and Plant Breeding Research Institute, C.E.F.
Timothy and Fescues	Dr. B.R. Christie, Crop Science Dept., O.A.C.
Forage Mixtures	Dr. J.E. Winch, Crop Science Dept., O.A.C.

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ALFALFASummary

In the Preliminary Trials established at Kemptville and Guelph in 1960 and at Ottawa in 1961, the Flemish and the Narragansett types were consistently good performers. Wilt-resistant Flemish, from which the new Cornell variety, Saranac, was derived, ranked first at Guelph, second at Kemptville. It was not sown at Ottawa but there DuPuits was first.

Narragansett was represented by the original strain and by High-Seed-Set derivative and a Wilt-resistant derivative. On the average, these did quite well at all three stations, leading Vernal by a slight margin at Guelph, a moderate margin at Ottawa, and a larger one at Kemptville.

In contrast with the consistently good performance of the agave, Cayuga and Haymor, which performed quite well in eastern Ontario, were both below average in the Guelph area. Based on this test alone, it is difficult to visualize Vernal being displaced by Cayuga in western Ontario, although there may be some areas where Cayuga may be preferred. In eastern Ontario, a wilt-resistant strain of Narragansett appears to offer as much promise as does Cayuga.

In the Preliminary Trials established at Kapuskasing, Kemptville, Ridgetown, and Guelph in 1962, the two varieties that appeared to be consistently promising were Mega and Glacier. At Kapuskasing, they were outyielded by the two very winter-hardy varieties Rhizoma and Tuna, and by DuPuits.

At Kemptville, Europe and F.D. 100 were also good. However, F.D. 100 was sown nowhere else, and Europe only at Guelph where it was slightly, but not significantly, behind the leaders.

See file for Performance Notes

SUMMARY: VARIETIES IN PROVINCIAL ALFALFA PRELIMINARY TRIALS 1960-1963

	Seeded 1960		Seeded 1961		Seeded 1962				Seeded 1963	
	Guelph Kemptville	Ridgetown Ottawa	Guelph	Ridgetown Ottawa	Guelph	Kemp.	Kapus.	Ridg.	Ridg.	Ott.
High Seed Set Narrag. ^{Ln 3}	X	X								
Wilt Resistant Flemish	X	X								
*Vernal	X	X	X	X	X	X	X	X	X	X
Wilt Res. Narrag.	X	X								
*DuPuits	X	X	X	X	X	X	X	X	X	X
Cardinal	X	X						X		
Narragansett	X	X								
Orchies	X	X						X		
Haymor (NK 502)	X	X								
Cayuga	X	X						X		
NK 503	X	X								
NY Syn. A	X	X								
NK 504	X	X								
Beaver		X	X	X	X	X	X	X	X	X
Tuna		X	X	X	X	X	X	X	X	X
Glacier			X	X	X	X	X	X	X	X
Eynsford			X	X	X	X	X	X	X	X
Progress (GL 10)			X	X	X	X	X	X	X	X
Mega			X	X	X	X	X	X	X	X
Warrior (NK 507)			X	X	X	X	X	X	X	X
NK 508			X	X	X	X	X	X	X	X
A 9 H			X	X	X	X	X	X	X	X
Europe			X	X	X	X	X	X	X	X
FD 100				X				X	X	
*Rhizoma							X			
*Alfa									X	X
Pioneer 525									X	X
Arnim									X	X
WL 262										X

Series 1

Series 2

Series 3

Series 4

* check varieties

SUMMARY:

PROVINCIAL ALFALFA PRELIMINARY TRIAL

SERIES I

	3-year Average 1961-1963						2-yr. Ave. 1962-1963			Ridgetown (1961)** % Winterkill Winter 1961-1962
	Guelph (1960)			Kemptonville (1960)			Ottawa (1961)			
	Hay	After.	Total	Hay	After.	Total	Hay	After.	Total	
High Seed Set										
Narragansett	4227	3436	7663	4548	3248	7796			9932	52
*Wilt Res. Flemish	4167	3649	7816	4489	3578	8067			---	---
Vernal	4252	3248	7500	4515	3137	7652			9659	50
Wilt Res. Narrag.	4277	3337	7614	4638	3135	7773			---	---
DuPuits	3936	3687	7623	4027	3365	7392			11058	78
Cardinal 501	3895	3588	7483	4439	3392	7831			10256	77
Narragansett	4071	3313	7377	4731	3473	8204			9910	40
Orchies	3706	3538	7244	4103	3319	7422			10165	91
Haymor 502	3878	3459	7337	4425	3598	8023			10497	73
Cayuga	3872	3379	7251	4595	3433	8028			10246	63
? Warrior (NK 503)	3950	3170	7127	4548	2800	7348			9546	70
NY Sym. A	3978	3300	7278	4570	3180	7756			---	---
NK 504	3840	3365	7205	4378	3104	7482			9822	62
Mean										
Mean	4004	3421	7425	4462	3290	7752				

* approximately Saranac

** heavy kill so no yield data on this trial. Partially reseeded in 1962

SUMMARY: PROVINCIAL ALFALFA PRELIMINARY TRIAL. SERIES 2

	2-yr. Ave. 1962-1963 Ottawa (1961) Total	% Winterkill Winter 1961-1962 Ridgetown (1961)	First Crop Year				
			Ottawa	Guelph	Kempt.	Kapus.	Ridge.
			(1961)	(1962)	(1962)	(1962)	(1962)
Vernal	9659	50	9700	10915	7602	6696	7235
DuPuits	11058	78	11700	11342	8029	6753	6862
Beaver	8938	73	9057	9783	7206	6232	6563
Tuna	9624	60	10008	10744	7602	6816	5753

ALFALFA PROVINCIAL PRELIMINARY TRIAL, RIDGETOWN, 1962

1963 Data

	June 17		July 19		Total lbs.DM/ac.	Spring 1963 % Survival
	% Legume	lbs.DM/ac.	% Legume	lbs.DM/ac.		
Vernal	51	5793	53	1442	7235	83
Beaver	60	5142	54	1421	6563	62
Cayuga	36	4979	28	1644	6623	50
DuPuits	54	4997	36	1865	6862	62
Cardinal	70	5220	50	1870	7090	67
Glacier	54	5968	46	1735	7703	83
Tuna	61	4103	41	1650	5753	67
Orchies	63	4221	23	1565	5786	42
LSD @ 5%		1120.8		N.S.		

ALFALFA PROVINCIAL PRELIMINARY TRIAL, GUELPH, 1960

A moderate amount of injury was suffered from the 1962-63 winter. Orchies was the hardest hit, followed by Cardinal (501), 502 and 503 in that order.

The first cut was taken on June 13. It was cut at that time because it had become lodged rather than because it was in the 10% bloom stage.

PROVINCIAL ALFALFA PRELIMINARY TRIAL, GUELPH, 1960 SEEDING

For corresponding Kemptville
data see p. 7

1961-63 Yields in Lbs. D.M. Per Acre

	1963					1962			1961			Three-year Average			Rank
	Cut 1 Jun.13	Cut 2 Jul.11	Cut 3 Aug.21	Aft. Past.	Total	Hay	Aft. Past.	Total	Hay	Aft. Past.	Total	Hay	Aft. Past.	Total	
High Seed Set Narragansett	3935	1343	1862	3205	7140	4088	3636	7724	4658	3466	8124 ^e	4227	3436	7663	2
*Wilt Res. Flemish	4609	1480	1950	3430	8039	3519	3901	7420	4373	3616	7989 ^f	4167	3649	7816	1
Vernal	4262	1089	1782	2871	7133	3749	3526	7275	4744	3348 ^g	7936	4252	3248	7500	5
W.R. Narr.	4454	1275	1772	3047	7501	3565	3569	7134	4813	3394 ^h	8207	4277	3337	7614	4
DuPuits	4298	1501	1815	3316	7614	3289	4132	7421	4222	3614	7836 ^e	3936	3687	7623	3
Cardinal(NK501)	3974	1462	1827	3289	7263	3323	3927	7250	4389	3547	7936	3895	3588	7483	6
Narragansett	4026	1187	1840	3027	7053	3633	3520	7133	4555	3391	7946	4071	3313	7377	7
Orchies	3655	1314	1817	3131	6786	3389	3888	7277	4073	3595	7668	3706	3538	7244	11
Haymor (NK502)	4101	1332	1787	3119	7220	3211	3772	6983	4323	3488	7811	3878	3459	7337	8
Cayuga	4031	1324	1732	3056	7087	3524	3595	7119	4060	3486	7546	3872	3379	7251	10
NK 503	4052	1070	1710	2780	6832	3461	3452	6933	4338	3279	7617	3950	3170	7127	13
NY Syn A	4319	1430	1675	3105	7424	3321	3701	7022	4293	3093	7386	3978	3300	7278	9
NK 504	4212	1332	1812	3144	7356	3477	3571	7048	3832	3380	7212	3840	3365	7205	12
Mean	4149	1319	1799	3118	7267	3505	3706	7210	4359	3438	7786	4004	3421	7425	
L.S.D. 5%	N.S.	275	N.S.			319		N.S.	N.S.	142	7797				
C.V.	9.6	14.6	7.8			6.3		5.0	10.2	3.0					

* approximately Saranac

PROVINCIAL ALFALFA PRELIMINARY TRIAL, 1962 SEEDING, GUELPH

For corresponding Kemptville data
see p. 8

TEST 573

1963 Yields in Pounds Dry Matter Per Acre

	Cut 1		Cut 2	Cut 3	Summer Aft. <i>cut 2 + cut 3</i>		October Aft.		Seasonal Total	
	Yield	Rank	Yield	Yield	Yield	Rank	Yield	Rank	Yield	Rank
Vernal	4385	2	2010	2925	4935	11	1595	10	10915	8
DuPuits	4016	10	2380	3025	5405	1	1921	2	11342	3
Beaver	4075	7	1830	2836	4666	12	1042	12	9783	12
Tuna	4054	8	2320	2815	5135	6	1555	11	10744	9
Glacier	4427	1	2350	2915	5265	4	1738	8	11430	2
Eynsford	4049	9	2160	3103	5263	5	1976	1	11288	5
Progress (CL-10)	3892	12	1960	3061	5021	9	1696	9	10609	11
Mega	4312	4	2400	2968	5368	2	1824	6	11504	1
Warrior (NK 507)	4150	5	2240	3028	5268	3	1906	3	11324	4
NK 508	4148	6	2130	2978	5108	7	1881	4	11137	7
A 9 H = <i>Hybride de Crecy</i>	3927	11	2070	2901	4971	10	1846	5	10744	9
Europe	4351	3	2230	2870	5100	8	1751	7	11202	6
Mean	4146		2175	2953	5128		1722		10996	
L.S.D. 5%	324		129	153	347		191		674	
C.V.	6.8		5.1	4.5	4.7		7.7		4.4	

S.S.P.
1963

No winter damage.

Order of maturity and speed of recovery after cutting:

DuPuits, Mega, Glacier, Europe, Eynsford;

Tuna, 507, 508;

A9H; = *Hybride de Crecy*

CL10, Vernal, Beaver.

ALFALFA PROVINCIAL PRELIMINARY TRIAL, KEMPTVILLE, 1960

Variety	% Ground Cover		Spring Vigour 1963	
	Clipped*	Non-Clipped	Clipped*	Non-Clipped
High Seed Set Narr.	93.7	92.5	3.00	2.50
Wilt Res. Flemish	91.3	93.7	2.25	1.25
Vernal	90.0	91.3	3.00	3.00
Wilt Res. Narr.	90.0	90.0	3.00	2.75
DuPuits	78.7	77.5	2.00	2.00
Cardinal (NK 501)	92.5	91.3	2.75	2.25
Narragansett	90.0	86.3	3.50	3.25
Orchies	82.5	85.0	2.75	2.00
Haymor (NK 502)	82.5	91.3	2.50	1.50
Cayuga	90.0	88.7	3.25	2.75
NK 503	85.0	87.5	3.75	3.00
NY Syn. A	93.7	88.7	4.25	3.25
NK 504	88.7	90.0	4.00	2.50

* Clipped 4 times during the 1962 growing season to simulate pasture conditions.

PROVINCIAL ALFALFA PRELIMINARY TRIAL, KEMPTVILLE, 1960 SEEDING

1961-63 Yields in Pounds Dry Matter per Acre

	1963					1962			1961		Three-Year Average			Rank
	Cut 1 Jun.13	Cut 2	Cut 3 Sept.6	Aft. Past.	Total	Cut 1 Jun.14	Cut 2 Aug.2	Total	Cut 1	Aft. Past.	Hay	Aft. Past.	Total	
High Seed Set Narragansett	5834	2432	1619	4051	9885	4111	2643	6754	3699	3049	4548	3248	7796	6
*Wilt Res. Flemish	6117	2316	1717	4033	10150	3581	2919	6500	3770	3783	4489	3578	8067	2
Vernal	5638	2207	1557	3764	9402	3902	2599	6501	4004	3047	4515	3137	7652	9
W.R. Narr.	6241	2054	1517	3571	9812	3928	2846	6774	3746	2989	4638	3135	7773	7
DuPuits	5325	1855	1622	3477	8802	3415	2730	6145	3340	3887	4027	3365	7392	12
Cardinal (NK501)	5484	2396	1662	4058	9542	3849	2657	6506	3984	3460	4439	3392	7831	5
Narragansett	6077	2352	1670	4022	10099	4171	2962	7133	3946	3435	4731	3473	8204	1
Orchies	5214	2022	1535	3557	8771	3576	2773	6349	3519	3627	4103	3319	7422	11
Haymor (NK502)	5547	2403	1731	4134	9681	4137	2860	6997	3592	3800	4425	3598	8023	4
Cayuga (NY Syn. B)	5837	2534	1637	4171	10008	4059	2657	6716	3889	3470	4595	3433	8028	3
NK 503	5836	1623	1448	3071	8907	4116	2367	6483	3693	2963	4548	2800	7348	13
N.Y. Syn A	6158	2120	1557	3677	9835	4047	2672	6719	3504	3209	4570	3186	7756	8
NK 504	5711	2004	1430	3434	9145	3924	2599	6523	3500	3278	4378	3104	7482	10
Mean	5771	2178	1593	3771	9542	3909	2714	6623	3707	3384	4462	3290	7752	
L.S.D. 5%									N.S.	120				
C.V.									11.5	5.0				

* approximately Saranac

PROVINCIAL ALFALFA PRELIMINARY TRIAL, 1962 SEEDING, KEMPTVILLE

1963 Yields in Pounds Dry Matter Per Acre

	Cut 1		Cut 2		Cut 3		Aftermath		Seasonal Total		Spring Vigour	% Ground Cover
	Yield	Rank	Yield	Yield	Yield	Rank	Yield	Rank	Yield	Rank		
	<u>May 1963</u>											
Vernal	3961	9	1785	1586	3371	12	7332	12	3.7	93		
DuPuits	4001	7	2011	2017	4028	4	8029	6	2.3	88		
Beaver	3868	11	1982	1356	3338	13	7206	13	3.7	88		
Tuna	3825	12	2006	1771	3777	7	7602	9	3.3	92		
Glacier	4231	4	2233	1811	4044	3	8275	3	2.3	87		
Eynsford	4128	6	2111	1653	3764	8	7892	7	3.3	80		
Progress (CL-10)	3970	8	1690	1723	3413	11	7383	10	3.3	88		
Mega	4409	1	2293	1895	4188	1	8597	1	2.0	85		
Warrior (NK 507)	4245	3	2051	1794	3845	6	8090	5	3.3	80		
NK 508	3778	13	2091	1498	3589	10	7367	11	4.3	85		
A 9 H	3894	10	2063	1685	3748	9	7642	8	3.3	85		
Europe	4377	2	2051	1878	3929	5	8306	2	2.0	92		
FD 100	4140	5	2281	1854	4135	2	8275	3	3.0	85		
Mean	4064		2050	1732	3782		7846					
L.S.D. 5%	414		N.S.	236	690		943					
1%	550			314								
C.V.	7.1		20.5	9.6	13.1		8.1					

ALFALFA SCREENING TRIAL #50 FOR HAY, OTTAWA 1962-1963

General Information:

Location: Central Experimental Farm, Ottawa
Soil Type: Uplands sandy loam
Experimental Design: Randomized blocks, 4 replications
Plot Size: Seeded 5' x 20'; harvested 3'-3" x 18'
Nurse Crop: Barley at 1 bushel per acre
Seeding Rate: 12 lb. per acre
Seeding Date: May 17, 1961
Sampling for D.M.: One 500-gram sample per plot per cut
Project Leader: L.M. Casserly

Results:

Performance of Alfalfa Varieties in Screening Studies
(Yield of dry matter in lbs. per acre)

Variety	1962	1963	1963	1963	1963	Mean 2 Years
	Total 4 Cuts	1st Cut June 24	2nd Cut July 25	3rd Cut Aug 28	Total 3 Cuts	
Haymore	10300 ab	5203	3432 a	2041 a	10676 a	10489
DuPuits	11700 a	4687	3489 a	2023 a	10199 ab	10950
Tuna	9240 cd	4900	3231 abc	1913 a	10044 ab	9643
Orchies	10440 b	4574	3336 ab	2051 a	9961 ab	10201
Cayuga	10740 ab	4875	3029 abcd	1873 ab	9777 abc	10259
MS ¹ Cornell-3	10140 bc	5072	2808 cd	1895 a	9775 abc	9958
Cardinal	10900 ab	4374	3272 abc	2000 a	9646 bcd	10273
N 9-504	10060 bc	4779	2881 bcd	1875 ab	9535 bcd	9798
Narragansett	10320 bcd	5004	2811 cd	1696 bc	9511 bcd	9916
Beaver	8820 d	5133	2828 cd	1468 d	9429 bcd	9124
Vernal	9700 bc	4826	2606 d	1588 cd	9020 cd	9361
N 9-503	10280 bc	4458	2692 d	1664 c	8814 d	9547
Significance	S.D.	N.S.	S.D. 9.37%	S.D. 6.41%	S.D. 5.65%	

PROVINCIAL ALFALFA PRELIMINARY TRIAL, KAPUSKASING, 1962

Dry Matter Yields (lbs/acre) in 1963

Variety	1st cut*	2nd cut	Total*
Vernal	3964 ab	2776 bc	6696 ab
DuPuits	3804 abc	2935 a	6753 ab
Beaver	3838 abc	2444 d	6232 ab
Tuna	3890 abc	2862 abc	6816 ab
Glacier	3724 bc	2992 ab	6716 ab
Eynsford	3497 bc	3050 a	6501 ab
Progress (CL 10)	3688 bc	2766 bc	6433 ab
Mega	3738 abc	3017 a	6721 ab
Warrior (NK 507)	3824 abc	2774 bc	6571 ab
NK 508	3698 bc	2896 ab	6590 ab
A 9 H	3267 c	2836 abc	6135 b
Rhizoma	4346 a	2648 c	7000 a
Average	3778	2833	6597
SE Var.	186.4	70.8	240.2
Date cut	July 10	Aug. 19	

* 4 replications only

The stand in the pure stand test was generally good. No winterkill was detected.

ALFALFA PERFORMANCE TRIAL, GUELPH, 1961

- April 22. No winter damage except in replicate 4, which was an extremely droughty area.
- May 27. Much less grass in the pasture than in the hay section of the test.
- May 31. Pasture section harvested at early bud stage, all strains being 16-18" high.
- June 14. H Hay section harvested in late bud stage, badly lodged.
- June 21. Order of recovery in pasture section:
 Ontario, Cayuga, Cornell - alike
 Vernal slightly slower, Beaver considerably so.
 This rate of recovery was typical of variety performance throughout the summer.

ALFALFA PERFORMANCE TRIAL, GUELPH - 1961 SEEDING

Test 570

1963 Yields in Lbs. D.M. (Legume + grass)/acre

Variety	Management System									
	Hay and Aftermath Pasture					Pasture				
	Cut 1 June 17	Cut 2 July 17	Cut 3 Aug.21	Cut 4 Oct.11	Total	Cut 1 May 31	Cut 2 July 2	Cut 3 July 31	Cut 4 Sept.4	Total
Cayuga	4942 83	1605 96	2400 88	1220	10167	2822 96	2005 99	1667 99	1430 96	7924
Vernal	5062 75	1380 95	2423 77	1120	9985	3001 88	1867 99	1612 98	1295 94	7775
Beaver	5162 55	1317 93	2103 71	650	9232	3152 72	1602 97	1362 93	1022 88	7138
Ontario Variegated	4710 75	1690 98	2435 90	1250	10085	2983 98	2167 100	1570 100	1462 99	8182
High Seed Set Narragansett	4772 66	1667 97	2393 89	1360	10192	2626 97	2015 100	1560 100	1387 96	7588
Mean	4930	1532	2350	1120	9932	2917	1931	1555	1319	7722

ALFALFA PERFORMANCE TRIAL, GUELPH - 1961 SEEDING

Summary of 1962-63 Yields
Yields in Lbs. D.M. per Acre

Test 570

Variety		Hay and Aftermath Pasture				Pasture Management						
		Hay	Aft. (2-3 cuts)		Total	Rank	Spring	Summer (3 cuts)		Total	Rank	
Cayuga	1962	3797	4410		8207		3752	6158		9910		
	1963	4942	5225		10167		2822	5102		7924		
	Mean	4370	5	4817	3	9187	4	3287	4	5630	2	8917
Vernal	1962	4352	5610		8962		3932	5742		9674		
	1963	5062	4923		9985		3001	4774		7775		
	Mean	4707	2	4766	4	9473	2	3466	2	5258	4	8724
Beaver	1962	4672	3684		8356		3490	4961		8451		
	1963	5162	4070		9232		3152	3986		7138		
	Mean	4917	1	3877	5	8794	5	3321	3	4473	5	7794
Ont. Var.	1962	4212	4420		8632		4053	6625		10678		
	1963	4710	5375		10085		2983	5199		8182		
	Mean	4461	4	4887	2	9358	3	3518	1	5912	1	9430
High Seed Set Narragansett	1962	4452	4508		8960		3935	6129		10064		
	1963	4772	5420		10192		2626	4962		7588		
	Mean	4612	3	4964	1	9576	1	3280	5	5546	3	8826
Mean	1962	4297	4327		8624		3832	5923		9577		
	1963	4930	5002		9932		2917	4805		7722		
	Mean	4613		4665		9278		3374		5364		8738

ALFALFA PERFORMANCE TRIAL, KAPUSKASING, 1962

Concurrently, two other tests were seeded, alfalfa being associated with brome and the first cut being taken 1) at the "pasture" stage, June 27
2) at the hay stage, July 10.

As two replications in both tests were not reliable, they were discarded and the results based on two replications alone. No analysis was calculated. Yields were generally poor in both tests.

1) Alfalfa with brome (hay management) - Lbs. D.M./acre in 1963

Variety	1st cut	2nd cut	Total
Vernal	2084	1714	3798
Rhizoma	2084	1516	3600
Beaver	2719	1786	4505
Alfa	2547	2108	4655
DuPuits	1796	2538	3334
Glacier	2784	2097	4881
Date cut	July 10	Aug. 19	

2) Alfalfa with brome (pasture management) - Lbs. D.M./acre in 1963

Variety	1st cut	2nd cut	Total
Vernal	2088	1481	3569
Rhizoma	2356	1694	4050
Beaver	2334	1348	3682
Alfa	2442	2019	4461
DuPuits	2078	2174	4252
Glacier	2566	2044	4610
Date cut	June 27	Aug. 7	

This year's data do not justify any change in recommendation for this area.

ALFALFA PERFORMANCE TRIALS, 1963

	<u>Guelph</u>	<u>Kemptville</u>	<i>Vernon Douglas</i>	<u>Ridgetown</u>	<i>f. Will</i>
Vernal series:					
Vernal		X	x	X	x
Narragansett		X	x	X	x
Cayuga		X	x	X	x
DuPuits series:					
DuPuits	X	X	x	X	x
Alfa	X	X	x	X	x
Glacier	X	X	x	X	x
Tuna	X				x

"ONTARIO VARIEGATED" SEED LOTS PRODUCED IN NIAGARA PENINSULA

Lot No.	Source	1961	1962	2-year average 1961-1962	% Stand August 1963 (Relative ground cover)
12	Dalgleish	9806	12127	10966	50
2	Rep. Sample from Niagara Peninsula	9462	11416	10439	22
4	Neichhold Jarvis - Farm 1	9293	11533	10413	37
9	Hubert Lint	9707	10810	10258	15
10	Piper	9319	10678	9999	35
11	Best	9727	10191	9959	45
1	Virgil Turnbull, R. R. #1, Paris	9191	10698	9945	27
6	H. Mattice	8860	10963	9912	22
5	Neichhold Jarvis - Farm 4	8561	10875	9718	25
3	Neichhold Jarvis - Farm 5	9012	10151	9582	37
8	S. Cade	8584	10235	9410	15
7	S. Pollard	9119	9283	9201	25
	Vernal	9787	11376	10582	92
	DuPuits	10732	11188	10960	15

- Note:
- Some lots were as good as Vernal over the 2-year period but most lots were inferior.
 - Some lots yielded a ton (\$25.00 worth of hay) less per acre over the 2-year period. Most farmers cannot afford this.
 - None of the lots survived as well as Vernal and most were strikingly inferior. This means greater risks especially where long-term stands are desired.
 - A new series of lots were seeded in 1962 in Haldimand county at the Soil Science Department Research Station near Kohler. This will allow assessment of this seed source right in the Niagara Peninsula area.

"ONTARIO VARIEGATED" SEED LOTS, HALDIMAND COUNTY, 1962

Pounds Dry Matter per Acre, 1963

Seed Lot No.	June 25	August 1	September 6	Total
1	3362	1327	1563	6252
2	3177	937	1317	5431
3	3329	1070	1641	6040
4	3638	1015	1554	6207
5	3500	1077	1725	6302
6	3575	953	1315	5843
7	3973	1214	1745	6932
8	3724	1115	1508	6347
9	3453	1232	1662	6347
10	3575	1149	1743	6467
11	3295	1238	1564	6097
12	3781	1150	1648	6579
13	3481	1064	1660	6205
14 Vernal	4259	1049	1563	6871
15 Ranger	3824	1179	1792	6795
16 Beaver	3674	1092	1308	6074
17 Cayuga	3673	1147	1658	6478

1962-2012

ALFALFA SCREENING FOR HAY (TRIAL NO. 61) OTTAWA 1963

General Information:

Location: Central Experimental Farm, Ottawa
Soil Type: Matilda loam
Experimental Design: Randomized blocks; 6 replications
Plot Size: Seeded 5' x 20'; harvested 3'-3" x 18'
Seeding Rate: 18 lb. per acre
Seeding Date: June 3, 1962
Sampling for D.M.: One 500-gram sample per plot per cut
Project Leader: L.M. Casserly.

Results:

Performance of Alfalfa Varieties for Hay
 (Yield of dry matter in lbs. per acre)

Variety	1st Cut June 28	2nd Cut Aug. 5	3rd Cut Sept. 3	Total 3 Cuts
Mega	5238	2229	2431 ab	9898 a
Glacier	5049	2206	2478 ab	9733 a
DuPuits	4590	2358	2689 a	9637 ab
Europe	4650	2302	2668 a	9620 ab
Vernal	4593	2424	2463 ab	9480 abc
S.C. Ma 582	4638	2333	2390 b	9361 abcd
Tuna	4642	2344	2211 bc	9197 abcd
Beaver	4538	2329	2213 bc	9080 abcd
S.C. Ma 581	4304	2435	2339 b	9078 abcd
S.C. Ma 591	4608	2189	1939 d	8736 bcd
Rambler	4619	2069	1949 d	8637 cd
S.C. Ma 601	4777	2017	1828 de	8622 cd
Rambler A	4846	1981	1654 e	8481 d
Ladak	4429	2078	1969 cd	8476 d
Rambler B	4550	2178	1721 de	8449 d
S.C. Syn 3591	4573	1927	1912 d	8412 d
Significance	N.S.	N.S.	S.D. 8.85%	S.D. 7.74%

ALFALFA VARIETY TEST FOR HAY - 1963 *1962 Seeding*

Location: Verner, Ontario
Soil Type: Eventual silt loam, moderately well drained.
Fertilizer Treatment: 300 lbs. per acre of 8-16-16 broadcast and disced into soil prior to seeding, plus 400 lbs. per acre of 0-10-20, as top dressing, applied May 15, 1963.
Test Design: Randomized, 6 blocks.
Companion Crop: None
Rate of Seeding: 10 lbs. pure seed per acre.
Date of Seeding: May 29, 1962

Variety	Dry matter yield in pounds per acre				Contribution of alfalfa to yields by cuts			Maturity or stage of bloom as per cent full bloom by cuts		
	1st cut Jun. 27	2nd cut Aug. 1	3rd cut Sept. 24	Total Mean Yield	1st	2nd	3rd	1st cut	2nd cut	3rd cut
Glacier	3718 ab	1648 a	1152 a	6519 a	98	99	100	12% bloom	35% bloom	Vegetative
DuPuits	3252 c	1604 a	1244 a	6104 ab	98	99	100	12% bloom	30% bloom	Vegetative
Chartrainvilliers	3298 bc	1509 ab	1293 a	6100 ab	98	99	100	17% bloom	35% bloom	Vegetative
Narragansett	3839 a	1353 bc	735 b	5926 ab	98	99	99	5% bloom	7% bloom	Vegetative
Tuna	3360 bc	1517 ab	741 b	5619 b	98	99	99	4% bloom	20% bloom	Vegetative
Vernal	3649 abc	1185 cd	666 b	5500 b	98	99	100	3% bloom	3% bloom	Vegetative
Beaver	3459 abc	1044 d	295 c	4798 c	98	99	99	3% bloom	1% bloom	Vegetative
Mean	3511	1409	876	5795						
L.S.D. @ .05	380	189	136	560						
C.V.	9.17	11.39	13.14	8.19						
S.E.m	131.50	65.42	47.00	198.84						

Department of Crop Science

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34.3 Y63

1963 FARM PLANTINGS OF ALFALFA VARIETIES

County branches of Soil and Crop Improvement Association
co-operating with Soils and Crops Branch, O.D.A.
and Crop Science Department, O.A.C.

You are invited to visit these farm plantings to assess them yourself. Contact the co-operator for additional detail on specific planting.

Early Maturity Group

DuPuits, Glacier seeded in mixture with one grass in each case. To evaluate Glacier in comparison with DuPuits (representing the DuPuits, Alfa type). Features to be compared - winterhardiness, maturities, persistence in stand and aftermath recovery.

<u>County</u>	<u>Co-operator</u>	<u>Address</u>	<u>Farm Location</u>
Elgin	Harold Jenkins	R. 3, Belmont	Lot 21, Con. 9, S. Dorchester
Middlesex	Donald Black	R. 2, Glamworth	Lot 6, Con. 7, Westminster
North Simcoe	Morris Schaer	R. 1, Minesing	
York	Davidson Bros.	R. 1, Stouffville	
Essex	Milt Farough	Maidstone	
Wentworth	Colin Lovering	Alberton	Lot 25, Con. 3, Ancaster
Haldimand	L.B. Mehlenbacher	Cayuga	
Perth	Allan Bain		Lot 10, Con. 5
Northumberland	Arnold Peister	R. 1, Brighton	
Lennox & Addington	Grant Huyke	R. 1, Bath	
Bruce	Herb Waechter	R. 2, Mildmay	
Dufferin	R.E. Thompson	Orangeville	
Oxford	Mac Logan	Orangeville	
Renfrew	Barclay Dick	R. 1, Douglas	
Prescott	Vioris Villeneuve	R. 2, Hawkesbury	

Regular Maturity Group

Plots containing Cayuga, Vernal, and Beaver are located adjacent to each other. Maturity, persistence of stand and aftermath recoveries are being compared. Each alfalfa is seeded in mixture with a grass, the same grass being used for all varieties at a location.

Middlesex	Donald Black	R. 2, Glamworth	Lot 6, Con. 7, Westminster
Lambton	Harry Wellington	R. 1, Corunna	Lot , Con. 11, Sarnia
S. Simcoe	Harry Cross	R. 1, Beeton	
York	Stewart Watson	R. 2, Markham	
Essex	Milt Farough	Maidstone	
Peel	Aubrey Livingston	R. 1, Brampton	Lot 20, Con. 2, Chinguacousy

Welland	John Hagar	Pt. Robinson	Lot 13 & 14, Con 1, Crowland
Waterloo	Roy Brubaker	Waterloo	
Prince Edward	Holmes Mathes	R. 2, Bloomfield	
Hastings	Philo Harris	R. 2, Tweed	
Grey	Gordon Kuhl	R. 2, Desboro	
Huron	Douglas McNeil	R. 6, Goderich	
Leeds	Arthur Modler	R. 2, Lansdowne	
Renfrew	Gibbon Bros.	R. 3, Renfrew	
Wellington	Edwin Whale	R. 2, Alma	(Narragansett replaced Beaver)
Wellington	Art Adie	R. 2, Elora	" " "

Additional Co-operators who have one or the other of the above farm plantings

Victoria	Jim Calvert	Lot 7, Con. 9, Ops Township (West half)
Durham	Gerald Armstrong	Lot 15, Con. 8, Cavan Township (South half)
Peterborough	Stewart Melson	Lot 13, Con. 5, Otonalee Town- ship
Kent	Murray Jacks	R. 1, Bear Line

BIRDSFOOT TREFOILSummary

In Ontario, because of its greater winter-hardiness and greater resistance to poor drainage conditions, Empire continues to be favored above Viking even though the latter usually yields more.

The place of Leo, the new variety developed from Morshansk at Macdonald College, has not yet been resolved. It appears to be very winter hardy, but intermediate in yield between Viking and Empire.

BIRDSFOOT TREFOIL STRAIN TRIALS, VERNER, 1961 SEEDING
(Yields in lb. D.M. Per Acre of Trefoil Plus Timothy)

Hay Management

Location: Verner, Ontario.
Soil Type: Casey, silty clay loam, imperfectly drained.
Fertilizer Treatment: 300 lb. per acre of 8-16-16 broadcast and disced into soil prior to seeding, plus 300 lb. 25-16-16 per acre, applied as top dressing, on June 20/62 and 300 lb. per acre of 8-16-16, applied as top dressing, May 31/63.
Weed Control: Sprayed with Tropotox at rate of 8 oz. acid per acre on Aug. 3/62 and 18 oz. acid per acre of Embutox E (2,4-DB) on July 22/63 and again on Sept. 11/63 the same rate of Embutox was applied plus 5 lb. per acre of Dalapon.
Test Design: Randomized, 6 blocks.
Companion Crop: 1 1/2 bushels of garry oats per acre, removed as hay at early dough stage.
Seeding Rate: Trefoil 8 lb. and Climax timothy 4 lb. per acre.
Seeded: May 26/61.

	Hay Crop Mean Yields			Aftermath Mean Yield			Mean Total Yields		
	1962 July 3	1963 June 26	Mean 2-Yr.	1962 Oct. 4	1963 Sept 6	Mean 2-Yr.	1962 Mean	1963 Mean	Mean 2-Yr.
Viking	3895 a	4874 ab	4385 a	768 ab	682 a	725 a	4663 a	5554 a	5110 a
Roskilde	3636 ab	4949 a	4293 a	722 b	675 a	698 a	4468 ab	5624 a	4991 a
Douglas	3610 ab	4573 bc	4091 ab	858 a	705 a	782 a	4358 ab	5278 a	4873 a
Mansfield	3473 ab	4736 abc	4104 ab	806 ab	642 ab	724 a	4279 b	5378 a	4829 a
Morshansk	3631 ab	4847 ab	4239 ab	572 c	590 b	581 b	4203 b	5437 a	4820 a
Empire	3178 c	4497 c	3837 b	468 d	392 c	430 c	3646 c	4889 b	4267 b
Mean	3571	4746	4158	699	615	657	4270	5360	4815
C.V.	7.38%	5.73%	5.41%	11.10%	9.89%	7.93%	6.65%	5.72%	5.23%
S.E.m	107.57	323.41	129.88	31.67	24.86	30.07	115.99	125.20	145.50

Species Contribution to Yield

Number of Trefoil
Plants Per Sq. Ft.

Variety	Birdsfoot Trefoil				Timothy			
	Cut 1		Cut 2		Cut 1		Cut 2	
	1962 July 3	1963 June 26	1962 Oct 4	1963 Sept 6	1962 July 3	1963 June 26	1962 Oct 4	1963 Sept 6
Viking	38	22	42	36	20	72	49	62
Roskilde	34	22	37	43	19	72	57	52
Douglas	32	16	38	42	19	78	51	55
Mansfield	34	18	42	41	19	76	52	57
Morshansk	34	9	18	16	17	83	69	81
Empire	25	11	17	27	21	84	69	71

1962 Oct. 10	1963 May 21	1963 Oct. 2
5	3	3
3	3	2
4	3	3
4	2	2
2	3	2
4	2	2

Birdsfoot Trefoil Variety Test for Pasture

Location: Verner, Ontario.
Soil Type: Casey silty clay loam, imperfectly drained.
Fertilizer Treatment: 300 lb. per acre of 8-16-16 broadcast and disced into soil prior to seeding, plus 300 lb. of 25-16-16 per acre applied as top dressing on June 20/62 and 300 lb. per acre of 8-16-16 applied as top dressing on May 31/63.
Weed Control: Sprayed with Tropotox at rate of 8 oz. acid per acre on Aug. 3/62 and 18 oz. acid per acre of Embutox E (2,4-DB) on July 22/63 and again on September 11/63 the same rate of Embutox was applied plus 5 lb. per acre of Dalapon.
Test Design: Randomized, 6 blocks.
Companion Crop: 1&1/2 bushels of oats per acre, removed as hay at early dough stage.
Seeding Rate: Trefoil 8 lb. and Climax timothy 4 lb. per acre.
Seeded: May 26/61.

Variety	Mean Yields of 1st Clips			Mean Yields of 2nd Clips			Mean Yields of 3rd Clips			Mean Total Yields		
	1962 June 13	1963 May 31	2-Yr. Mean	1962 Aug 21	1963 June 21	2-Yr. Mean	1962 Oct 12	1963 Sept 6	2-Yr. Mean	1962 3 Cuts	1963 3 Cuts	2-Yr. Mean
Viking	2166 a	1149 a	1657 a	1215 a	1577 a	1396 a	250 a	417 a	334 a	3631 a	3143 a	3387 a
Morshansk	2101 a	1113 a	1607 ab	1355 a	1623 a	1489 a	233 a	344 b	288 a	3688 a	3080 a	3384 a
Roskilde	1973 ab	1065 a	1519 ab	1340 a	1608 a	1474 a	249 a	431 a	340 a	3563 a	3104 a	3333 a
Douglas	1818 b	1021 a	1419 abc	1335 a	1611 a	1473 a	274 a	395 b	335 a	3427 ab	3027 a	3227 a
Mansfield	1766 bc	1010 a	1388 bc	1214 a	1608 a	1411 a	229 a	351 b	290 a	3208 bc	2969 a	3089 a
Empire	1586 c	841 b	1213 c	1189 a	1512 a	1350 a	225 a	333 b	279 a	3000 c	2686 b	2843 b
Mean	1901	1033	1468	1275	1590	1432	243	377	311	3419	3002	3210
C.V.	9.58%	11.86%	8.76%	10.26%	5.65%	5.94%	18.19%	13.32%	12.88%	6.90%	6.72%	5.33%
S.E.m	74.32	50.01	74.18	53.41	36.70	49.16	18.04	20.49	23.12	96.30	82.31	98.87

Species Contribution to Yield

Variety	Trefoil						Timothy					
	Cut 1		Cut 2		Cut 3		Cut 1		Cut 2		Cut 3	
	1962	1963	1962	1963	1962	1963	1962	1963	1962	1963	1962	1963
Viking	30	22	35	12	12	32	21	54	50	73	73	65
Morshansk	34	22	32	13	7	23	22	50	55	71	73	74
Roskilde	32	23	24	14	11	28	24	53	60	70	68	69
Douglas	32	23	27	10	10	32	22	53	58	76	74	66
Mansfield	31	22	27	8	14	26	23	54	56	77	68	71
Empire	32	15	18	11	8	26	18	60	64	72	74	72

Number of Trefoil
Plants Per Sq. Foot.

	1962	1963	1963
	Oct 10	May 21	Oct 2
	7	4	3
	5	3	3
	6	4	3
	6	3	2
	6	3	2
	3	2	2

BROMEGRASSSummary

Saratoga and Lincoln remain the recommended varieties of brome grass in Ontario for 1964. Fischer and Achenbach are considered equal to Lincoln in performance.

Ottawa Syn. C continues to perform well both in established tests and newly established test. On the basis of this data and additional data from tests across Canada, it was decided to support a request for licensing of this variety.

SUMMARY OF TOTAL SEASON YIELD FOR BROMEGRASS VARIETIES INCLUDED IN PURE STAND TRIALS
IN ONTARIO, HARVESTED IN 1963

	Guelph			Guelph		Guelph 1963	Verner 1963	Ottawa		Kapus- kasing 1963	Mean of 8 year- tests	Mean of 7 year- tests	Mean of 7 other year-tests
	1961	1962	1963	1962	1963			1962	1963				
Saratoga	9649	7816	9390	7538	10226	10290	5638	6180	9413	4639	7877	8339	7532
Lincoln	9597	6967	8828	7447	10159	10010	5718	5420	9730	4796	7633	8039	7294
Ott. Syn. C	9858	7767	9331			11209	5349	5220	9205	5024	7870	8277	7393
Ott. Syn. B	9536	7475	9063			10225	5330	5680	9922			8176	
Can. Common	8071	6068	8371	6176	9517			4880	6716				
Carlton	8334	5958	7988				4806	5960	7839	4593			6497
Sac	9459	7046	9287				5315	5500	8801	4958			7195
Wisc. B55	9570	7309	9333				5179	6020	9371	4449			7319
Wisc. B63	9604	6866	9049										
S-5054	8154	5732	8243										
S-4535	9442	6168	8965										
S-4092	9225	6625	8684										
Fischer							5417	6020	9322	4777			
Manchar							5266	6100	9152				
Achenbach								5660	9052				
S-5563				6284	8940			4680	6774				
S-6213				6896	9990			6200	8120				
S-6214				7041	9373			5600	8897				
Ott. Syn. A								6140	9293				
G-2252				7413	9838								
G-2253				7468	9846								
S-5824						11064							
Ott. Syn. D						11088							
RP 100						9828							
RP 101						10119							

BROME SYNTHETIC TEST , GUELPH, 1960 (TEST 218)

Summary of Yield (pounds dry matter per acre) for 1961-62-63

	Hay Yield				Aftermath Yield			
	1961 (Jun.22)	1962 (Jun. 7)	1963* (Jun.18)	3-year Mean	1961 (Aug.11)	1962 (Aug. 3)	1963 (Aug.15)	3-year Mean
S-5054	5758	4068	5996	5274	2396	1664	2246	2102
Carlton	5926	4066	5744	5245	2408	1892	2244	2181
S-4535	7358	4570	6679	6202	2084	1598	2279	1987
S-4092	6869	4806	6305	5993	2356	1819	2379	2185
Sac	7325	5131	6754	6403	2134	1915	2533	2181
Wisc. B63	7201	4989	6482	6224	2403	1877	2900	2390
Wisc. B55	7312	5300	6786	6466	2258	2009	2547	2271
Common	5634	4328	5782	5248	2437	1740	2589	2255
Lincoln	7310	5142	6382	6278	2287	1825	2446	2186
Saratoga	6919	5551	6388	6286	2730	2265	3003	2666
Ott. Syn. C	7399	5433	6591	6474	2459	2334	2740	2511
Ott. Syn. B	7089	5217	6462	6256	2447	2258	2601	2435
Mean	6842	4883	6362	6029	2367	1933	2514	2279
L.S.D. .05	548	361	N.S.		264	262	204	

* 1963 data from 3 replicates; 1961 and 1962 data from 6 replicates.

TEST 218 - TOTAL SEASON YIELD

	1961	1962	1963	3-Year Mean	Rank
S-5054	8154	5732	8243	7376	12
Carlton	8334	5958	7988	7427	11
S-4535	9442	6168	8965	8192	8
S-4092	9225	6625	8684	8178	9
Sac	9459	7056	9287	8597	5
B63	9604	6866	9049	8506	6
B55	9570	7309	9333	8737	3
Can. Common	8071	6068	8371	7503	10
Lincoln	9597	6967	8828	8464	7
Saratoga	9649	7816	9390	8952	2
Ott. Syn. C	9858	7767	9331	8985	1
Ott. Syn. B	9536	7475	9063	8691	4
Mean	9208	6816	8877	8301	
L.S.D. (.05)	----	527	N.S.		

BROME SYNTHETIC TEST, GUELPH, 1960 (TEST 218)

	Percent Leaf		
	1961	1962	2-Year Mean
Carlton	30.0	37.7	33.6
Sac	26.3	33.0	29.7
Common	28.9	33.5	31.2
Lincoln	27.7	32.1	29.9
Saratoga	28.1	33.4	30.7
Ott. Syn. C	26.8	30.3	28.6
Ott. Syn. B	27.5	30.1	28.8
Mean	28.0	32.9	30.5

BROME SYNTHETIC TEST, GUELPH, 1961 (TEST 223)

Summary of Yield (pounds dry matter per acre) for 1962-63

	Hay			Aftermath			Season Total		
	1962 Jun. 8	1963 Jun.18	2-year Mean	1962 Aug. 7	1963 Aug.15	2-year Mean	1962	1963	2-year Mean
Saratoga	5021	7671	6346	2517	2555	2536	7538	10226	8882
Lincoln	5227	7894	6560	2220	2266	2243	7447	10159	8803
Common	4167	7250	5708	2010	2267	2138	6176	9517	7846
S-5563	4120	6776	5448	2164	2154	2159	6284	8940	7612
S-6213	4593	7646	6119	2304	2345	2324	6896	9990	8443
S-6214	4792	7297	6044	2249	2076	2162	7041	9373	8207
G-2252	5189	7305	6247	2225	2545	2385	7413	9838	8125
G-2253	5045	7287	6166	2423	2558	2490	7468	9846	8657
Mean	4769	7389	6080	2264	2346	2305	7033	9735	8322
L.S.D. .05	262	N.S.		N.S.	229		355	790	

BROME SYNTHETIC TEST, GUELPH, 1962 (TEST 226)

1963 DATA

	Hay (June 20)	Aftermath (Aug.15)	Season Total
Sask. S-5824 (Syn.2)	7548	3515	11064
Ott. Syn. B. (Syn.1)	6720	3505	10225
Ott. Syn. C (Syn. 1)	7752	3457	11209
Ott. Syn. D. (Syn.1)	7784	3304	11088
RP.100 (Syn. 1)	6640	3189	9828
RP.101 (Syn. 1)	6969	3150	10119
Saratoga	6982	3309	10290
Lincoln	6940	3069	10010
Mean	7167	3312	10479
L.S.D. .05 level	N.S.	N.S.	973
C.V.	9.0	6.7	6.3

BROMEGRASS VARIETY TEST FOR HAY - 1963

Location: Verner, Ontario
 Soil Type: Casey silty clay loam, imperfectly drained.
 Fertilizer Treatment: 300 lbs. 8-16-16 per acre at time of seeding, plus 150 lbs. of pure nitrogen on June 20 and 600 lbs. 8-16-16 on July 18, 1962, per acre, plus 500 lbs. 16-16-16 per acre on July 9, 1963.
 Weed Control: 16 oz. 2,4-D (Ester acid) per acre on August 3, 1962, and 24 oz. applied on July 22; and September 26, 1963.
 Test Design: Randomized, 6 blocks.
 Companion Crop: Nil for 1962 seeding and 1½ bus. per acre of Garry oats, removed at early dough stage for 1961 seeding.
 Rate of Seeding: 12 lbs. per acre in pure seeding.
 Seeded: May 27, 1961.

N.B. Due to a poor or slow establishment, no yields were available in 1962.

Variety	Yield of Dry Matter per Acre					
	Hay cut	Aftermath	Hay and	Contribution	Leafi-	Maturity
	6/26/63	cut 9/19/63	Aftermath Yield	to Yield	ness	
	lb.	lb.	lb.	% ¹	1-5 ²	Stage ³
Lincoln	4348 a	1371 a	5718 a	94	2.2	pre-bloom
Saratoga	4196 ab	1442 a	5638 a	96	1.7	1st bloom
Fischer	4125 ab	1293 a	5417 a	93	1.9	1st bloom
Ottawa Syn. C.	4150 ab	1199 a	5349 ab	94	2.2	pre-bloom
Ottawa Syn. B	4062 ab	1268 a	5330 ab	93	2.0	pre-bloom
Sac (Wisc. B-81)	4073 ab	1241 a	5315 ab	92	2.2	1st bloom
Manchar	3926 bc	1340 a	5266 ab	94	2.1	pre-bloom
Wisc. B-55	3939 abc	1240 a	5179 ab	92	2.2	1st bloom
Carlton (S-4088)	3596 c	1210 a	4806 b	93	2.0	1st bloom
Mean	4046	1289	5335			
L.S.D. @ .05	354	N.S.	482			
C.V.	74.90%	12.17%	7.74%			
S.E.m	123.70	64.02	168.50			

¹ Contribution of brome to yield

² Leafiness 1 = High ratio of leaves to stems; 5 = Low ratio of leaves to stems of hay yield; no stems in aftermath yield.

³ Stage of bloom at hay harvest, vegetative stage at aftermath harvest

BROME VARIETIES - HAY

Trial No. 54

Location: Central Experimental Farm, Ottawa.

Soil Type: Uplands sandy loam.

Fertilization:

Experimental Design: Randomized blocks, 6 replications.

Plot Size: Seeded 5' x 20'; harvested 3'-3" x 18'.

Nurse Crop: Barley at 1 bushel per acre.

Seeding Rate: 12 lb. per acre.

Date of Seeding: May 15, 1961.

Sampling for D.M.: One 500-gram sample per plot per cut.

Project Leader: L.M. Casserly.

Performance of Brome Varieties for Hay
(Yield in pounds of dry matter per acre)

Variety	1962 2 cuts	1963 1st cut	1963 2nd cut	1963 1 & 2 cut	1962 & 1963 2 yr. mean
Ott. Syn. "B"	5680 ab	7776 a	2524 a	10300 a	7990
Saratoga	6180 a	7172 ab	2537 a	9708 ab	7944
Ott. Syn. "A"	6140 a	7486 ab	2045 abc	9531 ab	7836
Sae Wisc. B55	6020 a	7471 ab	2117 ab	9588 ab	7804
Fischer	6020 a	7095 abc	2465 a	9561 ab	7791
Manchar	6100 a	7025 abc	2228 ab	9253 ab	7677
Lincoln	5420 ab	7362 ab	2317 a	9679 ab	7550
Achenbach	5660 ab	7021 abc	2265 a	9286 ab	7473
S. 6214	5600 ab	7188 ab	1937 abc	9125 abc	7363
S. 6213	6200 a	6722 bc	1792 abc	8514 bc	7357
Ott. Syn. "C"	5220 ab	7197 ab	2252 a	9449 ab	7335
Wisc. B.81 (SAC)	5500 ab	7095 abc	1910 abc	9005 bc	7253
Carlton	5960 a	6324 cd	1715 abc	8039 c	7000
Can-Common	4880 b	5560 e	1402 bc	6962 d	5921
S. 5563	4680 b	5688 de	1260 c	6947 d	5814
C.V.		8.40%	30.10%	9.57%	

BROME VARIETY TESTS - KAPUSKASING - 1963

1. Pure stand cut under hay-pasture management

Variety	Dry Matter (lbs./acre)		
	1st cut	2nd cut	Total
Lincoln	4086 (3)	710 (6)	4796 (3)
Saratoga	3751 (6)	888 (1)	4639 (5)
Fischer	4015 (4)	762 (2)	4777 (4)
Carlton	3841 (5)	752 (3)	4593 (6)
Ott. Syn. C	4295 (1)	729 (5)	5024 (1)
Wisc. 55	3711 (7)	738 (4)	4449 (7)
Sac (Wisc. 81)	4251 (2)	707 (7)	4958 (2)
Average	3993	755	4748
S.E. Var.	228.4	65	249.1
Date cut	July 12	Aug. 19	

2. Pure stand cut under simulated pasture management

Variety	Dry Matter (lbs./acre)		
	1st cut	2nd cut	Total
Lincoln	2279 b	751	3030 c (5)
Saratoga	2878 a	872	3749 a (1)
Fischer	2664 a	806	3470 ab (3)
Carlton	2572 ab	725	3297 bc (4)
Ott. Syn. C.	2726 a	809	3536 ab (2)
Average	2624	792	3416
S.E. Var.	109.5	38.7	114.4
Date cut	June 27	Aug. 7	

3. In mixture with Empire trefoil or Vernal alfalfa

Variety	Dry Matter (lbs./acre)*	
	With Empire (pasture)	With Vernal (hay)
Lincoln	2361 (4)	5244 (3)
Saratoga	2474 (1)	5336 (1)
Fischer	2404 (3)	4898 (5)
Carlton	2414 (5)	5244 (3)
Ott. Syn. C	2432 (2)	5278 (2)
Average	2397	5200
S.E. Var.	96.5	122.4
Date cut	June 27	July 9

* Including grass and legume

No second cut was taken in this third group, the aftermath consisting of a uniform stand of trefoil or alfalfa.

Very few significant differences have been found between the varieties. In fact over the 6 years since brome was evaluated here, few varieties have shown a decisive superiority, statistically speaking. Nevertheless it may be seen that two varieties this year performed consistently better than all others, namely Saratoga and Ottawa Syn. C. These two varieties showed more vigour in the spring, while Carlton and Lincoln started more slowly. The stand of Wisc. 55 was poorer.

The rate of growth between June 27 and July 12 was very fast. As a result, yields in the so-called hay cut (July 12) were 1000 to 1800 lb. heavier than in the "pasture" series. The aftermath was practically the same in both managements, being no better when the first cut was taken early in the season. So that with respect to total dry matter yield, there was no apparent advantage in cutting brome before "hay" stage. This observation could be deducted from all the variety tests conducted at Kapuskasing in 1963.

No change in recommendations is advocated on the basis of the present results.

TWO-YEAR (1962, 1963) AVERAGE YIELD OF THE BROME-ALFALFA MIXTURE
OVER THE THREE LOCATIONS

Pounds dry matter per acre

	Cut 1	Cut 2	Cut 3	Season Total
<u>PASTURE</u>				
Saratoga	3212	2543	2280	8035
Lincoln	3202	2533	2213	7948
Manchar	3059	2428	2115	7602
Can. Common	2990	2623	2253	7866
Wisc. B55	3161	2502	2214	7877
Sac	3201	2498	2266	7965
Carlton	2904	2656	2321	7881
<u>HAY</u>				
Saratoga	5444	2738		8182
Lincoln	5546	2621		8167
Manchar	5384	2497		7881
Can. Common	5023	2514		7537
Wisc. B55	5441	2633		8074
Sac	5344	2589		7933
Carlton	5178	2696		7874

UNIFORM BROME VARIETY TEST, 1961

Average Yield of the Mixture (lbs. D.M./acre) over the three stations,
Guelph, Kemptville and Ridgetown in 1963

	Cut 1	Cut 2	Cut 3	Season Total
<u>PASTURE</u>				
Saratoga	3270	2929	2133	8332
Lincoln	3144	2934	2109	8187
Manchar	3095	2872	1991	7958
Can. Common	2975	3067	2159	8201
Wisc. B55	3051	2943	2043	8037
Sac	3238	2894	2117	8249
Carlton	2869	3077	2236	8182
Mean	3092	2959	2112	8162
<u>HAY</u>				
Saratoga	5672	2759		8431
Lincoln	5784	2727		8511
Manchar	5793	2611		8404
Can. Common	5236	2668		7904
Wisc. B55	5654	2704		8358
Sac	5543	2636		8179
Carlton	5443	2718		8161
Mean	5589	2689		8278

Yield of Mixture* (lbs. D.M./acre) 1963
and % grass in mixture

	Cut 1 May 31	% Grass	Cut 2 July 5	% Grass	Cut 3 Aug. 14	% Grass	Season Total
<u>PASTURE</u>							
Saratoga	3448	46.0	2524	38.0	2152	25.0	8124
Lincoln	3205	35.0	2712	26.6	2141	9.0	8058
Manchar	3295	47.0	2455	40.1	2054	37.5	7804
Can. Common	3014	41.5	2633	35.4	2153	24.0	7799
Wisc. B55	3015	34.0	2630	29.6	2039	9.0	7684
Sac	3544	39.0	2639	31.1	2174	8.0	8087
Carlton	3102	31.0	2923	30.0	2265	12.5	8289
Mean	3193	39.0	2645	32.9	2140	18.0	7978
<u>HAY</u>							
	June 8		Aug. 1		Oct. 2		
Saratoga	5677	46.0	3284	25.0	1559	23.3	10521
Lincoln	5611	42.5	3422	15.0	1615	12.5	10659
Manchar	5880	47.5	3354	26.6	1509	22.0	10759
Can. Common	5310	42.5	3305	23.3	1458	14.0	10073
Wisc. B55	5532	39.0	3310	13.3	1513	12.5	10355
Sac	5483	43.0	3145	20.0	1457	15.0	10084
Carlton	5650	42.5	3390	17.5	1557	15.0	10596
Mean	5592	43.0	3318	20.1	1524	16.3	10424
	4392		2982		1832		9206

* Mixture is 10 lbs./acre Vernal alfalfa, 10 lbs./acre brome grass. Managements - significantly different for all cuts and season total varieties and varieties x management non-significant for all cuts and season total.

YIELD OF GRASS COMPONENT IN POUNDS DRY MATTER PER ACRE IN 1963

	Cut 1	Cut 2	Cut 3	Season Total
<u>PASTURE</u>				
Saratoga	1581	972	550	3104
Lincoln	1123	712	189	2029
Manchar	1538	1000	775	3313
Can. Common	1226	857	531	2614
Wisc. B55	1031	770	185	2987
Sac	1284	823	179	2287
Carlton	955	896	279	2130
Mean	1248	862	384	2494
<u>HAY</u>				
Saratoga	2592	774	358	3724
Lincoln	2443	507	192	3142
Manchar	2782	888	336	4006
Can. Common	2271	769	208	3248
Wisc. B55	2172	432	188	2809
Sac	2352	611	204	3169
Carlton	2446	555	199	3200
Mean	2437	648	241	3326
F for Man.	Sig.	N.S.	Sig.	Sig.
Var.	Sig.	Sig.	Sig.	Sig.
M x V	N.S.	N.S.	Sig.	N.S.

W. O. A. S.
 UNIFORM BROME TRIAL* - SEEDED 1961
 1963 RESULTS - LBS. DRY MATTER PER ACRE

	May 21		July 8		August 21		Total
	Yield	% Grass	Yield	% Grass	Yield	% Grass	
<u>PASTURE</u>							
Saratoga	3776	39	4421	34	2509	29	10706
Lincoln	3656	31	4402	22	2594	17	10652
Manchar	3610	38	4250	36	2298	41	10158
Common	3554	24	4594	33	2565	29	10713
Wisc. 55	3640	29	4464	24	2446	17	10550
Sac	3636	29	4289	26	2467	26	10392
Carlton	3244	21	4413	28	2533	22	10190
L.S.D. @ 5%	201.8		N.S.		N.S.		
@ 1%	272.0						
<u>HAY</u>							
	June 11		July 19				
Saratoga	6612	37	2901	33			9513
Lincoln	6895	37	2620	18			9515
Manchar	7002	43	2456	47			9458
Common	6404	40	2593	28			8997
Wisc. 55	6676	35	2590	29			9266
Sac	6532	37	2721	27			9253
Carlton	6402	35	2596	29			8998
	N.S.		N.S.				

* Seeded to mixture of 10 lbs./acre Vernal alfalfa and 10 lbs./acre bromegrass

UNIFORM BROME VARIETY TEST, 1961

Kemptville, 1963

	Cut 1 (May 31)	Cut 2 (July 11)	Cut 3 (August 24)	Seasonal Total
<u>PASTURE</u>				
Saratoga	2587	1842	1737	6166
Lincoln	2572	1687	1592	5851
Manchar	2379	1911	1622	5912
Can. Common	2358	1973	1760	6091
Wisc. B55	2498	1736	1643	5877
Sac	2535	1754	1709	5998
Carlton	2261	1896	1910	6067
Mean	2456	1828	1710	5994
<u>HAY</u>	<u>(June 14)</u>	<u>(August 14)</u>	<u>Total Cut 1 & 2</u>	
Saratoga	4727	2091	6818	
Lincoln	4845	2138	6983	
Manchar	4498	2023	6521	
Can. Common	3995	2106	6101	
Wisc. B55	4753	2212	6965	
Sac	4615	2042	6657	
Carlton	4276	2167	5443	
Mean	4350	2108	6458	

Berseem clover has received some publicity recently in the United States as a possible annual legume crop for forage production, companion crop to establish a forage mixture or as a 'plough-down' crop. Berseem clover had been seeded previously, in 1958, at Guelph but performance data were not obtained. This was mainly due to the poor performance of the clover.

In the 1963 test, three Berseem clover varieties were tested. In addition, entries of Vernal and DuPuits alfalfa, Lasalle red clover and a mixture of Nile berseem clover, Vernal alfalfa and Saratoga brome (each component at 10 lbs./acre) were included in the test. The test was seeded April 29 and was sprayed with 16 oz. of 2,4-DB when the alfalfa was approximately three inches tall. The alfalfa varieties exhibited superior seedling vigor to the berseem clover varieties prior to spraying with the herbicide. Red clover was injured severely and did not resume good growth until shortly before the first harvest. 16 oz./acre of 2,4-DB would appear to be the upper limit of tolerance by berseem clover. Weed control was excellent initially, however, as the season progressed grassy weeds established in the berseem clover plots.

At the time of the first harvest (July 18), DuPuits alfalfa was approximately in full bloom, Vernal alfalfa at 25% bloom and the berseem clovers were at the bud stage with an odd bloom showing. In the berseem clover, Vernal alfalfa and Saratoga brome mixture, the berseem clover made up only about one percent of the mixture.

In the second harvest, yields of the berseem clover are apparently larger than those of alfalfa. However, 20-25 percent of the yield of berseem clover is made up of grassy weeds, mainly barnyard grass. The yield of red clover was markedly superior in the second cut. This might have been due to the lack of growth in the first cut.

The second harvest was made three weeks after initial bloom occurred. The percent dry matter of the berseem clover was approximately five to six percent lower than that of the alfalfa. If percent dry matter is correlated with percent digestibility, it would appear that berseem clover exhibits higher digestibility than alfalfa.

On the basis of the data presented below and previous performance of berseem clover at Guelph, alfalfa appears preferable to berseem clover as an annual legume. Weed control also is better and easier with alfalfa.

BERSEEM CLOVER AND OTHER LEGUMES, 1963, GUELPH (TEST 237)

Yield in Pounds Dry Matter per Acre

	Cut 1 (July 18)	Cut 2 (Sept.17)	Season Total
Hustler Berseem clover	1771	3455	5223
Nile " "	1701	3539	5239
Common " "	1789	3279	5068
DuPuits alfalfa	2097	2794	4891
Vernal " "	2024	2707	4731
Lasalle red clover	879	4612	5490
Nile B.C. + Vernal alfalfa + Saratoga brome	2071	3175	5246
Mean	1761	3366	5127
L.S.D. .05	284	417	333
.01	389	572	456
C.V.	11.0	8.4	4.4

MEADOW FESCUESummary

In 1964, the variety Mimer will be placed upon the list of recommended varieties for Ontario. This variety originated in Sweden, is high yielding and is resistant to rusts.

A new strain from Ottawa, called Ottawa Syn. A in the following tables, is being licensed under the name "Trader". This variety will be recommended in place of Mimer as soon as seed is available.

Exp. 619: Meadow Fescue Provincial Test, 1961

Location: Guelph

Yield - Lb. D.M./Acre

Variety	1962	1963		Total
	(3 cuts)	Cut 1 (May 21)	Cut 2 (June 20)	
Ottawa Syn B	5280	720 c ¹⁾	3740 ab	4460 b
Ottawa Syn A	5430	750 c	3660 abc	4420 b
Ottawa Syn C	5550	670 c	3690 abc	4350 bc
Mimer	4610	610 c	3360 bc	3970 cd
Ensign	4130	590 c ²⁾	3300 c ²⁾	3890 ²⁾ d
Climax (Timothy)	5870	1200 b	4060 a	5260 a
Clair (Timothy)	6190	1650 a	2690	4350 bc

1) Any two means followed by same letter are not significantly different (Duncan's Multiple Range Test.)

2) Yield of Ensign is 30-50% weeds.

Note: Test was cut on Aug. 15, 1963 but yields not taken due to an error.

Meadow Fescue Varieties (Trial No. 57) 1963

General Information:

Location: Central Experimental Farm, Ottawa.
Soil Type: Uplands sandy loam.
Fertilization: 400 lb. 8-16-16 before seeding,
 300 lb. 8-16-16, April 1962
 50 lb. N., May, 1962
 65 lb. N., August, 1962
 300 lb. 8-16-16, April, 1963
 35 lb. N., July, 1963
 60 lb. N., August, 1963
Project Leader: L.M. Casserly

Results:

Performance of Meadow Fescue Varieties for Pasture
 (Yield of dry matter in pounds per acre)

Variety	1962	1963	1962-63	Mean (2 years)
	3 Cuts Total	1 cut	4 Cuts Total	
Mimer	4260	3602	7862	3931
Ensign	4140	3229	7369	3685
Syn. 1	4460	3590	8050	4025
Mefon	3960	3480	7440	3720
SK. 6	4480	3931	8411	4206
S-215	4400	3504	7904	3952
	N.S.	N.S.		

Comments: Yields were generally low in 1962 and poor recovery in both years.

Meadow Fescue - Hay (Trial No. 67 and 68)General Information:

Location: Central Experimental Farm, Ottawa.
Soil Type: Kars gravelly sandy loam.
Fertilization: 300 lb. 8-16-16, spring, 1962
 300 lb. 8-16-16, spring, 1963
 35 lb. N., July, 1963
 60 lb. N., August, 1963
 475 lb. 8-16-16, October, 1963
Project Leader: L.M. Casserly

Results:

Performance of Meadow Fescue for Hay
 (Yield of dry matter in lbs. per acre)

Variety	Trial 67	Trial 68
	1963 1 cut	Total 2 cuts
S-215	4607	6177
Ensign	4026	5982
S.K.-6	4393	6149
Mimer	5071	6153
Syn. A	5155	6579
Syn. B	4939	6950
Syn. C.	4902	6928
	N.S.	N.S.

Comments: Yields did not vary significantly. Ensign performed poorly. 1963 yields were seriously affected by drought.

Summary of Yields - Mimer vs. Ensign

Variety	Hay Management			Pasture Management				
	1963A (1 cut)	Ottawa 1963B (2 cuts)	Mean	Ottawa 1962 (3 cuts)	1963 (1 cut)	Guelph 1962 (3 cuts)	1963 (2 cuts)	Mean
Ensign	4030	5980	5000	4140	3230	4130	3890	3850
Mimer	5070	6150	5610	4260	3600	4610	3970	4110

MEADOW FESCUE VARIETIES

PERFORMANCE OF "TRADER"

(OTTAWA SYN. A)

Submitted to Members of

Forage Crops Sub-Committee

Ontario Committee on Field Crop Recommendations

1963

Varietal Description: 1963

Crop - Meadow Fescue - Festuca pratensis

Name - Trader - tested under designations Ottawa Syn. A.

Origin - Genetics and Plant Breeding Research Institute, Research Branch, Canada Department of Agriculture, Ottawa.
Breeders - R.M. MacVicar and D.R. Gibson.

Breeding Method - A synthetic variety developed from 15 progeny tested clones. The source material were varieties and strains of European origin.

Characteristics - Trader is a leafy strain somewhat later in maturity than common and Ensign. It recovers well after defoliation and on observation appears to form a better basal growth than Ensign in pastures.

Both hay and pasture yield data indicate that Trader is equal to other varieties in yield and is consistently higher yielding than Ensign, the only pedigree meadow fescue in commercial production in Canada.

The limited seed data do not show significant values but Trader does not appear to be at much disadvantage to Ensign in this regard.

There has been selection for resistance to leaf rust (*Puccinea coronata*) in this variety and the limited data indicate a superiority to Ensign and Common in this regard.

Breeders Seed - The variety is being introduced with 150 pounds of seed available for 1964 increase and an additional modest amount for experimental testing.

Summary data - Meadow Fescue Strains - Hay and Pasture (Lb. D.M./A.)

Location Test No. Data Years	Hay						Pasture							
	Ottawa 23 3	Ottawa 34 2	Ottawa 67 1	Ottawa 68 1	Ottawa 70 2	Guelph A 2	Mean of 6 Comp- arible- tests	Mean of 6 Comp- arible tests	Mean of 6 Comp- arible tests	Mean of 6 Comp- arible tests	Ottawa 25 3	Ottawa 34 2	Ottawa 57 2	Mean of 6 Comp- arible tests
Ensign	3001	5655	4026	5982	2249	4010	4154	4641	3635	4673	2659	4186	3685	3510
Syn. A (Trader)	3271	6236	5155	6579	3484	4925	4942	5310	4330	5342	3068	4187	4025	3760
Syn. B	3229	6129	4939	6950	3406	4871	4921	5312	4255	5587	2987	4360		
Syn. C	3103	5864	4906	6928	3218	4952	4828	5199	4062	5594	2954	4345		
S-215	2888	5851	4607	6177				4981			2968	4283	3952	3734
Mefon	2309	5839			3355					3834	2293	4303		
Mimer			5071	6153		4292				5173			3931	
S-53	2275	5242			2153						2458	4282		
S-K6- (Att to M.S.)			4393	6149									4206	
Common					2244								3720	

Meadow Fescue Strain Test - 1962 - 1963General Information:

Location: Central Experimental Farm, Ottawa
Soil Type: Uplands sandy loam
Fertilization: 500 lb. 8-16-16 (1961-1962)
Plot Size & Type: Spaced plants - 30 per plot.
Planting Date: June 1961.

Variety	Pounds D.M./A. - single cut		
	1962 Mean	1963 Mean	2 Year Mean
Syn. B	3497 a	3314 a	3406 a
Syn. A (Trader)	3364 a	3604 a	3484 a
Mefon	3341 a	3369 a	3355 a
Syn. C	3322 a	3114 a	3218 a
Ensign	2182 b	2315 b	2249 b
S-53	2099 b	2207 b	2153 b
Common	1986 b	2502 b	2244 b
L.S.D. @ 5% point	454	460	450
C.V. for experiment	10.8%	10.6%	11%

Meadow Fescue - Seed Trials - 1963General Information:

Location: Central Experimental Farm, Ottawa
Soil Type: Kars gravelly sandy loam
Fertilization: 300 lb. 8-16-16, Spring 1962
 300 lb. 8-16-16, spring, 1963
Experimental Design: Randomized blocks, 4 replications
Plot Size: Seeded 5' x 20'; harvested 3' - 3" x 5'.
Seeding Rate: 18 lb. per acre
Seeding Date: June 5, 1962.

Variety	Test 67	Test 69	Mean 2 Tests
	(Lb. per acre)		
S-215	335		
Mimer	417		
SK-6	357		
Ensign	413	404	409
Syn. A (Trader)	336	359	348
Syn. B	375	362	369
Syn. C	392	344	368
L.S.D. (P = .05)	None	None	

Resistance of Meadow Fescue Strains to Leaf Rust (*Puccinia coronata*)

The three Ottawa lines have been selected on the basis of rust resistance as well as other characters. The degree of resistance obtained in comparison with the Ensign variety and Common is indicated in the Tables 1 and 2.

Table 1 - Percent Leaf Area Affected by Leaf Rust
in Seedling Growth - October 4, 1962

Strains	Mean Per Cent Leaf Area Affected by Uredospores
Ensign	68.59
Syn. A (Trader)	11.81
Syn. B	11.44
Syn. C	12.38
C.V.	19.92

Table 2 - Percent of Highly Rust Resistant Plants
in Second Year Single Plant Nursery of
Meadow Fescue Strains.
(Based on 100 plants in four replicates.)

Strains	Percent
Syn. A (Trader)	63.27
Syn. B	58.33
Syn. C	65.96
Ensign	8.08
Common	8.25
S.53	33.33

TIMOTHYSummary

Tests were conducted at Ottawa, Kemptville, Kapuskasing in 1963. Climax continues to be high in performance. Application has been made for licensing the variety WT41. This variety is very similar to Climax in performance.

Varieties being tested further are Clair, Ottawa Syn. 7, Wisc. Syn. T1 and WT-48. These varieties mature at approximately the same time as Climax. The later maturing varieties, Drummond and Essex, are too low in yield and are not being considered for recommendation.

TIMOTHY VARIETY TEST FOR HAY

Trial No. 53

Location: Central Experimental Farm, Ottawa.
 Soil Type: Uplands sandy loam.
 Fertilization:
 Experimental Design: Randomized blocks; six replications
 Plot Size: Seeded 5' x 20'; harvested 3'-3" x 18'.
 Nurse Crop: Barley at 1 bushel per acre.
 Seeding Rate: 10 pounds per acre.
 Seeding Date: May 15, 1961.
 Sampling for D.M.: One 500-gram sample per plot per cut.
 Project Leader: L.M. Casserly.

Performance of Timothy Varieties Seeded for Hay
 (Yield of dry matter in pounds per acre)

Varieties	1962 Hay & After- math	1963 Hay	1963 After- math	1963 Hay & After- math	Total Mean of 2 Years
Climax	5640	7729 ab	2746 ab	10475 ab	8058
Drummond	4500	7512 ab	1972 de	9483 ab	6992
Essex	4720	8115 a	2305 cde	10420 ab	7570
Clair	5880	6625 b	2889 a	9513 ab	7697
Ottawa 7 (Syn. I)	6080	8338 a	2352 bcd	10690 a	8385
Bottnia II	4580	7313 ab	1933 e	9243 b	6912
Weibulls T.41	5040	6781 b	2560 abc	9341 b	7191
Weibulls T.48	5100	7092 ab	2587 abc	9680 ab	7390
Wisc. Syn. T.11	4920	8064 a	2396 bc	10460 ab	7690
Significance	N.S.	S.D.	S.D.	S.D.	
		13.11%	12.96%	9.59%	

Timothy Variety TestsKapuskasing, 19631. Test cut at early hay stage. Aftermath as simulated pasture (June 26)

Dry Matter (Lb./Acre)

Variety	Cut 1	Cut 2	Total
Climax	1879 a	718 ab	2597
Drummond	1673 ab	739 a	2412
T-41	1377 b	654 ab	2031
Clair	1690 ab	747 a	2437
Bottnia II	1581 ab	538 b	2119
Milton	1800 ab	530 b	2330
Average	1667	654	2321
SE Var.	134.5	59.6	166.8
Date cut	June 26	Aug. 7	

2. Test cut at normal hay stage. Aftermath as pasture (July 9)

Dry Matter (Lb./Acre)

Variety	Cut 1	Cut 2	Total
Climax	4394 a	750	5144
Drummond	3851 ab	662	4513
T-41	3962 ab	682	4644
Bottnia II	3663 b	685	4348
Average	3968	695	4662
SE Var.	196.7	44.1	217.8
Date Cut	July 9	Aug. 16	

Varieties showed good spring stands except T-41 and Bottnia which were thin. Both tests received 100 pounds Ammonium nitrate in the spring and after the first cut. The increase in yield secured by an interval of two weeks is very clear cut. Yields on July 9 were more than double than recorded on June 26. The aftermath following the early cut was not any better than after the "normal-cut". There was no regrowth after the second cut.

Timothy Variety TrialLocation: Kemptville

Yield - lb. of D.M./Acre, 1963

Variety	Cut 1 June 26
Essex	4170 a
Medon	3510 ab
Weibull's T-41	3280 ab
Wisc. Syn. T-1	3100 b
Drummond	3070 b
Climax	3040 b
Essex + Empire T.	4010 a
Climax + Empire T.	3810 ab
Drummond + Empire T.	3290 ab

Exp. 617A. Timothy Strain Trial

Location: Guelph

Yield - Lb. of D.M./Acre, 1963

Variety	Cut 1			Aftermath			Total		
	Medium (June 26)	Late (July 5)	Mean	Medium	Late	Mean	Medium	Late	Mean
Climax	6130	5940	6030 a	2340	1790	2070	8470	7730	8100 a
O-233	6020	5910	5970 a	2240	2020	2130	8270	7920	8100 a
Weibull's T-41	5970	5830	5900 ab	1880	1720	1800	7850	7550	7700 a
Drummond	5510	5580	5540 bc	1670	1810	1740	7180	7390	7280 b
Essex	5230	5270	5250 cd	1960	2070	2010	7180	7340	7260 b
S-51	5040	5270	5150 d	1930	1740	1830	6970	7010	7000 b
Mean Sq. for time of Cut 1	N.S.			*			N.S.		
Mean Sq. for Varieties	* *			N.S.			* *		

Composition of Cut 1 Forage

Variety	1962			1963		
	Yield	% Veg.(1)	% Leaf(2)	Yield	% Veg.(1)	% Leaf(2)
Climax	5870 a	27.3 c	26.5 ab	6030 a	22.4 b	34.3 bc
O-233	5870 a	28.1 c	20.9 b	5970 a	25.6 b	32.0 bc
Weibull's T-41	5530 a	32.2 bc	26.8 ab	5900 ab	30.7 b	30.8 c
Drummond	5850 a	37.8 ab	25.8 ab	5540 bc	53.6 a	37.3 ab
Essex	5800 a	32.4 bc	32.1 a	5250 cd	48.5 a	41.4 a
S-51	4680 a	43.6 a	32.6 a	5150 d	52.8 a	40.8 a

(1) All shoots without a visible head were classed as vegetative.

(2) % leaf on those shoots with visible heads.

Order of Maturity

Bloom Date (1963)

O-233	June 24
Climax	June 26
Weibull's T-41	June 27
Drummond	June 30
S-51	July 3
Essex	July 5

Exp. 617 B. Timothy Strain Trial.

Location: Guelph

Yield - Lb. D.M./Acre - 1963

Variety	Cut 1			Aftermath			Total		
	Medium (June 26)	Late (July 5)	Mean	Medium	Late (Sept. 9)	Mean	Medium	Late	Mean
Climax	5980 a	6060 ab	6020 a	1770	1910	1840 a	7750	7980	7860 a
Wisc. Syn. T-1	5500 abc	5910 abcd	5710 ab	1780	1810	1790 a	7280	7720	7500 ab
Weibull's T-41	5480 abc	6220 a	5840 a	1550	1730	1640 a	7020	7950	7490 ab
Weibull's T-48	5660 ab	6050 abc	5860 a	1440	1450	1420 a	7060	7500	7280 bc
Essex	5120 bc	5560 bcd	5340 bc	1320	1790	1550 a	6440	7350	6900 c
Drummond	4980 c	5400 d	5190 c	1180	1790	1480 a	6160	7190	6670 c
Mean Sq. for Cuts			*			N.S.			*
Mean Sq. for Varieties			**			N.S.			**

Composition of Cut 1 Forage - 1963

Variety	Yield	% Veg. ¹⁾	% Leaf ²⁾
Climax	6020 a	38.4 e	36.6 a
Wisc. Syn. T-1	5710 ab	62.1 bc	42.6 a
Weibull's T-41	5840 a	46.9 de	36.7 a
Weibull's T-48	5860 a	55.7 cd	40.8 a
Essex	5340 bc	69.8 ab	40.9 a
Drummond	5190 c	73.1 a	42.1 a

1) All shoots without visible heads were classed as vegetative.
 2) % leaf on those shoots with visible heads.

Order of Maturity

Climax
 Weibull's T-41
 Drummond
 Weibull's T-48
 Wisc. Syn. T-41
 Essex

Bloom Date (1963)

June 26
 June 26
 June 30
 June 30
 July 2
 July 5

Timothy Variety Comparisons
W.T.-41 & T-48 with Climax, Essex and Drummond

Hay Management - Cut 1

Variety	Ottawa				Guelph						Kapuskasing			Kemptville	
	1957	1958	1959	1962	1959	1960	1961	1962	1963A	1963B	1960	1961	1962	1963	1963
Climax	5530	4480	2750	4060	5130	5430	5110	5870	6030	6020	2950	5270	1730	4390	3040
Drummond	5630	4550	2170	3280	—	—	—	5850	5540	5190	3600	4580	1770	3850	3070
Essex	6030	4510	2350	3440	—	—	—	5800	5250	5340	2400	5040	1620	—	4170
Weib.T-41	5170	4490	2630	3640	4990	6010	5150	5530	5900	5840	3070	5310	1540	3960	3280
Weib.T-48	—	—	—	3800	5080	5180	5240	—	—	5860	—	—	—	—	—

Hay Management - Total Yield (Only those tests for which more than 1 cut reported.)

Variety	Ottawa				Guelph			Kapuskasing	
	1958	1959	1962	1963	1962	1963A	1963B	1961	1963
Climax	6230	4320	5640	10210	7780	8100	7860	6870	5140
Drummond	5660	3700	4500	9100	7220	7280	6670	6060	4510
Essex	6030	4020	4720	10140	7350	7260	6900	6430	—
Weib.T-41	6310	4300	5040	9110	7270	7700	7490	6710	4640
Weib.T-48	—	—	5100	9590	—	—	7280	—	—

Pasture Management - Total Yield

Ottawa

Variety	1957	1958	1959	Average
Climax	4070	3620	3670	3790
Drummond	4050	3640	3660	3780
Essex	—	—	—	—
WT-41	3740	3740	3800	3760
WT-48	—	—	—	—

Timothy Variety Comparisons

W.T.-41 & T-48 with Climax, Essex & Drummond

Summary - Cut 1

Variety	No. Tests	Mean	No. Tests	Mean	No. Tests	Mean	No. Tests	Mean
Climax	15	4520	11	4340	5	5150	2	5040
Drummond		--	11	4110		-	2	4240
Essex		--	11	4090		--	2	4390
W.T.-41	15	4430	11	4220	5	5130	2	4740
W.T.-48		--		--	5	5030	2	4830

Summary - Total Yield

Variety	No. Tests	Mean	No. Tests	Mean	No. Tests	Mean
Climax	9	6900	8	7130	3	7900
Drummond	9	5970	8	6270	3	6760
Essex		--	8	6610	3	7250
WT-41	9	6510	8	6740	3	7210
WT-48		--		--	3	7320

MIXTURES

Summary

It is suggested that the hay-pasture mixtures as recommended in Publication 296, be changed in such a way as to emphasize the importance of simple mixtures by their listing, by their description and by notations in the use recommendation column. It is also suggested that these mixtures be recommended for use on well drained as well as imperfectly drained soils.

Such changes are needed and essential in order to allow conditions for forage to produce equivalent yields of a quality product to corn. For the use of simple mixtures provide the basis by which forage production can be intensified for high yield and high quality, coupled with the use of proper management.

Research data required for these changes has been obtained in part from trials conducted by this committee (trials on well drained sites, trials on imperfectly drained sites) and in part from data obtained from our forage quality research program.

Well drained mixture trials

Mixtures for well drained soils were tested over eight locations during the period 1958-1961. The analyzed data were presented to this group at the last planning conference and as a result are not included in this report.

In general, these data indicated: 1) that simple alfalfa-grass mixtures yielded more pounds of dry matter than complex mixtures and that these mixtures could be used throughout all of Ontario. The legume content of these simple mixtures remained higher over the three year period than it did in complex mixtures. 2) The inclusion of red clover or ladino in simple alfalfa-grass mixtures did not increase total yields and tended to reduce the alfalfa component.

Additional data are available to show that direct seedings of pure alfalfa are advantageous from the standpoint of seedling year production, ease of weed control and high feeding value. Pure alfalfa seedings are presently being used by the processors of alfalfa meal. In the future this type of seeding will be used for stored feed as a protein supplement and for energy ration on intensively managed farms.

Imperfectly drained mixture trials

The committee also tested mixtures for imperfectly drained soils. Series A mixture trials were conducted over six locations during the period 1958-1962. The summary of three years data supported the use of trefoil mixtures throughout all the province rather than the complex alfalfa-red clover-alsike-ladino-grass mixtures. Changes in the recommendations were considered last year.

Imperfectly drained mixture trials (Cont'd)

Series B mixture trials were conducted at four locations from 1960 to 1963. The data are contained in this report and support the fact that simple alfalfa-grass mixtures will produce more forage for a period of three years than trefoil mixtures on imperfectly drained soils if four conditions are fulfilled:

1. Alfalfa should be included in mixtures with no other legume
2. Surface water should be removed from soil surface
3. Soil fertility levels should be high
4. Proper cutting and/or grazing management practices should be followed.

Quality varieties

Data from research into forage quality have shown that there is a high positive correlation between stage of development of the crop and digestibility. This suggests that each of the components in the mixture must be chosen so as to have the varieties of the grass and the legume maturing at the same time. This can best be accomplished by using a two component mixture. Choosing the varieties on the basis of maturity has the added advantage in that mixtures can be compounded that will mature early, medium or late with respect to one another and can be used in farm forage programming.

STATUS OF MIXTURE TESTS

1963

Zone	Location	Fair Drainage	
		<u>Series A*</u>	<u>Series B</u>
1	Ridgetown	1958	
4	Guelph	1957	1960
6	Arthur	1958	
5	Kemptville		1961
7	Eau Claire	1957	
7	Noelville	1957	
8	Kapuskasing	1957	

* Series A - Six tests completed (3 consecutive years)

PROVINCIAL HAY-PASTURE MIXTURES FOR AREAS OF IMPERFECT DRAINAGE

Series A

COMPOSITION OF MIXTURES

<u>Mixture No.</u>	<u>Components and seeding rates</u>
1	Vernal 6 + Lasalle 3 + Ladino 1 + Climax 5 + Lincoln 6
2	Vernal 2 + Lasalle 5 + Alsike 2 + Climax 6
3	Vernal 3 + Lasalle 5 + Alsike 2 + Climax 4 + Orchard 2 + Meadow fescue 3
4	Vernal 3 + Lasalle 5 + Ladino 1 + Alsike 1 + Climax 3 + Orchard 2 + Lincoln 5
5	Vernal 4 + Viking 3 + Climax 6
6	Viking 5 + Lincoln 8
7	Viking 5 + Lincoln 5 + Climax 2
8	Viking 5 + Climax 5
9	Lasalle 6 + Alsike 2 + Climax 6
10	Empire 5 + Climax 5
11	Empire 5 + Alsike 1 + Climax 5
12	Viking 5 + Reed canary 6
13	Viking 5
14	Empire 5
15	Viking 5 + Alsike 1 + Climax 5

PROVINCIAL HAY PASTURE MIXTURES FOR AREAS OF IMPERFECT DRAINAGE - SERIES A

Zone Average of Hay + Aftermath

Yield is 1000's pounds of dry matter

Mix No.	Zone 1 ^o				Zone 4					Zone 6				Zone 7				Zone 8				
	1st	2nd	3rd	Ave.	1st	2nd	3rd	4th 1+ 2	Ave.	1st	2nd	3rd	Ave.	1st	2nd	3rd	Ave.	1st	2nd	3rd	Ave.	
1	5.9	7.2	10.6	7.9	5.7	6.3	4.3	3.9	7.6	5.1	9.2	6.7	5.7	6.4	4.8	4.3	5.2	4.8	4.8	3.4	2.8	3.7
2	5.6	5.7	9.8	7.0	7.1	6.1	4.6	3.4	7.8	5.3	9.0	6.8	4.6	6.0	4.8	4.6	5.2	4.9	5.0	2.8	2.3	3.4
3	5.7	5.8	9.7	7.0	6.6	4.9	3.4	3.3	7.7	4.6	8.4	6.2	4.6	5.7	4.8	4.1	3.5	4.1	5.1	2.9	1.9	3.3
4	5.5	6.6	9.4	7.2	6.3	5.1	3.5	4.2	8.0	4.8	8.8	6.4	4.6	5.8	4.5	4.2	3.4	4.0	5.3	3.0	2.3	3.6
5	5.2	5.6	9.3	6.7	6.5	7.1	5.9	6.1	8.6	6.4	8.9	6.6	6.4	6.6	4.5	4.2	4.9	4.6	2.4	2.9	2.3	2.6
9	4.5	4.7	5.6	4.9	6.4	5.7	4.2	3.3	7.1	4.9	8.1	6.6	3.3	5.5	5.0	4.9	5.6	5.2	4.8	2.8	2.2	3.3
13	5.1	5.8	8.9	6.6	5.3	7.1	5.6	6.8	8.2	6.2	4.9	4.7	4.9	4.8	4.6	3.6	4.5	4.2	1.6	2.3	2.2	2.1
8	5.4	6.0	9.6	7.0	5.3	7.4	6.5	7.5	8.2	6.7	5.9	5.3	3.9	4.8	4.9	4.4	5.0	4.8	1.7	3.1	2.6	2.4
6	5.2	7.4	10.6	7.7	5.5	7.5	6.0	7.3	8.3	6.6	5.9	4.9	4.1	4.6	4.3	3.9	4.6	4.3	2.2	3.1	2.7	2.7
7	5.1	7.1	9.9	7.4	4.9	8.1	6.1	7.5	8.7	6.7	6.7	5.7	4.1	5.2	4.9	4.1	4.9	4.7	1.9	2.8	2.7	2.5
15	4.8	6.5	9.4	6.9	5.9	6.2	4.8	6.4	8.2	5.8	6.5	5.6	4.5	5.2	5.0	4.3	5.2	4.8	2.4	3.3	3.1	3.0
12	4.8	6.2	9.0	6.7	4.2	6.9	6.1	6.9	8.2	6.0	5.6	5.4	3.5	4.8	4.3	3.8	5.8	4.7	1.4	3.0	2.3	2.3
14	3.5	4.9	7.9	5.4	5.5	6.0	6.3	5.7	7.1	5.9	4.1	4.1	4.4	4.2	4.2	3.3	4.5	4.0	1.2	2.5	1.9	1.9
10	3.4	5.9	9.1	6.2	6.0	5.7	7.0	7.0	7.9	6.4	4.6	4.4	4.0	4.2	4.6	4.2	5.4	4.7	2.8	3.4	2.7	3.0
11	4.0	5.5	8.8	6.1	6.0	5.6	6.1	6.2	8.2	6.0	6.3	5.6	3.3	4.8	4.6	4.2	5.4	4.7	2.5	2.9	2.8	2.7

+ 1 = no nitrogen; 2 = 100 lbs. nitrogen spring, 33 lbs. after hay, 33 lbs. after 1st pasture.

- o Zone 1 = average yield of 1 test for 3 years
- 4 = average yield of 1 test for 4 years
- 6 = average yield of 1 test for 3 years
- 7 = average yield of 2 tests for 3 years
- 8 = average yield of 1 test for 3 years

PROVINCIAL HAY - PASTURE MIXTURES - SERIES A
 Imperfect Drainage
 (Pounds of Dry Matter Per Acre)
 Hay

Location: Guelph
 Year Seeded: 1957

Harvest Year 1963

Mixture No.	1958-60	0 NITROGEN				150# NITROGEN				Ave. 1958-63	
		1961	1962	1963	Ave. 61-63	1961	1962	1963	Ave. 61-63	0 Nitrogen	150# Nitrogen
1	4150	2911	2868	2425	2735	5850	4588	6207	5548	3443	4849
2	4549	2876	2165	2620	2554	5717	4726	6038	5494	3552	5022
3	3514	2364	1953	1665	1994	4846	3888	4199	4311	2754	3913
4	3462	2187	1967	1609	1921	5176	3625	3611	4137	2692	3800
5	4519	3932	3717	3933	3861	5597	4861	5849	5436	4190	4978
9	4254	2780	2033	2008	2274	5561	4590	5641	5264	3264	4759
13	3474	4236	3596	4239	4024	5445	4582	5880	5302	3749	4388
8	4007	4539	4269	4733	4514	5447	4666	5366	5160	4261	4584
6	3704	4399	3755	3782	3979	5227	4402	5483	5037	3842	4371
7	3981	4557	3740	4448	4248	6111	5093	5549	5584	4115	4783
15	4289	4211	3570	4081	3954	5594	4961	5574	5376	4122	4833
12	3359	4036	3451	4139	3875	5266	4951	5762	5326	3617	4343
14	4468	3951	3479	3588	3673	5114	4386	5098	4866	4071	4667
10	4846	4098	3634	3880	3871	5733	4823	5434	5330	4359	5088
11	4846	4116	3648	3840	3868	5962	4948	6053	5654	4357	5250

PROVINCIAL HAY - PASTURE MIXTURES - SERIES A

Imperfect Drainage

Pounds of Dry Matter Per Acre

Aftermath

Year Seeded: 1957

Mixture No.	Ave. 1958-60	0 NITROGEN				150# NITROGEN				AVE. 1958-1963	
		1961	1962	1963	Ave. 1961-63	1961	1962	1963	Ave. 1961-63	0 Nitrogen	150# Nitrogen
1	1311	966	397	310	558	1787	1037	840	1221	935	1266
2	1371	573	981	110	555	2019	1137	1046	1401	963	1386
3	1454	990	379	262	544	2869	1698	1943	2170	999	1812
4	1511	1007	387	241	545	2848	1760	1913	2174	1028	1843
5	2051	2126	1244	755	1375	2992	1413	873	1759	1713	1905
9	1192	503	115	34	217	1566	893	1022	1160	705	1176
13	2583	2548	1387	1010	1648	2605	1458	1208	1757	2116	2170
8	2407	3007	1566	1118	1897	2711	1408	740	1620	2152	2014
6	2612	2897	1573	1063	1844	3098	1812	1120	2010	2228	2311
7	2389	2943	1671	1053	1889	2624	1386	1112	1707	2139	2048
15	1369	2196	1515	912	1541	2576	1319	938	1611	1455	1490
12	2359	2829	1484	1022	1782	2897	1459	1331	1896	2071	2128
14	1497	1708	878	573	1053	2095	1180	1043	1439	1275	1468
10	1388	1890	1057	402	1116	2150	1176	901	1409	1252	1399
11	1407	1968	869	432	1090	2181	1011	645	1279	1249	1343

PROVINCIAL HAY - PASTURE MIXTURE - SERIES A

Imperfect Drainage

Pounds of Dry Matter Per Acre

Hay and Aftermath

Year Seeded: 1957

Mixture No.	Ave. 1958-60	O NITROGEN				150# NITROGEN				AVE. 1958-63	
		1961	1962	1963	Ave. 1961-63	1961	1962	1963	Ave. 1961-63	0 Nitrogen	150# Nitrogen
1	5461	3877	3265	2735	3292	7637	5625	7048	6770	4377	6116
2	5921	3449	3146	2730	3108	7836	5863	7084	6928	4515	6425
3	4968	3354	2332	1927	2538	7715	5586	6142	6481	3753	5725
4	4973	4194	2354	1850	2799	8024	5385	5525	6311	3886	5642
5	6486	6058	4961	4688	5236	8589	6274	6721	7195	5861	6841
9	5447	3283	2148	2042	2491	7127	5483	6662	6424	3969	5936
13	5627	6784	4983	5249	5672	8150	6040	7088	7093	5650	6360
8	6414	7546	5835	5851	6411	8158	6074	6106	6779	6413	6597
6	6283	7286	5328	4845	5820	8325	6214	6602	7047	6052	6665
7	6370	7499	5411	5500	6137	8735	6479	6661	7292	6254	6831
15	5659	6407	5085	4994	5495	8170	6280	6512	6987	5577	6323
12	5718	6875	4935	5161	5657	8163	6410	7093	7222	5688	6470
14	5965	5659	4357	4161	4726	7109	5566	6141	6272	5346	6119
10	6234	6988	4691	4282	5320	7883	5999	6335	6739	5777	6487
11	5890	6184	4517	4272	4991	8153	5959	6697	6936	5441	6413

PROVINCIAL HAY-PASTURE MIXTURES FOR AREAS OF IMPERFECT DRAINAGE

Series B

COMPOSITION OF MIXTURES

<u>Mixture No.</u>	<u>Components and seeding rates</u>
1	Vernal 8 + Ladino 1 + Climax 4 + Lincoln 6
2	Vernal 2 + Red clover (comp.) 5 + Alsike 2 + Climax 6
3	Viking 8 + Climax 4
4	Empire 8 + Climax 4
5	Vernal 10 + Climax 6
6	Vernal 8 + Red clover (comp.) 2 + Climax 6
7	Empire 8 + Essex 4
8	Viking 8 + Red clover (comp.) 1 + Climax 4
9	Alsike 2 + Com. red 6 + Com. Timothy 6
10	Vernal 2 + Viking 8 + Climax 4
11	Vernal 4 + Viking 6 + Climax 4
12	Vernal 6 + Viking 4 + Climax 4
13	Vernal 2 + Empire 8 + Climax 4
14	Vernal 4 + Empire 6 + Climax 4
15	Vernal 6 + Empire 4 + Climax 4
16	Alsike 2 + Lasalle 6 + Climax 6

PROVINCIAL HAY PASTURE MIXTURES - SERIES B
 Imperfectly Drained Soils
 (Lbs. Dry Matter Per Acre)

Zone 4, O.A.C.

Mixture No.	Hay				Aftermath				Hay and Aftermath			
	1961	1962	1963	Ave.	1961	1962	1963	Ave.	1961	1962	1963	Ave.
5	6735	5394	5189	5773	5787	3154	6056	4999	12522	8548	11245	10772
1	7580	5734	5640	6318	5509	3223	6002	4911	13089	9957	11642	11563
2	6404	5552	5510	5822	4924	2740	5534	4399	11328	8292	11044	10221
6	6641	5885	4705	5744	5577	3237	5939	4918	12218	9123	10644	10662
16	6707	4220	5596	5508	4709	1793	2209	2904	11416	6013	7805	8411
9	6442	4632	6426	5833	4663	1599	2191	2818	11105	6231	8617	8651
3	6761	4718	5961	5813	4550	1588	2510	2883	11311	6306	8470	8696
4	5965	4830	6431	5742	4239	1615	1954	2603	10204	6445	8385	8345
7	5893	4622	5765	5427	4519	1680	2102	2767	10412	6302	7867	8194
10	6101	5691	5394	5729	5528	2968	5225	4574	11629	8659	10619	10302
11	6343	5528	5179	5683	5759	3063	5883	4902	12102	8591	11063	10585
12	6347	5761	4929	5679	5509	3314	6038	4954	11856	9075	10967	10633
13	6772	5710	5109	5864	5297	3126	5696	4706	12069	8836	10805	10570
14	6073	5905	5225	5722	5537	3056	5861	4818	11612	8961	11086	10553
15	6743	5928	4824	5832	5761	3410	6208	5126	12504	9338	11032	10958
8	6492	4701	5336	5510	5090	1560	1846	2832	11582	6261	7183	8342

PROVINCIAL HAY PASTURE MIXTURES - SERIES B
 Imperfectly Drained Soils
 (Lbs. Dry Matter Per Acre)

Zone 4, Kaine Farm

Mixture No.	Hay				Aftermath				Hay and Aftermath			
	1961	1962	1963	Ave.	1961	1962	1963	Ave.	1961	1962	1963	Ave.
5	5225	4727	4454	4802	4008	1387	2265	2553	9233	6114	6719	7355
1	5398	4212	4817	4809	3610	1127	1780	2172	9008	5339	6597	6981
2	5918	4173	4104	4732	4002	703	1143	1949	9920	4876	5247	6681
6	5836	4315	4552	4901	4125	1284	2498	2636	9961	5599	7050	7536
16	5110	4336	3540	4329	3404	1022	295	1574	8514	5358	3835	5902
9	5198	3773	2793	3921	2809	280	141	1077	8007	4053	2934	4998
3	4376	3776	4400	4184	3196	916	1212	1775	7572	4692	5612	5959
4	4305	3474	3913	3897	2410	720	3913	2348	6715	4194	4392	5100
7	3938	3558	4059	3852	2140	780	433	1118	6078	4338	4492	4969
10	4629	4613	4280	4507	3484	1215	2127	2275	8113	5828	6406	6782
11	5052	4298	4462	4604	4983	1235	2051	12756	10035	5633	6513	7394
12	4875	3567	4464	4302	3906	1341	2220	2489	8781	4908	6684	6791
13	4846	4758	4621	4742	3876	1385	2263	2508	8722	6143	6884	7250
14	4938	4293	4397	4543	3784	1360	1813	2319	8722	5653	6209	6861
15	5381	4616	4526	4841	4006	1354	2413	2591	9387	6970	6939	7765
8	4796	3813	4304	4304	3498	931	925	1785	8294	4744	5229	6089

PROVINCIAL HAY-PASTURE MIXTURES FOR AREAS OF IMPERFECT DRAINAGE

Series B

COMPOSITION OF MIXTURES

<u>Mixture No.</u>	<u>Components and Seeding Rates</u>
1	Alsike 2 + Com. red 6 + Com. Tim. 6.
2	Alsike 2 + LaSalle 6 + Climax 6
3	Viking 8 + Red Clover (comp) 1 + Climax 4.
4	Roskilde 8 + Climax 4.
5.	Vernal 4 + Viking 6 + Climax 4.
6	Empire 8 + Climax 4.
7	Vernal 2 + Red Clover (comp) 5 + Alsike 2 + Climax 6.
8	Vernal 2 + Viking 8 + Climax 4.
9	Vernal 6 + Viking 4 + Climax 4.
10	Viking 8 + Climax 4.
11	Leo 8 + Climax 4.
12	Vernal 6 + Empire 4 + Climax 4.
13	Empire 8 + Essex 4.
14	Vernal 2 + Empire 8 + Climax 4.
15	Vernal 4 + Empire 6 + Climax 4.
16	Vernal 8 + Ladino 1 + Climax 4 + Lincoln 6.
17	Vernal 10 + Climax 6.
18	Vernal 8 + Red Clover (comp) 2 + Climax 6.

PROVINCIAL HAY - PASTURE TRIAL, SERIES B, 1961
 Kemptville - 1963 Harvest

Mixture No.	Hay			Aftermath			Hay + Aftermath		
	1962	1963	Ave.	1962	1963	Ave.	1962	1963	Ave.
17	3565	5040	4303	1933	1468	1700	5498	6508	6003
16	4111	5387	4749	1490	871	1180	5601	6258	5929
7	4459	4845	4652	2397	300	1349	6856	5145	6001
18	4162	5473	4818	2376	1210	1783	6538	6683	6601
1	4366	5343	4855	2020	588	1304	6386	5931	6159
2	4423	4874	4649	2458	245	1351	6881	5119	5900
10	3792	4486	4139	1564	1011	1287	5356	5497	5426
6	3568	4860	4214	1830	263	1047	5398	5123	5261
13	3082	4293	3688	2266	313	1289	5348	4706	4977
8	3914	4945	4429	2046	1412	1729	5960	6357	6158
5	3943	5004	4474	2043	1714	1878	5986	6718	6352
9	3935	5097	4516	2091	1616	1854	6026	6716	6370
14	3743	4922	4333	2129	1374	1752	5872	6296	6085
15	3846	5420	4633	2101	1835	1968	5947	7255	6601
9	3935	5097	4516	2091	1616	1854	5026	6713	6360
3	4389	4811	4595	1903	1210	1557	6292	6021	6152
Roskilde 4	3477	4503	3990	1392	715	1054	4869	5218	5044
Leo 11	3740	4752	4246	1910	812	1361	5650	5564	5607

ORCHARDGRASSSummary

There were no provincial orchardgrass trials harvested in 1963.

Frode and Tardus II continue to be relatively high in performance. Rideau is a new variety from Ottawa which is later in maturity. Seed of this variety is being increased, but none will be available commercially until 1964.

New varieties of interest in orchardgrass are:

1. Latar - a later, higher-yielding variety. Developed in Washington State.
2. Coxa - a Swedish variety, similar to Frode.
3. Pennlate - similar to Latar in maturity. This variety is also high in yield and very leafy.
4. Motycka - a Polish variety which has been high yielding and leafy.

ORCHARD GRASS VARIETY TRIAL 1962

YIELD (lbs. Dry Matter per Acre)

RIDGETOWN, ONT.

	<u>June 3</u>		<u>July 9</u>		<u>Aug. 21</u>		<u>TOTAL</u>
	% Legume		% Legume		% Legume		
Common	5041	53	3161	71	1658	71	9860
Chinook	4726	57	3284	79	1610	78	9620
Tardus II	4337	62	3257	72	1633	73	9227
Frode	4538	58	3306	73	1800	74	9644
	N.S.		N.S.		N.S.		

Vigor Ratings April 22, 1963

1 = good

10 = poor

Common 5.2

Chinook 6.8

Tardus II 6.3

Frode 4.7

Orchardgrass Variety Test for Pasture (Trial No. 56) Ottawa 1962-1963

General Information:

Location: Central Experimental Farm, Ottawa
Soil Type: Uplands sandy loam
Experimental Design: Randomized blocks; 6 replications
Plot Size: 5' x 20'; harvested 3'-3" x 18'
Nurse Crop: Barley at 1 bushel per acre
Seeding Date: May 17, 1961
Sampling for D.M.: One 500 gram sample per plot per cut
Project Leader: L.M. Casserly

Results:

Performance of Orchardgrass Varieties Seeded for Pasture
 (Yield of dry matter in pounds per acre)

Variety	1962	1963	1963	1963	1963	Mean
	Total 4 cuts	1st cut June 5	2nd cut July 23	3rd cut Aug 28	Total 3 cuts	
Pennlate	4660 a	3115 a	1447 bc	922	5485 a	5072
Potomac	4680 a	2891 ab	1606 ab	918	5415 a	5048
Hercules	4120 ab	3159 a	1266 c	977	5402 a	4761
Rideau	4320 ab	2644 bc	1619 ab	887	5150 ab	4735
Masshardy	3660 b	2855 ab	1395 bc	847	5098 b	4379
Ottawa 100	3860 b	2437 c	1620 ab	758	4817 b	4338
S-143	3660 b	1798 d	1819 a	702	4318 c	3990
Significance	S.D.	S.D.	S.D.	N.S.	S.D.	
C.V.		9.90%	14.24%		7.69%	

Orchard Grass Variety Test for Hay

Location: Ottawa

General Information:

Fertilization - 300 lbs. 8-16-16 - 1962
200 lbs. 33% nitrogen - 1963

Seeding date: June 1961

Results:

Yield of dry matter in pounds per acre in rows

Variety	1962 (1 cut)	1963 (1 cut)	(1962 & 1963) first cuts
Ottawa 1	3327 ab	2837 cd	6164 c
Ottawa 2	3579 a	3916 a	7495 a
Ottawa 3	3162 b	3222 abc	6384 bc
S-143 4	1288 c	2166 d	3454 d
Ottawa 5	3398 ab	3935 a	7334 ab
S-143 6	877 d	2194 d	3076 d
Ottawa 7	3650 a	3101 bc	6751 abc
Strain K 8	3606 a	3573 ab	7180 abc
S. E.	109.60	235.2	348.1

Orchard Grass Variety Test for Hay in Plots

Location: Ottawa

General Information

Fertilization: 105 lbs. 33.3% aeroprills April 18, 1963.
120 lbs. aeroprills July 23, 1963.

150 lbs. aeroprills - 1962
120 lbs. aeroprills - second application.

Seeding date: June, 1961

Yield of dry matter in pound/acre in plots

Variety	1962	1962	1963	(1962 and 1963)
	First cut	Second cut	First cut	First cuts
Ottawa 1	2720	1351 b	4704 a	7424 abc
Ottawa 2	2922	1356 b	5029 a	7951 a
Ottawa 3	2907	1369 b	4591 ab	7498 abc
S-143 4	2966	2398 a	3816 c	6781 c
Ottawa 5	2902	1458 b	5006 a	7908 ab
S-143 6	2938	2342 a	4049 bc	6987 bc
Ottawa 7	2775	1497 b	5108 a	7883 ab
Strain K 8	3099	1536 b	5150 a	8248 a
S. E.	151.02	186.6	200.96	287.3

Exp. 621. Ottawa Polycross Test, 1961

<u>Entry</u>	<u>Yield - Lbs. D.M./Acre</u>			<u>Total</u>
	<u>Cut 1</u> <u>May 27</u>	<u>Cut 2</u> <u>June 21</u>	<u>Cut 3</u> <u>Oct. 7</u>	
<u>Seeded Alone</u>				
Polycross 5, No. 7	1050	2690	1650	5390
" , No. 2	1150	2250	1770	5170
" , No. 1	1080	2340	1730	5150
" , No. 5	1080	2460	1610	5150
" , No. 3	1040	2330	1670	5040
Frøde (?)	400	2020	2680	5100
S-143	330	1830	2790	4950
<u>Seeded with Ladino</u>				
Polycross 5, No. 7	800 (50)‡	1320 (45) ‡	860 (50) ‡	2980
" , No. 5	750 (55)‡	1190 (40)	950 (50)	2890
" , No. 2	820 (50)	1150 (45)	840 (50)	2810
" , No. 3	750 (45)	1120 (45)	930 (50)	2800
" , No. 1	710 (50)	1160 (40)	820 (50)	2690
Frøde (?)	400 (95)	1070 (95)	1270 (80)	2740
S-143	360 (95)	1030 (95)	820 (75)	2210

‡ Percentage of Ladino in forage

Fertilization: April 16 = 200 lb. aeroprills
 June 22 = " "

O.A.C., Guelph

Exp. 620. Orchardgrass Miscellaneous Strains, 1961

Composition of First Cut Forage

Entry	1)	2)	3)			4)			5) Relative Maturity
	Spring Vigour	Wb.Heads Sq.Foot	% Veg.			% Leaf			
	May 14/62	1963	1962	1963	Mean	1962	1963	Mean	
Frode	3	20	69 b	68 bc	69 b	13.9 a	31 ab	23. b	S
Re-Sel. Frode	4	12	68 b	63 bc	65 bc	16.5 a	34 ab	25 ab	L
Masshardy	4	12	71 b	66 bc	68 b	19.9 a	39 a	30 a	L
Motycka	3	14	84 a	85 a	84 a	14.2 a	29 b	22 b	S
Tardus II	3	16	69 b	69 bc	69 b	12.7 a	30 ab	21 b	
American Common									
#1	2	28	63 bc	66 bc	65 bc	13.4 a	27 b	20 b	E
#2	2	20	52 c	58 c	55 d	13.3 a	27 b	20 b	E
#3	3	24	58 bc	61 c	59 cd	15.1 a	32 ab	24 b	S
#4	2	24	63 bc	68 bc	65 bc	15.4 a	27 b	21 b	E
Mean	2	24	59	63	61	14.3	28	21	
Danish Common									
#1	4	16	60 bc	74 ab	67 bc	16.5 a	34 ab	25 ab	S
#2	3	24	51 c	66 bc	58 cd	15.1 a	31 ab	23 b	S
#3	3	28	64 bc	65 bc	65 bc	13.7 a	30 ab	22 b	E
#4	4	6	87 a	68 bc	77 a	14.3 a	33 ab	23 b	L
Mean	4	18	66	68	66	14.9	32	23	
American vs. Danish			xx	xx	xx	N.S.	N.S.	N.S.	

- 1) Rating: 1 (good) to 5 (poor)
- 2) Visual estimate
- 3) All shoots without a visible head were classed as vegetative.
- 4) % Leaf on those shoots with visible heads
- 5) Relative maturity compared to Frode: E=earlier, S=same, L=later.

Exp. 620. Orchardgrass Miscellaneous Strains, 1961

O.A.C., Guelph

Yield - Lbs. of D.M./Acre

Entry	Cut 1			Cut 2			Season Total		
	June 21/62	June 14/63	Mean	Aug. 16/62	Oct 7/63	Mean	1962	1963	Mean
Frode	3770 abc (1)	4190 abc	3980 abc	1730 ab	2600 abc	2160	5500 bcd	6800 abc	6150 abc
Re-Sel. Frode	3470 abc	4190 abc	3830 abcd	1730 ab	2550 abcd	2140	5200 d	6740 abcd	5970 cd
Masshardy	3021 bc	3750 cd	3380 cd	1400 c	1980 e	1690	4420 e	5730 f	5080 f
Motycka	3990 a	3800 cd	3890 abc	1850 ab	2780 a	2320	5840 abc	6580 bcde	6210 abc
Tardus II	3680 abc	3890 cd	3790 bcd	1860 ab	2300 d	2080	5540 bcd	6200 e	5870 cd
American Common									
#1	4250 a	4270 abc	4260 ab	1820 ab	2680 ab	2250	6070 a	6950 ab	6510 a
#2	4140 a	4760 a	4450 a	1810 ab	2320 cd	2060	5960 ab	7090 a	6520 a
#3	3490 abc	4070 bcd	3780 bcd	1660 ab	2460 bcd	2060	5150 d	6530 bcde	5840 cde
#4	3970 ab	4630 ab	4300 ab	1890 a	2500 abcd	2200	5860 abc	7120 a	6490 ab
Mean	3960	4430	4200	1800	2490	2140	5760	6920	6340
Danish Common									
#1	3670 abc	4140 bc	3900 abc	1700 ab	2650 ab	2180	5370 cd	6800 abc	6080 bcd
#2	3510 abc	4050 bcd	3780 bcd	1640 ab	2530 abcd	2080	5150 d	6580 bcde	5860 cd
#3	3410 abc	3900 cd	3650 bcd	1650 ab	2470 bcd	2060	5060 d	6370 cde	5720 de
#4	2990 c	3490 d	3240 d	1600 bc	2790 a	2200	4590 e	6280 de	5440 e
Mean	3400	3900	3640	1650	2610	2130	5040	6510	5780
American vs. Danish	XX	XX	XX	N.S.	N.S.	N.S.	XX	XX	XX

(1) Any two means with the same letter are not significantly different at the 5% level, (Duncan's Multiple Range Test).

XX Difference significant at the 1% level.

Orchardgrass farm plantings- 1963 report on 1961 planting.

Reports are available on two plantings- Ken McCague, Teeswater
S. Watson, Markham.

Both farmers preferred the Latar variety over all the others. One preferred it because there was less bunching than in other varieties. The other showed a preference because of the leaf appearing to go further up the plant. This man reported that there was more material left on the Latar plot than on the others in the test which were grazed at the same time- indicating some differential grazing with some selection against Latar.

Both farmers like Ottawa 200 (Rideau), but indicated preference for Latar. Maturity of Ott 200 appears to be between that of Dupuits and Vernal alfalfa. The variety competes with alfalfa more than S 143. One farmer indicated a preference for this variety over Tardus II and Frode.

Tardus II and Frode were found hard to separate in identification. They were the earliest of the group, were slightly uneven and more inclined to bunching than the others. The amount of alfalfa left in the plots was equal to that left in the Ottawa 200 plot at one farm. Earlier than DuPuits on the one farm.

S 143 showed no spring vigour, and little production, in comparison to the other varieties. Alfalfa was vigorous in the plot on one farm.

The third farm planting - Brant county had to be written off in 1963. The fourth at WOAS was written off in 1962. The fifth may be reported on, at the Committee meetings.

RED CLOVER VARIETY TESTS

1963

FORAGE CROP SUB-COMMITTEE

OF THE

ONTARIO COMMITTEE ON FIELD CROP RECOMMENDATIONS

Table 1 - Summary of red clover variety tests for hay, 1961 to 1963.

(Average seasonal yields by stations for the first crop year in lbs. of dry matter per acre)

Variety	Fort Frances 1961	Fort William 1961	Kapuskasing 1962	Noelville (2 yr.ave.) 1961,1962	Verner (2 yr.ave.) 1962,1963	Mindemoya
Lasalle(Cert.-East)	4198	6672	6246 a	6967 ab	4721 a	8377a
Lasalle(Cert.-West)	4259	6222	5887 ab	6848 ab	4665 ab	8579a
Lakeland	4144	6134	5972 ab	6892 ab	4834 a	7868 bcd
Dollard(Foundation)	4045	5604	5739 abc	6691 ab	4336 b	7518 d
Dollard (Cert.-Calif.)	4384	5444	5461 bcd	7096 a	5495 ab	8137abc
Ottawa(Foundation)	4076	5966	5990 a	6402 b	4634 ab	7795 cd
Ottawa(Bishops Comm.)	3656	5999	5106 cd	6430 b	4706 ab	8276ab
Chesapeake	3696	5674	4999 d	6606 ab	4548 ab	7868 bcd
Tetraploid-Ottawa	--	--	5859 ab	--	3665 c	--
L.S.D. P=.05	425	435	--	--	--	--
	Ottawa(3 yr. ave.1961, 1962,1963)	Guelph 1962	Ridgetown 1961	Foxboro 1962	Average (10 stations)	
Lasalle(Cert.-East)	9186	7386	11581	6676	7201	
Lasalle(Cert.-West)	8615	7118	11248	6732	7017	
Lakeland	8792	7210	11120	7028	6999	
Dollard(Foundation)	8737	6837	10823	6110	6644	
Dollard(Cert.-Calif.)	8723	7375	11428	6257	6980	
Ottawa(Foundation)	8797	6823	11071	6396	6795	
Ottawa(Bishops-Comm.)	8622	6753	10510	5984	6604	
Chesapeake	8620	7090	12188	6290	6758	
Tetraploid Ottawa	--	5828 *	--	5456	--	
L.S.D.- P=.05	--	N.S.	--	--	--	

* Not included in analysis.

Table 11 - Summary of red clover variety tests for seed 1961 and 1963
(Average yield in pounds per acre)

Variety	Williamstown 1963	Ottawa 1963	Ottawa 1961	Mindemoya 1961	Noelville 1961	Noelville 1962	Average* (5 tests)
Lasalle(Cert.-East)	167 ab	353 cd	355 bc	84 b	140a	108 bc	208
Lasalle(Cert.-West)	--	399 bc	362 bc	74 bc	133a	106 bc	215
Lakeland	193 a	570a	438a	85 b	144a	138a	275
Dollard(Foundation)	--	493ab	357 bc	73 bc	134a	100 bc	231
Dollard(Cert.-Calif.)	143 bc	373 c	396ab	78 b	139a	104 bc	218
Ottawa (Foundation)	--	333 cd	323 c	54 c	108a	82 c	180
Ottawa (Bishops-Comm.)	121 c	259 d	348 bc	94 b	140a	114ab	191
Chesapeake	147 bc	319 cd	350 bc	119a	142a	124ab	211
L.S.D., P=.05	40	--	--	--	N.S.	--	--

* Average of 5 stations excluding Williamstown.

Note - Williamstown Test 1963 by J. G. Provencher.
 Ottawa " 1961 " " " "
 Ottawa " 1963 " L. M. Casserly
 Mindemoya " 1961 " C. B. Dalton
 Noelville " 1961 and 1963 by C. B. Dalton

Table 111 - Red clover variety test for hay and seed (Verner)

Location: Verner, Ont.
Soil Type: Casey silty clay loam, imperfectly drained.
Fertilizer Treatment: 300 lb. per acre of 8-16-16 broadcast and disced into top soil prior to seeding; plus 400 lb. per acre of 0-10-20 to 1962 seeding on May 10/63.
Test Design: Randomized, 6 blocks.
Companion Crop: None for 1962 seeding, and 1 1/2 bus. oats per acre, removed at early dough stage on 1961 seeding.
Late of Seeding: 10 lb. pure seed per acre.
Seeded: May 29/62 and May 26/61.
N. B.: A similar test seeded on May 31/62 at Noelville, resulted in a catch failure and was discarded on July 8/63.

Dry matter yield in pounds per acre - Verner, Ont.

Variety	Hay			Aftermath			Hay plus aftermath			1963 Seed Yield per acre.
	1962 cut June 29	1963 cut June 25	2-year Mean	1962 cut Sept. 18	1963 cut Aug. 21	2-year Mean	1962	1963	2-year Mean	
Ottawa-Comm. (Bishops)	3403cde	3634a	3519a	1262abc	1112a	1187a	4665bcd	4746a	4706ab	6.68c
Lakeland	3617abc	3774a	3696a	1459a	818b	1139a	5076a	4592ab	4334a	13.26ab
Chesapeake	3310 e	3447a	3378a	1259bc	1081a	1170a	4569cd	4528ab	4548ab	12.02ab
Lasalle East, Cert. (92)	3719ab	3597a	3658a	1266ab	861b	1063ab	4985ab	4458ab	4721ab	8.01bc
Dollard Cert. Calif. (92)	3647ab	3662a	3655a	1206bcd	675c	941b	4853abc	4337abc	5495ab	13.80a
Ottawa-Breeders (F.2792)	3609abc	3393a	3501a	1400ab	866b	1133a	5009ab	4260bc	4634ab	6.50c
Lasalle-West, Cert. (gr.)	3804a	3409a	3606a	1358ab	760bc	1059ab	5162a	4169bc	4665ab	12.28ab
Dollard-Breeders (Foundation)	3540bcd	3418a	3479a	1064 d	651cd	858 b	4604cd	4069c	4336b	12.19ab
Ottawa-Tetraploid	3321de	2391b	2856b	1075cd	542d	809 b	4396 d	2933 d	3665 c	----
Mean	3552	3414	3433	1261	819	1040	4813	4233	4523	10.59
L.S.D. @ .05	205	335	218	169	119	145	330	395	355	4.65
C.V.	4.96%	8.41%	4.89%	11.48%	12.44%	8.44%	5.87%	8.00%	4.75%	37.54%
S.E.m.	71.89	117.28	98.36	59.09	41.59	50.66	115.29	138.31	124.07	1.62

C. B. Dalton

Table IV - Red clover for hay (trial No. 64) 1963 Ottawa

General InformationLocation: Central Experimental Farm, Ottawa.Soil Type: Kars gravelly sandy loam.Fertilizer: 300 lbs. 8-16-16, Spring 1962

300 lbs. 8-16-16, Spring 1963

35 lbs. N., July 1963

60 lbs. N., August 1963

475 lbs. 8-16-16, October 1963

Experimental Design: randomized blocks, 6 replications.Plot Size: Seeded 5' x 20', harvested 3'-3" x 18'Seeding Rate: 15 lbs. per acre.Seeding Date: June 5, 1962Sampling for D.M.: One 500 gram sample per plot per cut.Project Leader: L. M. Casserly.Results:Performance of Red Clover for Hay
(Yield of dry matter in lbs. per acre)

Varieties	Total	
	2 Cuts	1963
Tetraploid	6512	c
Chesapeake	6378	c
Lakeland	7793	ab
Ottawa F-2792	7405	ab
Dollard Breeders	7948	ab
Dollard (Cert.) Cal. grown	7329	ab
Ottawa (Bishop Common)	7294	ab
Lasalle (Cert.) East. grown	8095	a
Lasalle (Cert.) West.grown	7698	ab
	H.S	

Comments:

Highly significant difference between varieties.

Table V. Red Clover, Test 572, 1961 Seeding, Ontario Agricultural College, Guelph
D.M. in lb. per acre

Variety	1963			1962			1962-63		
	Cut 1 Hay June 18	Cut 2 A'math July 31	Season Total	Cut 1 Hay June 15	Cut 2 A'math July 27	Season Total	Cut 1 Hay	Cut 2 A'math	2-Year Total
LaSalle, east	4314	826	5140	4521	2862	7383	8835	3688	12523
LaSalle, west	4013	678	4691	4475	2643	7118	8488	3321	11809
Lakeland	4199	675	4874	4574	2636	7210	8773	3311	12084
Dollard, found.	3896	503	4399	4180	2657	6837	8076	3160	11236
Dollard, cert.	4104	859	4963	4609	2766	7375	8713	3625	12338
Ottawa, breeders	4062	572	4634	4164	2659	6823	8226	3231	11457
Ottawa, Bishops	2927	508	3435	4210	2543	6753	7137	3051	10188
Chesapeake	2953	787	3740	4198	2892	7090	7151	3679	10830
Mean	3807	676	4483	4365	2707	7072	8175	3383	11554
L.S.D. 5%	508	N.S.		N.S.	220	N.S.			
C.V.	9%	30%		9%	7%	7%			
English	1893	trace	1893	4369	2458	6827	6269	2458	8727
Tetraploid	3907	820	4727	3801	2027	5828	7708	2847	10555

Some Notes on the Red Clover Strain Trial

April, 1963 - Winter survival
 Badly damaged - Burgess (English variety)
 Moderate damage - Chesapeake, Ottawa Bishops
 Slight damage - Dollard, LaSalle, Lakeland, Tetraploid
 No damage - Ottawa Breeders

July to present time - drought

At the time of the second cutting, July 31, Burgess was reduced to a ground cover of 15-20%, Bishop's 35%, Chesapeake 60%, remainder 70-80%. Ottawa Breeders had the best stand at this date.

B. E. Twamley

Table VI - Red Clover variety test for hay - Kapuskasing

Varieties	D. M. yields/A.		
	1963	1st. cut	1962
	2nd. cut		2nd. cut
	lb./a	lb.	lb.
Found. Dollard	3155 ab	2898	2841
Cert. Dollard (Calif.)	2464 c	2535	2926
Found. Ottawa	3027 ab	2810	3179
Bishop's Ottawa	1338 d	2165	2942
Lasalle (east-grown)	2826 bc	2848	3399
Lasalle (west-grown)	2771 bc	2804	3083
Lakeland	3383 a	2844	3128
Tetraploid	3450 a	3126	2733
Chesapeake	612 e	2227	2772
Average	2559	2695	3000
S.E. Mean	148.6	113.2	145.1

It is apparent that except for Chesapeake and the commercial seed stock of Ottawa (Bishop's) most varieties retained good stands in their second crop year. Chesapeake stand was practically killed out while Bishop's Ottawa retained only a few scattered plants. Lakeland and the tetraploid strain were markedly higher yielding. The foundation stocks of Dollard and Ottawa performed similarly. And the two Lasalle's gave practically the same yields. One may note the high difference in survival and yield between the Foundation and the certified stocks of Dollard and between the foundation and commercial stock of Ottawa. In view of this year's observations, the test is to be retained until next year; survival in the third crop will be studied. The first cut was taken around July 20 and was not recorded due to a high proportion of weeds.

P. Dermine

Table VII. Red clover variety trials - 1963, Kapuskasing, Ontario.

a) Single-cut red clover.

Four varieties of late red clover were seeded in 1962; Altaswede, Ulva, Silo and Molstad. Two alsike varieties were included in the test, namely Aurora and tetraploid strain, Ott. 136.

The test was run in three distinct series, based on the date of the first cut.

Series cut on July 12: Dry Matter Yields (lb./acre)

Varieties	1st cut* July 12	2nd cut Aug. 2*	Total*
Silo	(2) 3851 ab	(1) 2418 a	6414 a
Altaswede	(3) 3674 ab	(2) 2148 ab	5955 ab
Molstad	(5) 3231 b	(4) 2045 b	5266 b
Ulva	(6) 3177 b	(3) 2417 a	5569 ab
Aurora	(4) 3626 ab	(6) 658 d	4268 bc
Ott. tetra 136	(1) 4416 a	(5) 1352 c	5814 ab
Average	3662	1840	5547
S.E.Var.	309.8	101.6	333.7

* Based on three reps. only.

Series cut on July 17 and July 22: Dry Matter Yield (lb./acre)

Variety	Cut July 17	Cut July 22
Silo	(1) 4833 a	(3) 5469 b
Altaswede	(5) 4352 ab	(2) 6077 a
Molstad	(2) 4579 ab	(4) 5025 b
Ulva	(4) 4446 ab	(1) 6357 a
Aurora	(6) 3980 b	(3) 3953 c
Ott. tetra 136	(3) 4544 ab	
Average	4456	5376
S.E.Var.	248.4	169.6

- 2 -

At the July 12 cut, the red clover varieties were just starting to bloom while the Alsikes were already in full bloom. At the July 22nd cut the red clover strains were in full bloom. The difference in yields between the July 22 nd July 17 cuts can be attributed only partly to growth rate in the five-day interval. Growth in the "July 22" series was for unexplained reasons always faster and more vigorous than in the other two series. It may be noted that the yields of red clover increased consistently at each 5-day interval, whereas Alsike seemed to have reached its best development at the first cutting date, increasing only slightly thereafter.

The test indicated that even the so-called single cut red clover can yield a good aftermath when the first cut is taken early enough. There was practically no aftermath after the July 22 cut. The aftermath following the July 17 cut was not cut although it would have deserved to be clipped in mid-September. Although Alsike gave practically no aftermath, the tetraploid strain was significantly superior to the diploid Aurora in this regard.

Winterkilling rate as measured in the spring of 1963 varied between 5 and 15 percent. Ulva generally seemed more vigorous with larger leaves than other varieties. Its winter hardiness seems weaker in small land depressions. Silo was in bloom a few days before the other red clover strains.

P. Dermine.

WHITE CLOVER VARIETIES

November - 1963

FORAGE CROP SUB-COMMITTEE
OF THE
ONTARIO COMMITTEE ON FIELD CROP RECOMMENDATIONS

WHITE CLOVER VARIETIES

A. Forage

The average yield from the 1961 seeding at Ottawa and Verner does not show outstanding differences between varieties.

The ranking of the varieties and strains from the 1962 seeding varies from location to location; nevertheless, certain trends are apparent. Pilgrim and Merit generally were high ranking, and Common White Dutch and New Zealand Certified low. The Ottawa synthetics are intermediate in average yield. Ottawa B tends to be higher yielding than Ottawa A except at Guelph.

B. Seed

Nordic, Ottawa A and Ottawa B were high ranking in seed yields.

C. Comments

There was no white clover variety recommended in Ontario in 1963. No change is suggested.

L. P. Folkins
Co-ordinator

Ladino Clover Variety with Timothy for Pasture (Trial #44) - Ottawa 1963.General Information:

Location: Central Experimental Farm, Ottawa
Soil Type: Uplands sandy loam.
Experimental Design: Randomized blocks, 6 replications.
Plot Size: Seeded 5' x 20'; harvested 3'-3" x 18'.
Nurse Crop: Barley at 1 bushel per acre.
Seeding Rate: Clover 2 lb. per acre; Timothy 8 lb. per acre.
Seeding Date: May 11, 1961.
Sampling for D.M.: One 500-gram sample per plot per cut.
Project Leader: L.M. Casserly.

Results:

Performance of Ladino Varieties with Timothy for Pasture
 (Yield of dry matter in pounds per acre)

Variety	1962	1963	1963	1963	1963	Mean 2 Years
	Total 3 Cuts	1st Cut June 7	2nd Cut July 23	3rd Cut Sept. 24	Total 3 Cuts	
Kersey	7100	4075	1921	1934 ab	7930	7515
Ottawa Syn. A	7400	3969	1762	1953 ab	7684	7542
Cert. California	7200	3721	1833	2038 a	7592	7396
Pilgrim	6940	3878	1818	1888 ab	7584	7262
Ottawa Syn. B	7160	3902	1698	1892 ab	7492	7326
S-100	7220	4008	1678	1738 bc	7424	7322
Nordic	7740	3792	1667	1571 c	7030	7385
Significance C.V.	N.S.	N.S.	N.S.	S.D. 10.51%	N.S.	

Table 2 - White clover varieties for hay. 1961 seeding.
Verner - 1963

Location: Casey silty clay loam; imperfectly drained.
Fertilizer Treatment: 300 lb. 8-16-16 per acre, broadcast and disced into the soil prior to seeding, plus, as top dressing, the following applications of fertilizer per acre; - June 20/62 - 300 lb. 8-16-16, on July 17/62 - 600 lb. 0-16-16, on July 9/63, 300 lb. 0-15-30.
Weed Control: Sprayed with Tropotox at rate of 8 oz. of active ingredient per acre on August 3/62, and with 18 oz. (acid) per acre of Embutox E (2, 4-DB) on July 22/63, and again on Sept. 11, 1963, also on Sept. 11/63, 5 lb. per acre of Dalapon was applied by sprayer with the Embutox E.
Test Design: Randomized, 6 blocks.
Companion Crop: Oats seeded at 1 1/2 bus./acre and removed as hay at early dough stage.
Rate of seeding: 2 lb. of white clover, plus 8 lb. of Climax timothy per acre.
Seeding Date: May 24/61.

Variety	Yield of dry matter in lbs. per acre (1)		
	1962 yield cut July 3rd	1963 yield cut July 3rd	2-year Mean yield
Certified Ladino	2936 a	3465 a	3201 a
Pilgrim	2871 a	3353 ab	3112 a
Kersey	3156 a	3071 bc	3114 a
S-100	2999 a	2933 c	2966 a
Ottawa A	2881 a	2904 c	2893 a
Nordic	3176 a	2835 c	3006 a
Ottawa B	2973 a	2760 c	2866 a
Mean	2999	3046	3022
L.S.D. @ .05	N.S.	321	N.S.
C.V.	8.5%	8.95%	7.32%
S.E.m	102.27	111.30	127.77

(1) One cut only was obtained in each of the two years, due to insufficient regrowth for a second harvest.

Variety	Species Contribution (%)				No. of Wh.Cl. plants per square foot.		
	White Clover		Timothy		Date counted		
	1962 crop	1963 crop	1962 crop	1963 crop	Oct. 10/62	May 21/63	Oct. 2/63
Certified Ladino	38	10	35	86	4	3	2
Pilgrim	38	8	31	87	4	3	2
Kersey	33	10	38	83	3	3	1
S-100	33	12	32	82	3	3	1
Ottawa A	36	7	34	87	4	3	2
Nordic	38	6	29	86	2	2	1
Ottawa B	37	7	32	87	3	2	1

N.B. White clover (all varieties) in full bloom and timothy just starting to bloom at time of harvest of both years.
C. B. Dalton

Table 3 - White clover varieties for pasture, 1962 seeding (with orchard grass). Guelph, 1963.

	Yield of D.M. in pounds per acre						
	Cut 1		Cut 2		Cut 3		Total 1963
	May 27		June 21		Aug. 2		
		% Leg.		% Leg.		% Leg.	
S-100	2010	39	2320	48	867	19	5197 ✓
California	2167	44	2247	55	1253	51	5667 ✓
Ottawa A	1944	36	2241	51	1037	37	5222 ✓
Kersey	2133	50	2303	52	932	45	5368 ✓
N. Zealand	1910	40	2199	50	720	16	4829 ✓
Granladino	2055	39	2223	55	1059	50	5337 ✓
Pilgrim	2156	42	2288	57	1236	50	5680 ✓
Common	1854	34	2255	50	750	20	4859 ✓
Ottawa B	1944	39	2182	53	858	47	4986 ✓
Nordic	2189	41	2236	52	856	27	5281 ✓
Merit	2277	39	2307	57	1178	55	5764 ✓
C. P. Pasture	1944	32	2160	47	754	11	4858 ✓
C. B. Hay	2011	41	2232	49	771	23	5014 ✓
Mean	2016		2245		944		5235 ✓
L.S.D. at 5%	159 lb.		N.S.		184 lb.		
C.V.:	6.7%		6.0%		16.9%		

Comments: Based on yield and general vigor, Merit appeared to be the most promising variety.

Apart from a little injury suffered by California, the test wintered in excellent shape.

At the time of the first cut, May 27, Syn. B was showing a little less vigor, to the eye, than Syn. A, but their yields were identical.

Order of flowering, June 21, ranked from earliest to latest.

Common, C. B. Pasture
S-100
New Zealand, Nordic, Kersey,
Syn. B, C.B. Hay, Pilgrim
California, Merit,
Syn. A, Granladino

June growth - in reverse order to the above, i.e. Granladino most, Common least.

July growth - as in June in the main, but little difference between Syn. A and Syn. B.

August, September, October - no growth.

B. E. Twamley

Table 4. - White clover varieties for pasture - 1962 seeding, Kapuskasing - 1963.

Variety	Dry Matter (lb. per acre)			
	1st cut	2nd cut	3rd cut	Total
Pilgrim	2268 a	1150 ab	774 ab	4191 ab
Nordic	2281 a	790 c	710 ab	3781 c
Merit	2257 a	1188 a	832 a	4277 a
Calif. Cert.	1997 ab	1089 ab	748 ab	3834 bc
Ott. syn. A.	2016 ab	1056 b	719 ab	3791 c
Ottawa syn. B.	2069 ab	1131 ab	630 b	3831 bc
Kersey	2076 ab	763 c	709 ab	3547 cd
S-100	2199 a	686 cd	726 ab	3612 cd
New Zealand	1795 b	628 d	721 ab	3144 e
Common white	2124 a	498 e	653 b	3275 de
Average	2108	838	722	3728
S.E. Var.	99.0	36.4	46.1	120.2
Date cut	July 10	July 31	Aug. 28	

The test was in good condition at the start of the season. No winterkill except in a slight depression where two plots were completely destroyed and a few were damaged. The whole replication was discarded from the yield determination and analysis. The yields were generally fair, although the total yield of three cuts did barely reach two tons of dry matter. Merit and Pilgrim were the best producers of the Ladinos.

P. Dermine

Ladino Varieties for Pasture (Trial No. 62) Ottawa 1963General Information:

Location: Central Experimental Farm, Ottawa.
Soil Type: Manotick sandy loam.
Experimental Design: Randomized blocks, 6 replications.
Plot Size: Seeded 5' x 20'; harvested 3'-3" x 18'.
Seeding Rate: 3 lbs. per acre
Seeding Date: June 3, 1962.
Sampling for D.M.: One 500-gram sample per plot per cut.
Project Leader: L.M. Casserly.

Results:

Performance of Ladino Varieties for Pasture
 (Yield of dry matter in pounds per acre)

Variety	1963 1st Cut June 7	1963 2nd Cut July 24	1963 3rd Cut Sept. 24	1963 Total 3 Cuts
Pilgrim	2181 a	995	1879 a	5055 a
Merit	1880 bc	925	1749 ab	4554 ab
Ottawa Syn. B	1962 ab	925	1588 abc	4475 ab
G-2385	1858 bc	1144	1321 cde	4323 abc
S-100	1980 ab	805	1475 bcd	4260 abc
Calf. Cert.	1690 c	809	1750 ab	4249 abc
Ottawa Syn. A	1822 bc	852	1556 abc	4231 bc
Nordic	1723 bc	820	1461 bcd	4004 bc
Kiwi	1853 bc	993	1053 e	3899 bc
G-2386	1848 bc	967	1081 e	3896 bc
Kersey	1677 c	894	1309 cde	3880 bc
Comm. White Dutch	1729 bc	674	1327 cde	3730 c
New Zealand	1748 bc	642	1162 de	3552 c
Significance	S.D.	N.S.	S.D.	S.D.
C.V.	10.47%		17.9%	14.08%

Table 6 - White clover varieties for hay-pasture - 1962 seeding -
Verner, 1963

<u>Location:</u>	Verner, Ontario.
<u>Soil Type:</u>	Evantural silt loam moderately well drained.
<u>Fertilizer Treatment:</u>	300 lb. per acre of 8-16-16, broadcast and disced into soil prior to seeding, plus 400 lb. per acre of 0-10-20, as top dressing, on May 15, 1963.
<u>Weed Control:</u>	Tropotox at 8 oz. acid per acre, applied by spray on August 3, 1962, plus Embutox E (2, 4-DB) at 18 oz. acid per acre on July 22, 1963 and on September 11, 1963.
<u>Test Design:</u>	Randomized, 6 blocks.
<u>Companion Crop:</u>	Nil.
<u>Rate of Seeding:</u>	2 lbs. of pure seed per acre.
<u>Seeded:</u>	May 29, 1962.

Variety	Yield of Dry matter per acre ⁽¹⁾ cut June 28/63.	White Clover contribution to yield (2)	No. of White Cl. Plants per square foot		
			Date counted	Oct. 11/62	May 21/63
	lb.	%	No.	No.	No.
Kiwi-origin Svalof Sweden (Hogg & Lytle)	1242 a	88	11	7	4
S-100	1178 a	78	11	6	4
Merit Ladino-C.P. Wilsie, Ames, Iowa	1168 ab	91	10	7	4
Nordic	1149 abc	86	15	7	4
Kersey	1142 abc	81	11	6	4
N.Z. Certified white clover	1131 abc	85	8	6	3
California Certified Ladino	1127 abc	82	10	5	3
Pilgrim	1117 abc	90	10	6	4
Ottawa Syn. B.	1114 abc	78	8	5	2
Common White Dutch Clover	1006 bc	74	9	6	3
Ottawa Syn. A.	994 c	80	7	5	3
Mean	1125				
L.S.D. @ .05	140				
C.V.	10.7%				
S.E.m	49.15				

(1) One cut only was obtained from this test which was a poor catch and resulted in a poor stand with a lack of vigour and no regrowth or aftermath.

(2) All varieties of white clover were in full bloom at time of harvest.

N.B.: A test similar to the above, except that the variety Kiwi was not included, was seeded on the same date and rate of seeding for seed production, but due to a sparse stand and poor seed set no seed yields were obtained in 1963.

Table 7 - White clover varieties for seed - 1962 seeding - Ottawa, 1963General Information:

Location: Central Experimental Farm, Ottawa.
Soil Type: 1; Matilda, 2; Kars gravelly sandy loam.
Fertilization: 300 lb. 8-16-16, Spring 1962.
 300 lb. 8-16-16, Spring 1963.
 475 lb. 8-16-16, October 1963.
Experimental Design: Randomized blocks, 6 replications.
Plot Size: Seeded 5' x 20'; harvested 3'-3" x 14'.
Seeding Rate: 3 lbs. per acre.
Seeding Date: June 5, 1962.

Results:

Performance of Ladino Clover Varieties for Seed
 (Yield in lbs. per acre)

Variety	1963 Mean 1 year
Commercial White Dutch	37 c
N.Z. (Cert.) White Dutch	37 c
Ottawa Syn. B.	73 ab
Cali. (Cert.)	63 abc
Ottawa Syn. A.	81 a
Pilgrim	67 abc
S-100	59 abc
Merit	49 bc
Nordic	77 ab
Kersey	51 abc
	S.D.

L. M. Casserly

Table 8 - White clover varieties for seed - 1961 seeding - Ottawa, 1963General Information:

Location: Central Experimental Farm, Ottawa.
Soil Type: Uplands sandy loam.
Fertilization: 400 lb. 8-16-16 before seeding - April 1961.
 300 lb. 8-16-16, April 1962.
Experimental Design: Randomized blocks, 6 replications.
Plot Size: Seeded 5' x 20'; harvested 3'-3" x 14'.
Nurse Crop: Barley at 1 bushel per acre.
Seeding Rate: 2 lbs. per acre.
Seeding Date: May 11, 1961.

Results:

Performance of Ladino Clover Varieties for Seed
(Yield in lbs. per acre)

Variety	1963 Mean 1 year
Ottawa Syn. A.	36
Ottawa Syn. B.	46
Certified Ladino	50
Pilgrim Ladino	33
Kersey	38
S-100	38
Nordic	41
N.S.	

L. M. Casserly

Table 9 - White clover varieties for seed - 1962 seeding - Williamstown, 1963

<u>Test #100</u>		<u>Test #101</u>	
<u>Variety</u>	<u>lb/A</u>	<u>Variety</u>	<u>lb/A</u>
Nordic	116 a	Ott. Syn.B	137 a
Ott. Syn. A	81 b	Nordic	131 a
Ott. Syn. B	80 b	Ott. Syn.A	120 a
Kersey	78 b	S-100	80 b
G - 2385	70 bc	Kersey	79 b
Pilgrim	69 bc	Pilgrim	71 bc
S-100	66 bc	Calif. Cert.	68 bc
G - 2386	61 bcd	Comm. Wh. Dutch	66 bc
Comm. Wh. Dutch	55 bcde	Merit	49 c
Calif. Cert.	45 cde	N.Z. Cert.	47 c
Kiwi	38 de		
Merit	34 de		
N.Z. Cert.	32 e		

Comments:

Seeded May 23, 1962, on Castor fine sandy loam.
 Test #100 was seeded as a forage test but the first cut in 1963 was discarded on account of weeds. Stand recovery was good and both tests were harvested on August 19 for seed.

J.G. Provencher

Table 10 - Summary of forage yields from 1962 seeding - 1963

	Guelph	Kapuskasing	Ottawa	Verner	Mean
Pilgrim	5680	4191 ab	5085 a	1117 abc	4018
Merit	5764	4277 a	4554 abc	1168 ab	3941
Calif. Cert.	5667	3834 bc	4219 bc	1127 abc	3712
Ott. Syn. B	4986	3831 bc	4609 ab	1114 abc	3635
S-100	5197	3612 cd	4238 abc	1178 a	3556
Nordic	5281	3781 c	4004 bcd	1149 abc	3554
Ott. Syn. A	5222	3791 c	4066 bcd	994 c	3518
Kersey	5368	3547 cd	3879 bcd	1142 abc	3484
Comm. Wh. Dutch	4859	3275 de	3736 cd	1006 bc	3219
N.Z. Cert.	4829	3144 e	3290 d	1131 abc	3099
G-2385	5014	-	4343 abc	-	
G-2386	4858	-	3902 bcd	-	
Granladino	5337	-	-	-	
Kiwi	-	-	3898 bcd	1242 a	

Table 11 - Summary of forage yields (2-yr. average) from 1961 seeding - 1963

	Ottawa	Verner	Mean
Kersey	7535	3114 a	5325
Calif. Cert.	7384	3201 a	5293
Ott. Syn. A	7542	2893 a	5218
Ott. Syn. B	7561	2866 a	5214
Nordic	7374	3006 a	5190
Pilgrim	7261	3112 a	5187
S-100	7261	2966 a	5114

Table 12 - Summary of seed yields - 1963

	<u>1961</u>		<u>1962 Seeding</u>		
	<u>Seeding</u>		<u>Williamstown</u>		<u>Mean of</u>
	<u>Ottawa</u>	<u>Ottawa</u>	<u>Test 1</u>	<u>Test 2</u>	
Nordic	41 a	77 ab	116 a	131 a	108
Ott. Syn. B	46 a	73 ab	80 b	137 a	97
Ott. Syn. A	36 a	81 a	81 b	120 a	94
Kersey	38 a	51 abc	78 b	79 b	69
Pilgrim	33 a	67 abc	69 bc	71 bc	69
S-100	38 a	59 abc	66 bc	80 b	68
Calif. Cert.	50 a	63 abc	45 cde	68 bc	59
Comm. Wh. Dutch	-	37 c	55 bcde	66 bc	53
Merit	-	49 bc	34 de	49 c	44
N.Z. Cert.	-	37 c	32 e	47 c	39
G - 2385	-	-	70 bc	-	-
G - 2386	-	-	61 bcd	-	-
Kiwi	-	-	38 de	-	-