

BSC

PROGRESS REPORT
FORAGE CROP
INVESTIGATIONS
1961

BREEDING AND STRAIN TESTING



Field Husbandry Department
Ontario Agricultural College
Guelph

FORAGE PROGRESS REPORT - 1961

This report contains data on O.A.C. trials. It is not complete in that only the data summarized by May 1, 1962, are included. However, it does contain much of the data. The report is prepared for use of the members of the Field Husbandry Department and for those associated with the forage program.

A federal-provincial program is in operation in variety and mixture testing and in orchardgrass breeding. This report does not cover data collected by other stations in this co-ordinated program. The complete set of data from all stations is available.

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ALFALFA

Alfalfa Strain Trial, 1959 Seeding, O.A.C., Guelph
(Yield in pounds dry matter per acre)

Code	Varieties	1960				Hay Cut	1961			H/A Seasonal Total	Rank	1960-61	
		Cut 1	Cut 2	Seasonal Total	Rank		Cut 1	Aftermath				2-Yr. Mean	Rank
								Cut 2	Cut 3				
1.	A216	3850	1900	5750	20	4909	1491	2614	4105	9014	4	7382	8
2.	DuFuits	4150	2150	6300	3	3749	1622	2205	3827	7576	25	6938	21
3.	Sask. seed	4250	1850	6100	9	4556	1398	2106	3504	8060	21	7080	16
4.	FD100	4000	2060	6060	10	4224	1599	2261	3860	8084	20	7072	17
5.	Grimm	3450	1820	5270	28	4784	1461	2013	3474	8258	15	6774	23
6.	Buffalo	3250	1900	5150	29	3699	1344	2125	3469	7168	27	6159	29
7.	A248	3700	1930	5630	24	3388	1478	2230	3708	7096	28	6363	27
8.	NY Syn. A	4650	2010	6660	1	4490	1654	2373	4027	8517	12	7589	4
9.	Sask. Forage	4100	1750	5850	15	4595	1385	2150	3535	8130	19	6990	18
10.	Rhizoma	4100	1930	6030	11	4714	1639	2449	4088	8802	8	7416	6
11.	Tuna	3800	2070	5870	14	4761	1741	2274	4015	8776	9	7323	11
12.	Ranger	3500	1940	5440	26	4474	1473	2229	3702	8176	16	6808	22
13.	Ladak	3800	1530	5330	27	4378	1212	2090	3302	7680	24	6505	26
14.	Atlantic	3750	2020	5770	19	4744	1627	2260	3887	8631	11	7201	12
15.	Williamsburg	3650	2010	5660	23	3817	1647	2296	3943	7760	23	6710	24
16.	Vernal	4250	1880	6130	8	4966	1655	2515	4170	9136	3	7633	3
17.	A253	3900	1920	5820	16	4422	1288	2437	3725	8147	17	6984	19
18.	Rambler	4150	1320	5470	25	4239	1019	1838	2857	7096	29	6283	28
19.	Sask. Recovery	3950	1850	5800	18	4664	1504	2200	3704	8368	13	7084	15
20.	Narragansett	4100	1900	6000	12	5127	1448	2436	3884	9011	5	7506	5
21.	A600	4300	1940	6240	4	5314	1479	2421	3900	9214	2	7727	2
22.	Sask. Ladak	4250	1900	6150	7	3977	1401	2420	3821	7798	22	6974	20
23.	Tourneur 505	4000	2210	6210	5	5106	1745	2510	4255	9361	1	7786	1
24.	Alfa	4350	2050	6400	2	4368	1647	2267	3914	8282	14	7341	10
25.	Viking Trefoil	3500	1200	4720	30	1395	663	1060	1723	3118	30	3919	30
26.	Sask Wilt	3950	1730	5680	22	4906	1552	2261	3813	8719	10	7200	13
27.	Teton	4450	1280	5730	21	4684	1004	1601	2605	7289	26	6510	25
28.	Cardinal	4100	2070	6170	6	4243	1672	2229	3901	8144	18	7157	14
29.	Cayuga	3900	1910	5810	17	4945	1674	2288	3962	8907	6	7359	9
30.	A224	4400	1510	5910	13	5152	1193	2559	3752	8904	7	7407	7
Mean		4000	1850	5850		4426	1457	2224	3681	8107		6979	
L.S.D. 5%		530	220										
C.V.		9%	8%										

Comments on the 1959 Seeding of Alfalfa, O.A.C., Guelph

Following the unusually dry summer and fall of 1960 and the low temperatures without the normal snow cover in the following winter, differential winter killing ensued.

Thinned to a 45 - 55% stand - DuPuits, F.D. 100, Williamsburg.

Thinned to a 60 - 65% stand - Alfa, Buffalo, Cardinal.

Thinned to an 80 - 90% stand - Atlantic.

Relatively unharmed - All others.

Based on earliness of flowering, the entries can be arranged somewhat arbitrarily into the following series, the listing within each group being likewise arranged according to maturity.

Early: DuPuits, F.D. 100, Cardinal, Alfa, Tuna, Tourneur 505.

Medium: Grimm, Williamsburg, Atlantic, A 600, Narragansett, Ranger, Vernal, Syn. A, Syn. B, Buffalo, Sask. seed, Sask. forage, Sask. recovery, Sask. wilt, Sask. ladak.

Late: Rambler, Ladak, Teton, A 253, A 224.

In this test, Vernal continued to be outstanding in its class, outyielding Grimm, Ranger, Rhizoma, etc.

None of the Saskatchewan synthetics gave promise of being able to compete successfully with Vernal or with the best of the French alfalfa types such as Tourneur 505 or Alfa. Beaver (Saskatchewan Forage) was average in performance.

Cayuga (Cornell Syn. B) ranked in the upper third but gave no indication of an ability to displace Vernal as a favourite Ontario recommendation.

Of the early types Tourneur 505, now named Glacier, appeared to be the best. Superior winter hardiness may have been the cause of its high yield in 1961.

Alfalfa Provincial Strain Trial, 1960 Seeding, O.A.C., Guelph
(Yield in pounds dry matter per acre)

Variety	1961				Season Total
	Hay Cut 1	Cut 2	Aftermath Cut 3	Total	
N9-501 (Cardinal)	4389	1468	2079	3547	7936
Wilt Resistant Narragansett	4813	1427	1967	3394	8207
Orchies	4073	1489	2106	3595	7668
Vernal	4744	1344	2004	3348	8092
N9-503	4338	1306	1973	3279	7617
Narragansett	4555	1399	1992	3391	7946
Syn. B (Cayuga)	4060	1354	2132	3486	7546
N9-504	3832	1255	2125	3380	7212
High Seed Narragansett	4658	1422	2044	3466	8124
DuPuits	4222	1432	2182	3614	7836
N9-502	4323	1293	2195	3488	7811
Flemish (Cornell 5)	4373	1422	2194	3616	7989
Syn. A	4293	1210	1883	3093	7386
Mean	4359	1371	2067	3438	7797
LSD 5%	N.S.	157	132	142	N.S.
LSD 1%		N.S.	176	189	
C.V.	10.2%	8.0%	4.4%	2.9%	3.8%

Comments on the 1960 Seeding of the Alfalfa Provincial Strain Trial:

Damage caused by winterkilling - none. Maturity - based on earliness of flowering.

Early: N9 501, DuPuits.
Medium Early: N9 502, Flemish, Orchies
Medium: N9 503, Vernal, wilt-resistant Narragansett, N.Y. Syn. 3.
 N.Y. Syn. A.
 High seed set Narragansett, N9 504.
 Narragansett

In this test the five earlier strains appeared quite similar whereas the two commercial strains of the Vernal type, 503 and 504, were substantially out-yielded by Vernal and the Narragansett derivatives.

1961 Seedings

Two alfalfa strain trials were successfully established, one on range 18E, the other at the Kaine Farm. The entries were Vernal, Beaver, Cayuga, Ont. Variegated and Cornell 3 (High Seed Set Narragansett).

Alfalfa Samples - Brant and Haldimand Counties (1960)

Location: B-1

Seeded: May 4, 1960.

Variety	First Hay Cut June 20/61 lbs. Dry Matter/A.	Second Hay Cut August 9/61 lbs Dry Matter/A.	Total Yield First and Second lbs Dry Matter/A.
1. Virgil Turnbull	5064	4127	9191
2. Rep. Sample of Niagara Peninsula	5081	4383	9464
3. Neichhold Jarvis Farm No. 5	5305	3708	9013
4. Neichhold Jarvis Farm No. 1	5476	3818	9294
5. Neichhold Jarvis Farm No. 4	4891	3670	8561
6. Hartley Mattice	5199	3662	8861
7. Sid Pollard	4702	4413	9115
8. Gordon Cade	4818	3766	8584
9. Hubert Lint	5732	3975	9707
10. Piper	5176	4144	9320
11. Best	5549	4179	9728
12. Dalghesh	5489	4317	9806
13. Vernal	<u>5503</u>	<u>4285</u>	<u>9788</u>
14. DuPuits	5988	4745	10733
15. Alfalfa E.	5707	4307	10014

Mean 2 Reps.

1961 REPORT

Alfalfa Farm Plantings

Soil and Crop Improvement Associations and Ontario Department of Agriculture co-operating.

In 1958 alfalfa farm plantings were made in 25 counties in Ontario. These plantings compared seven varieties of alfalfa - each seeded at 10 lbs. per acre in combination with Climax timothy at 6 lbs. per acre.

The varieties involved at each location:

Alfa
DuPuits
Grimm
Ranger
Rhizoma
Narragansett
Vernal

A plot containing Vernal 5, Viking trefoil and Climax timothy was included along with another containing Viking trefoil and Climax timothy.

1961 SUMMARY OF NOTES ON ALFALFA FARM PLANTINGS (1958)

1. In the third harvest year, Vernal has better persistence, as indicated by stand, than other varieties in the test.
2. Alfa, DuPuits, Rhizoma, and Narragansett appeared to survive less well than Vernal, but better than Grimm or Ranger in this series.
3. A majority of reports indicate the poor competitive position of Viking trefoil when seeded in a mixture with alfalfa.
4. Viking trefoil seeded without other legumes survived better than when seeded with alfalfa. Even so, the farmers preferred alfalfa varieties to Viking trefoil.
5. Preference of co-operators for fair drainage locations follows in this order:
 1. Vernal
 2. DuPuits
 3. Alfa, Rhizoma, Viking

1961 Reports of Co-operators

Of the 15 locations still producing in 1961, only 7 co-operators reported. Two more locations are, or will be, plowed up in 1961. - North Simcoe and Lennox and Addington.

All seven reporting co-operators indicated that vernal had over 50% stand of alfalfa during 1961 production. Six reported over 50% stand for Narragansett, Rhizoma, DuPuits and Vernal in the Vernal Viking plot, while only five reported such a stand in Alfa, Grimm and Ranger plots.

The only report of less than 25% stand of alfalfa was for the Grimm plot.

All seven reports indicated that Vernal survived equal to or better than other varieties under fair drainage. Four reported Alfa and DuPuits equal to or better than other varieties in survival under fair drainage. Rhizoma and Narragansett were put in this category by three out of the seven co-operators. Four reports indicated Grimm surviving poorer than others and three reported poor survival from Alfa. No reports showed Vernal survival as poor and only one out of seven reported Narragansett or Rhizoma in this category.

Six out of seven reports indicate that the Viking trefoil did not stand the competition from Alfalfa when the two were seeded together. In mixture with Vernal, the Viking stand is reported to have increased in three, decreased in three, and remained the same in one location. Two farmers indicated that Viking trefoil survived better than the best

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alfalfa under fair drainage. Three others said it survived poorer than the alfalfa and one reported equal survival to the best alfalfa.

Farmers opinions favoured Vernal alfalfa in three cases as the variety which performed best under fair drainage. DuPuits was mentioned twice in this category, while Alfa, Rhizoma, and Viking were each mentioned once.

The following comments, volunteered by co-operators, indicates the stage of thinking at which the co-operators stand:

"DuPuits and Alfa always made best growth. We should cut them earlier than others for best results."

"DuPuits looks so good that I plan to plant some more next year."

"Many people are watching the plots as they drive by."

"Trefoil, though improved in 1961, is too slow for my rotation."

"In plot 8 (Vernal plus Viking) there is a little trefoil, but not enough to be of much use."

1961 Staff Evaluation

After visiting the plots in Dufferin, Bruce, and North Simcoe in 1961, the following observations are made.

These three locations are very close to the well drained classification. In two locations Alfa, DuPuits, and Grimm have a thinner stand than the remaining varieties. However, the stand of these three is still acceptable at about 40 - 45%. Vernal and Narragansett are persisting better than others in the clay area of one location.

Production at all three locations is good to excellent. Trefoil in the Vernal Viking plot has done poorly in each location. Viking trefoil alone has done poorly in two out of the three locations. In the third location, trefoil has produced quite well in 1961.

For stand and vigour in the third harvest year, under conditions of good to fair drainage, Vernal, Narragansett, Rhizoma, Ranger appear better than Alfa, DuPuits, or Grimm. Viking has not done so well as the alfalfa varieties under these conditions.

RED CLOVERRed Clover Strain Trial, Guelph, 1960 Seeding1961 Yields in Pounds D.M. per acre

	Cut 1	Cut 2	Cut 3
* Common Red	1959	757	2716
La Salle West	3454	974	4428
La Salle East	3477	1392	4869
La Salle Foundation	2977	1104	4081
Dollard Foundation	3646	1200	4846
Dollard Certified	3985	1166	5151
Lakeland	3528	1044	4572
* Chesapeake	1192	940	2132
* Dutch	2375	1279	3654
Mean	2954	1095	4050
LSD 5%	693	231	498
" 1%	955	319	671
C.V.	13.6%	12.2%	7.4%

* Very severely damaged by winter injury.

Comments on the Red Clover Strain TrialWinter Injury

Because of the dry weather in the summer of 1960, the somewhat shallow soil, and the low temperature without snow cover in the late fall, winter damage was very extensive and closely correlated with earliness. Dollard suffered least and Common, Dutch and Chesapeake most. La Salle was intermediate and just slightly better than Lakeland.

All of Rep. 4 and part of Rep. 1 were discarded because of winter damage.

Red Clover (Cont'd)

Order of Earliness, based on flowering in June

Common
Chesapeake
Dutch

Lakeland - about a day earlier than La Salle east.
La Salle east - La Salle foundation
La Salle west - no more than a day later than La Salle east.

Dollard certified - about a day earlier than Dollard foundation.

Recovery

The second cut was taken in early August. In September, there was an unusual amount of regrowth. This was clipped back but no yields were taken.

1961 Seeding

A Provincial Strain Trial was established on 18E. The entries were Ottawa Breeder, Ottawa Bishops, La Salle East, La Salle West, Dollard Foundation, Dollard Certified, Lakeland, Chesapeake, Burgess (England), Tetraflod. Gloria was used as a border.

BIRDSFOOT TREFOIL

Seedling Vigor Studies in European - type Trefoil

A. In 1960 an experiment was undertaken to investigate relationships between seed weight and seedling vigour in the field, between greenhouse yields and seedling vigour in the field and between greenhouse vigour grades and field seedling vigour. Sixty-four progeny lines were grouped into eight seed weight classes ranging in average weight per class from 180 mg. per 100 seeds to 94 mg. per 100 seeds. These were sown in the greenhouse and on 11E and 8C. Data were collected on seedling performance at all three sites. The following conclusions were reached.

1. Seedling vigour, whether in greenhouse or field, was significantly correlated with seed size.
2. The three heaviest seed weight classes outperformed the other five classes in the field. This leads to the suggestion that 75% of all lines may be discarded on the basis of their lower seed weight leaving only 25% to be tested further.
3. Seedling weight of progeny lines in the greenhouse at about six weeks of age appeared to provide a good criterion for rejecting a further fraction. If the lowest yielding half are discarded, the remainder are likely to include most of the lines that would rank high in the field. In the actual experiment the discarding of the lower five seed weight groups, and of the twelve lines out of the remaining twenty-four lines on the basis of greenhouse yield allowed the retention of lines which in the field ranked 1, 2, 3, 4, 5, 6, 7, 9, 16, 22, 28, 44.

(Test 562)

B. In 1961 an experiment was undertaken to explore additional aspects of seedling vigour. The following observations were made.

1. Lines that excelled in seedling vigour in the greenhouse commonly outyielded in both the first and second field cut of the seedling year those lines that were below average in the greenhouse.
2. A group of progeny lines of very high seed weight (over 200 mg. per 100 seeds) did not perform in the field quite as well as lines of above-average seed weight (150 - 190 mg. per 100 seeds).
3. Lines of the same seed weight taken from families differing in mean seed weight performed similarly, on the average, in the field.

C. Based on a series of studies on seedling vigour designed to investigate screening techniques for eliminating progeny lines low in seedling vigour the following recommendations, applicable only to the European-type trefoil, are made.

1. If a nursery of 4000 plants is set out and seed harvested from every plant regardless of phenotype, 3000 of these may be discarded on the basis of seed size.
2. The remaining 1000, all of good seed weight, may be progeny tested for seedling vigour in the greenhouse. These should be harvested when the secondary tillers average 1-2 inches in length, which usually occurs at about six weeks of age. Based on this forage weight at least half of the 1000 clones may be discarded leaving 400-500 lines to be tested in the field.

Seedling Vigor Studies in Empire Trefoil

Three experiments were performed in 1961, these being listed as 565, 566, and 567.

Experiment 565 contained 64 progeny lines grouped into eight seed weight classes. The range in mean seed weight per class was 97 to 158 mg. per 100 seeds. The other two tests included only lines that were above average in seed weight. All three tests were seeded both in the greenhouse and in the field in much the same manner as for the European-type lines.

These experiments were much less decisive than those on the European-type trefoil. Possible causes of this include the relatively poor germination percentage of many Empire lines even though the seed is mature and well filled. The resulting variation in stands leads to low correlation between field yields and greenhouse yields or between seed size and forage yields. In addition Empire grows more slowly and it is possible that a longer period of growth in the greenhouse is necessary to evaluate lines properly.

Some of the postulates arising from these experiments are listed below.

1. Lines below average in seed weight may be discarded.
2. A study should be made on germination capabilities.
3. A study should be made on techniques for field evaluation of progeny lines, plant counts being kept in mind.
4. The length of time necessary for greenhouse growth should be investigated.

Test 563 Heritability Studies on Combining Ability for Seedling Vigor

Eight families were studied. A family consisted of a parent plant and 10 daughter plants. Open-pollination seed was planted in four replicates for the mother seed and two replicates for the daughter seed. Eleven foot rows, 300 seeds to a row, with 27 inch spacing were used. The material was harvested at 7 weeks and again at 15 weeks of age.

There appeared to be little or no relationship in yield between mother line and the mean of the daughter lines in either the first or the second cut. For example, the highest yielding mother line produced daughter progeny which came second last while the poorest yielding mother line had its daughter mean in second place. No statistical analysis was made since it was obvious that the regression value would not be significant.

A possible explanation for the low heritability may lie in the fact that all eight families were above average in seedling vigour and hence, the range in yield was much smaller than if a normal population had been sampled.

Row vs. Broadcast vs. Broadcast with Timothy

(Test 561)

Four progeny lines were fractionated into three seed weight groups each to provide 12 entries. These were sown in rows, broadcast alone, and broadcast with timothy. The material was harvested at about seven weeks of age after being graded visually for seedling vigour.

Significant differences were found between lines and between seed weight fractions with respect both to seedling vigour grade and yield. There was, however, no interaction between methods and lines or methods and fractions.

The conclusion is reached that selection for high seedling vigour in row plantings, as has been done in the past, is a satisfactory method of detecting lines that will also perform well either alone in broadcast seedings or in broadcast seedings with timothy.

Interactions Between Strain Maturity and Harvest Date

(Test 369)

A small test containing only five strains of trefoil known to differ considerably in maturity was established in such a way that three different cutting dates treatments could be imposed. This was done both for rows and for broadcast seeding.

The plots were kept reasonably free of weeds in 1961 in preparation for a study of the mature plant material in 1962.

Interactions Between Maturity and Winter Hardiness

(Test 570)

Viking, Roskilde, Morshank, and Empire trefoil along with Vernal, and DuPuits alfalfa were seeded in forty-two 66' rows. The plants were thinned out to about a 6" spacing during the summer. Portions of each row were cut back at intervals of 7 - 9 days during late August, September and early October. Data on winter survival of each variety for each cutting date will be obtained in the spring of 1962. These will be analyzed to determine whether there was an interaction between cutting date and maturity (or strains).

1961 FARM PLANTINGS OF TREFOIL

The 1961 Soil and Crop Improvement Association project on trefoil consists of three 2-acre plots seeded as follows:

Plot 1	Empire trefoil	8
	Climax timothy	4
Plot 2	Empire trefoil	5
	Viking trefoil	3
	Climax timothy	4
Plot 3	Empire trefoil	6
	Vernal alfalfa	2
	Climax timothy	4

The objective of these farm plantings is to assess for yield and persistence the mixture of Viking and Empire with timothy as well as the mixture of Empire and Vernal alfalfa with timothy in terms of the check Empire plus timothy.

The project was planned for use in 36 counties. Completed reports on the seedling year were received from 20 co-operators. One report indicating separate seeding dates for each plot is not included in the summary. A summary of the information from the other 19 reports follows.

The following listing indicates the kinds of practices used by the co-operators in obtaining establishment on the plots. The cold, wet spring was responsible for delaying seeding of 11 plots until May and 8 plots until June. These were seeded on poorly drained land in one location, fair drainage land in 13 locations and well drained land in 5 locations. All but one plot series was seeded on fall plowed land.

Fifteen, a majority of the 19 which were fertilized, had fertilizers applied on the basis of soil test.

Co-operators paid considerable attention to proper establishment of the plot series as indicated by the practices used. Three co-operators used no companion crop and controlled broadleaf weeds with 2,4-DB.

Of the fifteen who did use a companion crop, seven increased row spacing from the normal 7" to a 14" row spacing. Only two used over 1½ bushels seeding rate for the companion crop. Five used chemicals to control weeds and one used band seeding.

Harvest procedures were also conducted to favour the establishment of forage seedings. Four co-operators cut the companion crop for hay and one removed it for grain feed. Several reports indicated some pasturing had been carried out.

As a result of these and other practices during the seedling year all but one co-operator could report a good stand of trefoil this year. The one exception was caused by a grain crop which was 100% lodged to cause a spotty stand of forage plants.

Trefoil stands in plot 1 were reported to be thicker than 10 plants per foot by 9 of the 15 co-operators. Fon reported a stand between 5 and 10 plants per foot. Five plants has been accepted as a good stand of trefoil. The vigor of the plants is indicated by the reports of 7 out of 14 co-operators who said height of trefoil was over 5".

In plot 2 the same stand situation was reported as in plot 1. Seven out of 12 co-operators reported trefoil height in plot 2 to be over 5".

In plot 3 (Empire trefoil plus Vernal alfalfa plus timothy), 9 out of 14 co-operators reported trefoil stands over 10 plants per foot. Three co-operators reported the stand at between 5 and 10 plants per foot. Height was reported over 5" in 9 cases. The alfalfa was reported by only 2 co-operators to have over 10 plants per foot and by 9 co-operators to have 5-10 plants per foot. The vigor of the alfalfa is greater though as indicated by all 13 co-operators reporting its height over 5".

These notes would indicate that the trefoil plantings got away to a good start in 1961. The weather has been favorable and the practices used by co-operators have favored good stands of trefoil and alfalfa and good vigor in these legumes. Because of this the series of plots can be used over the years as a good indicator of performance of the respective mixtures under a wide range of conditions. Progress reports will be made periodically to indicate the success in Ontario of planting a mixture of trefoil varieties vs. a mixture of trefoil and alfalfa vs. a single variety of trefoil.

Comments volunteered by co-operators indicate that some of them at least expected trefoil to grow as high and vigorously as alfalfa. As a result some are less favorably impressed with plots 1 and 2 than with plot 3 during the seedling year. Despite this their comments indicate that the majority feel they have good healthy stands of legumes in all plots.

Exp. 211

Timothy Variety Test, 1958.

Guelph

Variety	Height May 29	Yields (lbs./A.) - 1961						Total
		July 5	July 10	Mean	Cut 2		Mean	
					Sept. 25	Sept. 25		
Climax	12"	5,950	5,980	5,960	2,220	2,270	2,250	8,210
Common	12"	5,730	5,670	5,700	2,330	2,240	2,290	7,990
S-51	11"	5,620	5,240	5,430	2,380	2,340	2,360	7,790
Drummond	8"	5,510	5,320	5,420	2,000	1,920	1,960	7,380
Essex	9"	5,450	5,320	5,390	1,980	1,960	1,970	7,360
S-48	5"	3,860	3,600	3,730	1,960	1,840	1,900	5,630
L.S.D. 5%		430	430	310	170	170	120	
1%		570	570	410	220	220	160	
C.V.				7.1%			6.9%	

These varieties were grown in pure stands. These plots were fertilized with 200 lbs. of ammonium nitrate in early spring, and 100 lbs. after the first cut.

Exp. 213

Timothy Preliminary Strain Trial, 1958.

Variety	Cut 1 - Yields (lbs./A.)				Composition (1) 1960	
	1959	1960	1961	Mean	% Vegetative	% Leaf (2)
	(June 18)	(June 27)	(July 5)			
WT-41	4,990	6,010	5,150	5,380	28	25
Climax	5,130	5,430	5,110	5,220	39	29
WT-48	5,080	5,180	5,240	5,170	34	29
O-233	4,930	5,470	5,010	5,140	36	25
S-48	3,470	4,960	3,010	3,820	91	30
L.S.D. 5%	360	N.S.	540		31	3
1%	490		730		42	4
C.V.	6.4%	11.7%	9.5%			

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

(2) % leaf on shoots with heads.

Note Second cuts were taken in 1959 and 1961. There were no significant differences among varieties. These varieties were tested in pure stands, and received the same amount of nitrogen fertilizer as the previous test.

Timothy Variety Observation Nursery, 1959

Exp. 604

Variety	Vigour ⁽¹⁾			Bloom Date (July)	Height (inches)
	May 8	June 1	June 23 ⁽²⁾		
1. Kampe II	2.5	3.0	2.0	5-6	37
2. Heidemiz	3.0	5.0	2.5		
3. Melle pasture	3.5	5.0	3.5		
4. S. 48	3.5	4.0	1.0	15	33
5. Barenza hay	2.5	3.5	3.5	10	36
6. Barenza pasture	3.5	4.5	4.0	11	29
7. Melle hay	2.5	3.0	2.0	10	36
8. King	3.5	5.0	3.0	14	32
9. S-151	3.0	4.5	3.0	14	34
10. Vanadis	3.0	3.5	3.5	10	37
11. C.B.	3.0	4.0	2.5		33
12. Favor	2.5	3.5	3.0	10	35
13. Omnia	2.5	3.5	3.0	10	35
14. Barbantia pasture	3.0	5.0	3.0		
15. Scottish	3.0	2.5	3.0	5	38
16. Climax	3.0	3.0	2.0	11	36
17. Drummond	4.0	3.5	1.5	11	35
18. Meldon	3.0	3.0	1.5	8-10	37

(1) Vigour rating: 1 (good) to 5 (poor).

(2) Aftermath rating for $\frac{1}{2}$ row cut June 2, 1961.Timothy Variety Observation Nursery, 1960

Exp. 612

Variety	Vigour ⁽¹⁾		Bloom Date (JULY)	Height (inches)
	June 1/61	June 23/61		
1. SV. 0857F ₁	3.0	2.75	10-11	36 —
2. SV. 0857F ₄	3.0	3.25	10	37 —
3. SV. 0857F ₅	3.5	2.0	10	34
4. SV. 0857F ₃	3.25	2.75	10	35
5. Ank. No. 2299	3.0	3.3	6	38 —
6. SV. 0857F ₂	3.5	2.0	10	36
7. SV. 0863	3.5	2.75	10	36
8. SV. 0865	3.25	2.25	10	38
9. SV. 0858	3.5	3.5	10	37
10. W.T. 59	3.75	2.0	11-	35
11. W.T. 40	4.5	1.5	16-	37
12. W.T. 41	3.75	2.5	10-	36
13. C.B.	3.75	2.5	16	34
14. Climax	3.0	2.5	10-11	40
15. Medon	3.5	1.75	10	39
16. Barenza	3.0	3.75	5	39 —
17. Kampe II	3.0	3.5	5	38 —
18. Essex	3.25	2.25	11	38

(1) Vigour rating: 1 (good) to 5 (poor).

Timothy - Variety Trials, Seeded 1961

The following varieties were included in 1961 seedings:

<u>Variety</u>	<u>Origin</u>
Climax	Ottawa
Drummond	Macdonald College
Essex	New York
Wisc. Syn. T-1	Wisconsin
Weibulls T48	Sweden
Weibulls T41	Sweden
O - 233	Hungary
S - 51	Wales
Claire	U. S. A.

Exp. 602

PROVINCIAL ORCHARDGRASS TEST, 1959

1961 Data

Management - PastureYield of Dry Matter (lbs. per acre)

<u>Variety</u>	<u>Spring Vigour¹ (May 8)</u>	<u>Plant Height (June 1)</u>	<u>Cut 1 (June 2)</u>	<u>Cut 2 (June 26)</u>	<u>Cut 3 (Aug 3)</u>	<u>Cut 4 (Sept 15)</u>	<u>Total</u>	<u>% Alfalfa Cut 1</u>
Danish	3.0	20"	1940	930	2160	1270	6290	15
Frode	3.0	15"	1810	1040	2220	1220	6280	12
Pennlate	3.0	20"	1710	950	2190	1250	6100	16
Hercules	3.0	15"	1720	980	2080	1180	5960	8
Latar	2.5	20"	1700	1100	2060	1090	5940	12
Ottawa 200	3.0	10"	1500	1150	1950	1070	5680	14
Tardus II	3.2	15"	1440	1010	2040	1120	5600	15
Trifolium 1631	4.2	10"	730	1100	2240	1280	5350	22
S-143	5.0	6"	210	1150	2350	1330	5060	50
<hr/>								
L.S.D. 5%			270	130	200	140	150	
1%			360	180	260	180	200	
C.V.			16.1%	11.0%	7.8%	9.8%	8.9%	

1. Visual rating: 1 - good to 5 - poor. Frode given 3.0 in every replication.

Exp. 602

PROVINCIAL ORCHARDGRASS TEST, 1959

1961 Data

Management - Silage plus aftermath pasture

Yields of Dry Matter - lbs./acre.

Variety	Spring Vigour (1) (May 8)	Bloom Date	% Alfalfa Cut 1	Cut 1 (June 13)	Cut 2 (July 18)	Cut 3 (Aug 3)	Cut 4 (Sept 15)	Total
Sterling	2.8	June 17	12	3920	1960	1460	970	8310
Ottawa 200	3.0	June 27	21	3280	2000	1250	800	7320
Danish	2.8	June 19	12	3190	1770	1440	880	7280
Tardus II	3.2	June 22	14	2990	1800	1370	830	6990
Hercules	3.0	June 19	8	3210	1610	1350	780	6960
Frode	3.0	June 19	10	2820	1950	1380	760	6910
Latar	2.7	June 24	7	2590	1740	1210	870	6410
Trifolium 1631	4.0	June 27	32	2010	2090	1380	840	6310
S-143	5.0	June 27	68	1470	1900	1250	950	5580
L.S.D. 5%				560	220	100	100	280
1%				750	290	140	130	380
C.V.				17.0%	10.0%	6.8%	9.7%	14.4%

1. Visual rating: 1 good to 5 - poor. Frode given 3.0 in every replication.

Exp. 602

PROVINCIAL ORCHARDGRASS TEST, 1959

1961 Data

Management - Hay plus aftermath pastureYields of Dry Matter in pounds per acre

Variety	Spring Vigour (May 8) ¹	% Alfalfa Cut 1	Cut 1 (June 21)	Cut 2 (July 24)	Cut 3 (Aug 18)	Cut 4 (Sept 15)	Total
Tardus II	3.2	12	5080	1680	1250	730	8740
Ottawa 200	3.0	14	4800	1890	1110	820	8620
Frode	3.0	11	3740	1880	1230	810	7660
Latar	2.3	9	3900	1740	1140	880	7650
Sterling	2.7	8	3660	1590	1370	820	7440
Hercules	2.8	12	3640	1670	1240	830	7380
Danish	2.7	8	3610	1640	1340	760	7350
Trifolium 1631	4.2	19	3680	1700	1110	780	7270
S-143	5.0	33	3180	1870	1060	810	6930
L.S.D. 5%			N.S.	N.S.	100	N.S.	N.S.
1%			N.S.	N.S.	132	N.S.	N.S.
C.V.			31.1% ²	11.0%	7.0%	12.2%	30.0%

1. Visual rating: 1 - good to 5 - poor. Frode given 3.0 in every replication.

2. Winter-killing plus flooding on parts of reps. 3,4 and 5 caused a high degree of variability.

Exp. 609

PROVINCIAL ORCHARDGRASS PASTURE TEST, 1960

1961 Data

Yield of dry matter (lbs./acre)

Companion	Variety	Cut 1 (June 5)	Cut 2 (June 29)	Cut 3 (July 27)	Cut 4 (Aug. 31)	Cut 5 (Oct 17)	Total
Alone	Ottawa 200	2730	1300	2230	670	340	7269
	C.B.	1840	1320	2200	700	570	6625
	Ottawa 100	2020	1260	2130	650	340	6401
	Frode (?)	830	1320	2200	700	500	5554
	S-143	901	1350	2150	650	450	5507
	Mean	1670	1310	2180	676	440	6271
Ladino	Ottawa 100	1720	1410	1910	1770	1060	7869
	Ottawa 200	2080	1180	1550	1520	1100	7430
	C.B.	1520	1300	1650	1670	1070	7215
	Frode (?)	920	1500	1930	1740	1040	7130
	S-143	650	1430	1920	1690	1070	6759
	Mean	1380	1360	1790	1680	1070	7280
Alfalfa	Ottawa 200	1980	940	980	1060	710	5674
	S-143	1140	920	1260	1350	920	5595
	Ottawa 100	1690	960	1000	1080	720	5438
	C.B.	1350	910	1000	1140	790	5196
	Frode (?)	1040	860	1150	1110	860	5014
	Mean	1440	918	1080	1150	800	5383
L.S.D. (Varieties)							
	5%	250	130	140	130	130	240
	1%	360	170	190	170	170	320
C.V.		14.6%	9.1%	7.4%	10.8%	14.3%	16.7%

Orchardgrass Variety Observation Nursery, 1959

Exp. 603.

Variety	Vigour ¹					Bloom Date (June)	Height ² (inches)
	May 8/61	May 31		June 22 Pasture	Aug 1/61 Aftermath		
		Pasture	Hay				
1. Iowa 6	2.0	1.0	1.5	2.5	2.5	19	37
2. Potomac	2.0	2.0	2.0	2.0	3.0	14	36
3. Kentucky Syn.	2.0	2.0	1.5	1.5	3.0	19	34
4. Penn. Early	2.0	2.0	2.5	1.5	3.0	19	36
5. " Med.	2.5	3.0	3.5	1.5	2.5	19	36
6. Trifolium A 11	3.0	3.5	4.0	2.5	3.0	21	35
7. Hammenhogs	3.5	3.0	4.0	1.5	3.0	22	36
8. Avon	2.5	1.0	1.0	2.0	3.0	14	38
9. Oron	1.5	2.0	2.0	2.0	3.0	19	36
10. Danish	2.0	2.0	2.5	2.0	3.0	19	36
11. Trifolium Early	3.0	3.5	3.0	2.5	3.0	19	35
12. Roskilde	3.0	3.5	4.0	2.5	3.0	19	34
13. Wisc. 52	3.0	2.0	1.5	2.0	3.0	19	37
14. Dorise	2.5	3.5	3.0	2.0	3.5	22	36
15. Esquire I	4.5	5.0	5.0	3.0	3.5	22	32
16. Esquire II	4.5	4.5	4.5	2.5	3.0	27	35
17. Ottawa 200	3.0	3.0	3.5	2.0	3.0	27	38
18. Frode	3.0	3.0	3.0	2.0	3.0	20	36
19. Tardus II	3.0	3.0	3.5	2.5	2.5	22	36
20. Utah Synd.	3.0	3.0	3.0	2.0	3.0	22	38
21. M.S.G.	4.0	4.0	4.0	2.0	3.0	23	39
22. Barbantia	3.0	4.0	4.0	2.0	3.0	27	36
23. S-26	5.0	5.0	5.0	4.0	3.5	27	33
24. Eagle Hill	4.0	4.0	4.0	3.0	3.0	19	35
25. Aurora	3.0	3.0	2.5	1.5	2.5	29	--
26. Latar	2.0	3.0	2.0	1.5	2.0	24	46
27. S-143	5.0	5.0	5.0	4.0	3.5	(3)	--
28. S-37	4.0	4.0	4.0	2.0	3.0	27	37
29. Trif. 1631	4.5	4.5	4.5	2.5	3.0	27	35
30. Hercules	2.0	2.5	2.0	1.5	2.5	20	38
31. Akaroa	4.0	4.0	4.5	2.5	3.0	27	35
32. Coxa	3.5	3.5	4.0	2.0	3.0	23	35
33. Grasslands	5.0	5.0	5.0	4.0	3.5	(3)	--
34. Glasnevin	4.0	5.0	5.0	3.0	3.0	27	36
35. Barenza	3.0	3.5	3.5	2.0	3.0	27	38
36. Japanese	2.5	2.0	2.5	2.0	2.5	19	36
37. Polycross	3.0	3.0	3.5	2.0	3.0	24	39

(1) All vigour ratings 1 (good) to 5 (poor).

(2) Measured to tip of panicles

(3) Few heads.

Orchardgrass Variety Observation Nursery, 1960

Exp. 611

Variety	Vigour ¹			Bl. Bloom 1962		Height (inches)
	June 1/61	June 22/61	Aug 1/61	Date	Rate	
1. Avon	1.0	1.75	3.0	4 14	M-27	36
2. Chinook	1.0	2.25	3.25	4 14	M-27	36
3. Donise	2.5	3.0	3.0	9 19	M-31	34
4. Heideny	3.0	2.25	3.0	19	-84	34
5. Barenza	2.5	1.5	3.0	19	-17	34
6. Kropaar C.B.	3.25	2.75	3.0	27	-98	35
7. Sceimpter	2.75	2.25	2.75	19	-85	33
8. Mommersteegs	3.25	2.5	3.0	23	-88	36
5/49 9. Frode	4.75	3.0	3.0	27	-89	34
10. Ottawa	3.75	1.75	3.0	27	-89	33
11. Ottawa 200	3.25	2.0	3.0	27	-88	38
12. S-143	4.75	3.5	3.25		-89	
13. Swedish G.1963	3.75	2.5	3.0	23	-85	35
14. " G.1964	2.5	1.5	3.0	27	-89	40
15. " G.1965	4.25	3.25	3.0	27	-89	34
16. " G.1966	2.0	1.5	3.0	10 19	-82	33
17. Orig. Tardus II	1.75	1.75	3.0	19	-82	35
18. W.H. 11	3.0	2.0	2.75	27	-89	38
19. W.H. 16	3.5	2.5	3.0	27	-89	37
20. C.B.	4.0	3.0	3.0	23	-88	34
21. Trifolium	2.0	2.3	3.0	9 19	-M31	36
22. Dutch G.1867	2.5	1.0	2.5	19	-81	35
23. " G.1868	3.5	3.0	3.0	23	-82	35
24. " G.1869	4.0	2.5	3.0	23	-88	34
25. " G.1880	3.0	2.0	3.0	23	-85	39
26. " G.1871	3.0	2.0	3.0	20	-82	34
27. " G.1872	3.5	3.0	3.0	22	-84	30
28. " G.1873	2.5	2.5	3.0	19	-82	35
29. " G.1878	2.0	1.5	2.5	19	-82	35
30. " G.1875	3.5	2.5	3.0	27	-85	33
31. " G.1876	3.5	2.5	3.0	27	-89	36
32. " G.1877	4.0	4.0	3.0		-84	
33. " G.1874	2.0	1.0	3.0	22	-84	37
34. " G.1879	4.0	2.0	3.0	27	-89	36
35. " G.1870	4.0	3.0	4.0	23	-88	35
36. -0276.G.2046	1.75	1.5	2.75	9 19	-M31	36
37. -0277.G.2047	3.5	2.75	3.0	19	-84	33
38. -0278.G.2048	1.5	1.5	3.0	9 19	-M31	38
39. Introduction (JEC)	4.0	3.0	3.0	27	-88	33

1. Vigour ratings: 1 (good) to 5 (poor).

Exp. 610 OttawaOrchardgrass Progeny Test, 1960

Entry No.	Plant No.	Spring ^(a) Vigour	Adjusted Yields (lbs. of D.M. per Acre)				
			Cut 1 June 2	Cut 2 June 29	Cut 3 July 20	Cut 4 Sept 6	Total
1	68	3.3	1,806	1,155	1,308	1,110	5,379
2	187	3.0	1,981	1,408	1,398	1,103	5,890
3	29	3.0	2,242	1,347	1,501	1,164	6,254
4	226	3.0	1,984	1,170	1,257	1,125	5,536
5	22	3.0	2,298	1,381	1,216	1,194	6,089
6	49	3.3	1,689	1,221	1,297	1,149	5,356
7	55	3.0	1,808	1,228	1,333	1,453	5,822
8	52	3.6	2,265	1,203	1,412	1,197	6,077
9	238	3.0	1,823	1,194	1,237	1,121	5,375
10	172	3.0	2,120	1,390	1,415	1,101	6,027
11	86	3.6	2,005	1,265	1,330	1,005	5,605
12	107	3.0	2,232	1,195	1,259	999	5,685
13	50	3.3	2,054	1,280	1,238	1,182	5,753
14	60	3.0	2,004	1,265	1,363	1,243	5,875
15	28	3.3	2,074	1,300	1,311	1,269	5,954
16	53	3.0	2,202	1,184	1,304	1,131	5,821
17	163	3.3	1,751	1,286	1,317	1,100	5,454
18	250	3.0	1,940	1,295	1,310	1,234	5,779
19	141	3.3	1,643	1,284	1,353	1,260	5,540
20	30	3.0	2,310	1,148	1,305	1,063	5,826
21	326	3.0	1,951	1,202	1,354	906	5,413
22	90	3.3	2,116	1,251	1,358	1,005	5,779
23	97	3.0	2,360	1,197	1,404	1,236	6,197
24	25	3.0	2,207	1,317	1,310	1,214	6,048
25	220	3.3	1,603	1,378	1,222	1,049	5,252
26	58	3.3	1,954	1,096	1,295	1,241	5,586
27	203	2.6	1,992	1,244	1,349	1,157	5,741
28	234	3.3	2,145	1,132	1,270	1,079	5,626
29	242	3.3	1,879	1,196	1,187	1,020	5,282
30	169	3.3	1,876	1,073	1,356	1,185	5,489
31	135	3.0	1,962	1,281	1,463	1,163	5,870
32	175	3.6	2,035	1,349	1,307	1,165	5,855
33	285	3.3	1,659	1,154	1,328	1,130	5,271
34	174	3.6	1,492	1,294	1,309	1,219	5,315
35	252	3.0	2,065	1,081	1,221	1,001	5,368
36	194	3.3	2,132	1,282	1,271	1,056	5,742
37	74	3.3	1,857	1,282	1,445	1,166	5,750
38	262	3.0	1,862	1,220	1,337	1,037	5,456
39	170	3.3	1,737	1,314	1,335	1,160	5,546
40	36	3.0	2,058	1,189	1,308	1,241	5,796
41	S-143	5.0	785	1,442	1,330	1,283	4,841
42	Frode (?)		921	1,281	1,256	1,218	4,675

(a) Rating: 1 (good) to 5 (poor) Rated May 8, 1961

(?) Probably S-143

ORCHARDGRASS - Trials seeded 1961

- (1) Variety treats - one variety trial was seeded and included the following varieties:

<u>Variety</u>	<u>Origin</u>
Frode	Sweden
Frode (re-selected)	"
Masshardy	Massachusetts
Motycka	Poland
Tardus II	Sweden
Latar	Washington
Common (4 lots)	Denmark
" "	U. S. A.

Management = Hay + aftermath pasture.

- (2) Ottawa Progeny Test - five polycross progenies produced by Dr. W. R. Childers, Ottawa, are being tested alone and with ladino clover under a pasture management.
- (3) Seed Collection - row seedings were made of 54 collections from counties of Simcoe, Bruce and Oxford, along with 22 introductions from Europe, Asia and South America.

RELATIONSHIPS OF SEED WEIGHT TO SEEDLING VIGOUR AND MATURE PLANT
VIGOUR IN BROMEGRASS, 1959 AND 1960 (TESTS 216 AND 219)

These field tests were concluded in 1961. A portion of the available data were analysed and interpreted in a M.S.A. thesis by Mr. Hans J. von Amsberg, entitled "Relationship of seed weight with seedling vigour and mature plant vigour in smooth brome grass, Bromus inermis Leyss. A summary of the thesis is included below. For more detailed information concerning the study, reference should be made to the thesis.

Much of the data remain to be analyzed and will be reported in future reports. Some data on seed performance of the material included in Test 219 follow.

Summary

Two experiments were conducted from 1959 to 1961 to determine the influence of seed weight on seedling and mature plant vigour. Ninety-nine and 25 entries were selected from a total of 350 plants and divided into 11 and 5 seed groups of similar seed weight for experiment I and experiment II, respectively. A split plot design was used to determine the entry and seed group performance during the four growth stages. Several agronomic characters were chosen to evaluate the mature plants.

Results of the two experiments showed that seed weight had a direct influence on seedling vigour one month after planting. Dry matter yields of the first growth stage were directly associated with seed weight, growth differences and per cent emergence. The second growth stage still showed a close relationship between seed weight and seedling vigour, but genetical growth differences became prominent. The third growth stage reflected the superior growth of the high intermediate seed groups in particular, but the indirect effects of seed weight were still appreciable.

The mature growth stage did not show any direct association with seed weight. However, some of the more vigorous seedlings also had superior mature plant dry matter yields. Seed weight was associated to some degree with stem diameter, but did not show any specific relationship with the other mature plant evaluation characters. The superior yielding mature plant types appeared to have coarser stems, slightly less leaf, more spread, slightly less disease and better aftermath yields.

BROME SEEDLING AND MATURE PLANT VIGOR STUDY, 1960 (TEST 219)

Average seed yield, fertility index and weight per 50 seeds for the 25 entries

Entries*	Seed Yield (grams) 4 ft. row	Fertility** index	Weight per 50 seeds (grams)
21-1	48	0.63	.214
187-13	41	0.75	.223
152-6	22	0.55	.186
31-4	22	0.61	.202
126-7	24	0.62	.231
171-5	45	0.53	.196
3-2	36	0.72	.195
102-3	25	0.72	.203
10-7	58	0.75	.214
125-6	42	0.69	.230
122-11	28	0.65	.194
180-2	53	0.77	.219
99-9	25	0.69	.175
82-1	16	0.60	.196
6-6	36	0.74	.193
159-14	61	0.78	.195
169-9	15	0.52	.168
158-10	16	0.55	.158
52-13	54	0.76	.191
151-15	34	0.69	.192
31-10	58	0.68	.173
124-17	13	0.51	.168
29-12	43	0.69	.167
73-14	20	0.74	.160
119-7	61	0.75	.192
Mean	36	0.74	.193

	D.F.	Seed Yield M.S.		
Reps	3	503	0.0400	.001097
Entries (E)	24	1008	0.0597**	.003664**
Error (a)	72	62	0.0184	.001176
Sampling error	100	N/A	.0086	.000084
Total	199			
C.V. %		22.04	18.32	32.39

** Fertility index = $\frac{\text{Weight of seed from a panicle}}{\text{Weight of panicle + seed}}$

* Each group of five entries represents one seed weight class. The first group represents the highest seed weight and the remainder are in descending order of seed weight.

BROME-ALFALFA COMPETITION STUDY - 1960 (TEST 217)

Total Yield in Pounds of Dry Matter per Acre in 1961					
Hay	Cut 1 June 21	Cut 2 August 10	Cut 3* October 5	Cut 4*	Seasonal Total
Vernal + Common	5066	3613	2077		10756
Lincoln	5403	3676	1994		11073
Saratoga	5610	3512	2129		11251
Climax	5095	3565	2089		10749
Frode	5573	3662	2519		11754
Alone	4807	3655	2035		10497
Mean	5259	3614	2157		11030
DuPuits + Common	5252	4648	2596		12496
Lincoln	5221	4738	2573		12532
Saratoga	5032	4761	2525		12318
Climax	4971	4440	2503		11914
Frode	5507	4383	2810		12700
Alone	5131	4560	2573		12264
Mean	5186	4588	2597		12371
Hay Mean	5222	4101	2377		
Pasture	June 1	July 10	August 29	November 1	
Vernal + Common	3370	3705	2673	589	10337
Lincoln	3430	3827	2693	636	10586
Saratoga	3804	3744	2575	536	10659
Climax	3391	4030	2835	662	10918
Frode	3568	3405	2703	769	10445
Alone	3479	3891	2788	595	10753
Mean	3507	3767	2711	631	10616
DuPuits + Common	3372	4181	3403	1322	12278
Lincoln	3472	4354	3344	1413	12583
Saratoga	3325	4120	3220	1331	11996
Climax	3362	4243	3365	1277	12247
Frode	3383	4434	3354	1240	12411
Alone	3381	4092	3166	1336	11975
Mean	3382	4238	3309	1320	12249
Pasture Mean	3445	4002	3010	976	11433
Overall Mean	4333	4052	2689	976	12050

* mean of 5 replications because of groundhog damage

BROME-ALFALFA COMPETITION STUDY, 1960 (TEST 217)

Analysis of Variance - Total Yield (Mean Squares)

Variable	D.F.	Cut 1	Cut 2	Cut 3*	Cut 4*
Reps	5	566,355	643,509	374,284	53,460
Management (M)	1	113,767,108**	350,267	12,342,460**	N/A
Error (a)	5	631,769	586,483	384,997	N/A
Alfalfa (A)	1	351,248	18,786,438**	8,330,289**	7,111,172**
A x M	1	23,622	2,286,151**	159,876	N/A
Error (b)	10	146,241	66,806	36,688	50,250
Grasses (G)	5	402,298**	80,577**	138,555**	11,108
G x M	5	193,623**	88,429**	122,060**	N/A
G x A	5	323,001**	117,946**	28,268	38,317**
G x A x M	5	605,490**	259,324**	38,278	N/A
Error (c)	100	58,899	17,443	30,883	9,342
Total	143				
C.V. for (G) %	-	5.60	3.26	22.66	9.90
C.V. for (A) %	-	8.82	6.38	52.05	22.97
C.V. for (M) %	-	18.35	18.90	23.07	N/A

* mean of 5 replications because of groundhog damage. Therefore, degrees of freedom do not apply

** significant at 1% level

Grass Component in Pounds

Hay	Cut 1	Cut 2	Cut 3*	Cut 4*	Seasonal total
Vernal + Common	1493	1147	634		3274
Lincoln	1129	373	95		1597
Saratoga	3016	1254	923		5193
Climax	759	266	158		1183
Frode	2527	1548	1473		5548
Mean	1785	918	657		3360
DuPuits + Common	54	109	9		172
Lincoln	44	53	0		97
Saratoga	140	83	17		240
Climax	59	30	25		114
Frode	1377	948	1088		3413
Mean	335	245	228		808
Hay Mean	1060	581	443		2084
<u>Pasture</u>					
Vernal + Common	632	482	182	22	1318
Lincoln	533	202	35	13	782
Saratoga	1623	1053	641	45	3362
Climax	350	469	0	22	841
Frode	1669	1261	958	430	4318
Mean	962	693	363	106	2124
DuPuits + Common	48	13	0	0	61
Lincoln	77	53	0	0	130
Saratoga	220	222	0	3	445
Climax	40	30	0	3	73
Frode	775	1205	609	229	2818
Mean	232	304	122	47	705
Pasture Mean	597	499	243	76	1415
Overall Mean	828	540	343	76	1787

* mean of 5 replications because of groundhog damage

BROME-ALFALFA COMPETITION STUDY, 1960 (TEST 217)

Grass Component

Variable	D.F.	Cut 1	Cut 2	Cut 3*	Cut 4*
Reps	5	370,939	45,772		
Management (M)	1	6,431,533*	202,377		
Error (a)	5	512,664	190,782		
Alfalfa (A)	1	35,622,293**	8,456,706**		
A x M	1	3,896,285	605,488		
Error (b)	10	708,411	122,873		
Grasses (G)	5	7,501,200*	4,606,475**		
G x M	5	306,222	194,675*		
G x A	5	2,301,861**	654,699*		
G x A x M	5	376,241	150,620		
Error (c)	100	132,323	49,549		
Total	143				
C.V. for (G) %	-	43.93	41.22		
C.V. for (A) %	-	101.65	64.91		
C.V. for (M) %	-	86.47	81.08		

* no figures owing to absence of grass in mixtures with DuPuits

VERNAL ONLY

<u>Variable</u>	<u>D.F.</u>	<u>Cut 1</u>	<u>Cut 2</u>	<u>Cut 3</u>	<u>Cut 4</u>
Reps	5	822,150	82,602	105,457	4,780
Management (M)	1	10,169,814*	753,985	2,578,250**	N/A
Error (a)	5	805,010	233,386	67,586	N/A
Grasses (G)	4	7,411,402*	2,822,182**	2,598,782**	170,086**
(G) x (M)	4	444,511**	287,835**	127,317	N/A
Error (b)	40	475,322	61,661	49,723	5,277
Total	59				
C.V. for (G) %	-	50.21	30.85	42.07	71.97
C.V. for (M) %	-	65.35	60.01	49.05	N/A

BROME-ALFALFA COMPETITION STUDY, 1960 (TEST 217)

Percent Grass in Mixture

Hay	Cut 1	Cut 2	Cut 3*	Cut 4*
Vernal + Common	29.4	32.0	30.8	
Lincoln	21.1	10.2	4.9	
Saratoga	52.6 -	36.3 -	43.2 -	
Climax	14.6	7.4	7.4	
Frode	44.4 -	42.9 -	58.9 -	
Mean	32.4	25.8	29.0	
DuPuits + Common	1.1	2.4	0.4	
Lincoln	0.8	1.1	0.0	
Saratoga	2.8	1.8	0.7	
Climax	1.6	0.7	1.0	
Frode	24.8	21.7	38.8	
Mean	6.2	5.5	8.2	
Hay Mean	19.3	15.7	18.6	
<u>Pasture</u>				
Vernal + Common	18.6	13.2	7.1	4.1
Lincoln	15.6	5.3	1.3	2.0
Saratoga	42.2 -	28.3 -	25.1 -	9.0 -
Climax	10.3	11.8	0.0	3.8
Frode	44.8 -	36.7 -	36.1 -	57.1 -
Mean	26.3	19.1	13.9	15.2
DuPuits + Common	1.5	0.4	0.0	0.0
Lincoln	2.2	0.8	0.0	0.0
Saratoga	6.8	5.6	0.0	0.3
Climax	1.6	0.8	0.0	0.3
Frode	22.6	26.8	17.9	18.7
Mean	6.9	6.9	3.6	3.9
Pasture Mean	16.6	13.0	8.8	9.6
Overall Mean	18.0	14.4	13.7	9.6

* mean of 5 replications because of groundhog damage

MIXTURE DIVERSITY TRIAL, 1960 (TEST 310)

Seeded: May 4, 1960

Location: B-1

Harvested: June 20, 1961

Association	Lbs. D.M./acre Alfalfa + Grass Early Cut	Percent Alfalfa	Percent Grass	Lbs. D.M. per acre alfalfa	Lbs. D.M. per acre grass
DuPuits + Lincoln	6194	98.1	1.9	6082	112
Climax	5896	98.9	1.1	5839	57
Frode	6501	80.0	20.0	5204	1298
Mean	6182	92.3	7.7	5708	489
Vernal + Lincoln	5263	88.1	11.9	4648	615
Climax	5335	87.6	12.4	4643	645
Frode	5629	48.1	51.9	2811	2807
Mean	5409	74.6	25.4	4034	1356

BROME SYNTHETIC TEST, 1960 (TEST 218)

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1961 Data

Entry		Yield in lbs. D.M. per acre			% Leaf Cut 1	Yield of Leaf (lb. D.M./acre) Cut 1	Height May 29 inches	Vigor* Aug. 9
		June 22	Aug. 11	Seasonal Yield				
S-5054 (Syn.1)	1	5758	2396	8154	30.9	1774	13.8	4.0
Carlton	2	5926	2408	8334	30.0	1778	16.3	2.7
S-4535 (Syn.2)	3	7358	2084	9442	26.7	1968	15.7	4.7
S-4092	4	6869	2356	9225	26.4	1814	15.8	3.8
Wisc. B81	5	7325	2134	9459	26.3	1924	18.8	4.2
Wisc. B63	6	7201	2403	9604	27.6	1993	20.5	3.0
Wisc. B55	7	7312	2258	9570	28.5	2089	19.8	3.8
Common	8	5634	2437	8071	28.9	1625	16.3	2.5
Lincoln	9	7310	2287	9597	27.7	2021	19.5	4.8
Saratoga	10	6919	2730	9649	28.1	1947	22.8	1.0
Ott. Syn. C	11	7399	2459	9858	26.8	1986	21.3	2.8
Ott. Syn. B	12	7089	2447	9536	27.5	1956	21.5	2.5
Mean		6842	2367	9208	28.0	1906	18.5	3.3
L.S.D. (.05)		548	264			232		
C.V. (%)		6.9	9.7			10.5		

* Vigor: 1 = 18" height; 5 = 10" height.

BROME POLYCROSS PROGENY TEST, 1958 (TEST 210)

Percent Protein and Fibre in leaf and stem material from cut 1 in 1960^(a)

	Percent Protein		Percent Fibre	
	Leaf	Stem	Leaf	Stem
S-55-50	12.0	4.1	30.9	41.1
S-55-56	11.0	3.4	32.5	41.8
S-55-64	11.9	3.9	31.2	40.2
S-55-82	12.8	4.5	29.6	40.5
S-55-92	12.6	4.9	31.1	39.8
S-55-92	13.0	4.4	29.8	41.3
S-55-99	11.0	4.2	32.1	41.6
S-55-106	12.5	4.5	32.1	39.9
S-55-109	12.3	4.5	31.2	41.7
Can. Common	12.7	4.3	30.8	38.3
Saratoga	13.7	4.5	29.4	39.5
Lincoln	12.1	4.4	31.5	39.4
Mean	12.3	4.3	31.0	40.4
L.S.D. (.05)	N.S.	N.S.	N.S.	N.S.
C.V. (%)	12.3	18.0	4.8	5.1

(a) from 3 reps. only

Entry	Seed yield (lbs. per acre)	100 seed weight (in gms.)
S-55-50	295.0	0.427
S-55-56	266.6	0.346
S-55-64	264.8	0.361
S-55-82	281.7	0.410
S-55-92	234.8	0.375
S-55-93	231.4	0.385
S-55-99	220.4	0.364
S-55-106	359.5	0.354
S-55-109	251.0	0.401
Can. Common	212.8	0.376
Saratoga	238.7	0.359
Lincoln	259.3	0.408
Mean	259.7	0.381

	d.f.		d.f.
Reps	5	9,220.18	2
Entries	11	9,514.52(N.S.)	11
Error	55	10,667.59	22
Sampling Error		N.A.	36
C.V. for Entries		39.0%	32.0%

1961 SUMMARY

Saratoga brome farm plantings (1960)

Ontario Department of Agriculture and
Soil and Crop Improvement Association Co-operating

In 1960 farm plantings were set out in about 35 counties through Southern Ontario to evaluate Saratoga brome grass.

One series of plantings (34 counties) consisted of a comparison between Saratoga brome grass (10 lbs. per acre) and orchardgrass (8 lbs. per acre), each seeded with DuPuits alfalfa (10 lbs. per acre). The second series of plantings (11 counties) of Saratoga brome, Lincoln brome, Canadian brome and Climax timothy each seeded with Vernal alfalfa.

The following general observations are indicated by the co-operators' reports for 1961:

Saratoga brome does not appear to compete as well as orchardgrass with DuPuits alfalfa. However, it has done a good job where stands were good and appears to be the brome variety which can best be used with DuPuits for early hay.

The aftermath production from Saratoga brome is fair, but not nearly as vigorous or plentiful as that from orchard.

Some farmers had difficulty in getting good catches of Saratoga, thus indicating that this problem is still with us, in spite of the good seed quality and seedling vigor.

Saratoga was reported as growing earlier than orchard in very early spring and continuing to produce more in this first cutting. Where cool weather and late frosts were encountered, orchard growth was slowed severely.

About half the farmers with the comparison plots of bromes indicated that they felt Saratoga was too competitive for Vernal alfalfa.

The Saratoga had better stands and produced more in the first cut and aftermath than Lincoln, Canadian brome and Climax timothy. The amount of grass in aftermath was still lower than that desired by farmers for pasture.

1961 Report Summarizing Details from Co-operators' Report

Early Silage and Aftermath Pasture Demonstration

Plot 1 - DuPuits 10, Saratoga 10 }
 Plot 2 - DuPuits 10, Orchard 8 } Seeded 1960

- Twenty-two reports were received from co-operators. Of these, eight applied fertilizer and thirteen applied manure since seeding. Only eight grazed the plots in the seeding year. The same number recorded slight winterkill in alfalfa and ten recorded winterkill in either orchard or brome.
- While eleven reported orchard growing before or at the same time as Saratoga brome in the spring, there were seven reports of better spring vigor in Saratoga brome. Some of these were in areas which had late frosts after growth started in the spring, indicating that the brome can be more vigorous and give earlier growth than orchard during cool, wet, late springs.
- Eleven reports indicated that orchard headed out before DuPuits, while nine indicated Saratoga headed before DuPuits.
- Four reports indicated Saratoga heading after DuPuits. Only two co-operators claimed this situation for orchard.
- Saratoga was reported as making up a smaller percentage of the stand than orchard in nine cases while the opposite held in two reports. Three reports indicated equal percentages for the grasses. Sixteen reports indicated first cutting of hay was made from mid June to July 7.
- The brome plot made coarser hay than the orchard plot in seven out of eleven reports. This was attributed to the coarseness of alfalfa resulting when the brome made up a small per cent of the stand.
- Yields from the Saratoga brome plot were reported higher than those from the orchard plot by eight co-operators, less than orchard by five and equal to orchard by six co-operators.
- Though Saratoga brome was reported to give a fair amount of aftermath, the orchard gave considerably more in fourteen out of seventeen locations.

1961 Report Summarizing Details from Co-operators' Report

Bromegrass Competition and Aftermath Production

Saratoga 8	Lincoln 8	Canadian Brome 8	Climax Timothy 6
Vernal alfalfa 10	Vernal alfalfa 10	Vernal alfalfa 10	Vernal alfalfa 10

Eleven plot series were planted in 1960, one (Grey) has been plowed up due to poor establishment. Nine of the remaining co-operators reported 1961 performance.

Only three co-operators applied fertilizer since seeding and five applied manure during the winter between seeding year and first crop year. Very little winterkill was reported on any of the plots.

Saratoga brome was reported as the most vigorous grass in the spring by eight of the co-operators. Three indicated climax as the least vigorous grass.

Saratoga matured before Vernal alfalfa according to five out of eight co-operators, while only two put Lincoln in the category as one put Climax in the category.

Climax was reported as maturing after Vernal by five co-operators; Lincoln and Canadian were reported later than Vernal by three co-operators. In all cases Saratoga was reported to make up more stand than Lincoln and Canadian brome and Climax timothy.

Saratoga is reported to give as much or more hay than the other grasses in the comparison and to give best aftermath in seven out of eight cases. Climax was reported as giving the poorest regrowth by five of the eight co-operators.

EFFECT OF LOCATION ON GENOTYPE IN BROMEGRASS SEED PRODUCTION, 1960

TEST 222

Yield of Dry Matter
in pounds per acre
Hay Cut
June 22, 1961

Lincoln (Man. S-5839)	6767
Lincoln (Saskatoon)	6945
Lincoln (S-4981) (original)	6869
Fischer (Alysham, Sask.)	6814
Fischer (Iowa) (original)	6828
Fischer (Zealandia, Sask.)	6649
Mean	6812
L.S.D.	N.S.
C.V. (%)	6.3

No differences among entries were observed in other characters as well.

Survey of Perennial Bromus Species (1960) - Test 221

Entry No.	Species	P.I. No.	G. No.	Country of Origin	Vigor (Range 1-10; 1 = good; 10 = poor)			Plant Height (cms.) Jun. 27/61	Leafiness (Range 1-5; 1 = leafy)	Leaf Width (Range 1-5; 1 = narrow)	Stem Coarseness (Range 1-5; 5 = coarse)	Lodging (Range 1-5; 5 = lodged)	Remarks
					Jun. 13/60	Aug. 29/60	May 29/61						
1	<i>B. fibrosus</i>	172389	G-1815	Turkey	5	5	4	126	3	3	4	3	Many basal leaves; very pubescent - admixture.
2	<i>B. erectus</i>	172390	G-1806	Turkey	6	6	2	118	3	2	2	5	Fair aftermath recovery; very soft leaf; Possibility - aftermath production.
3	<i>B. fibrosus</i>	172392	G-1816	Turkey	6	6	3	116	3	2	3	5	Very soft leaf; possibility - aftermath production.
4	<i>B. pumpellianus</i>	196321	G-1827	Germany	6	5	4	140	2	3	3	2	Good aftermath recovery.
5	<i>B. erectus</i>	196322	G-1808	Germany	9	9	9	93	4	1	1	4	Basal leaves.
6	<i>B. laenkeanus</i>	202276	G-1842	Argentina	6	6	10	47	1	2	1	1	85% winterkilled.
7	<i>B. sitchensis</i>	202534	G-1840	Belgium	4	3	9	85	2	3	3	1	Fair aftermath recovery; late maturing.
8	<i>B. erectus</i>	206645	G-1797	Turkey	7	9	9	99	5	1	1	5	Basal leaves.
9	<i>B. fibrosus</i>	220580	G-1817	Afghanistan	8	10	10	115	5	2	3	3	50% winterkilled.
10	<i>B. tomentellus</i>	227501	G-1823	Iran	8	10	10	99	5	1	2	2	90% winterkilled.
11	"	227840	G-1822	Iran	7	10	10	84	5	1	1	3	Basal leaves.
12	<i>B. tomentosus</i>	229441	G-1824	Iran	8	10	10	45	3	1	1	1	95% winterkilled.
13	<i>B. erectus</i>	229601	G-1807	Iran	7	10	9	69	4	1	1	2	Basal leaves; 95% winterkill
14	<i>B. tomentosus</i>	229940	G-1825	Iran	8	7	10	93	4	1	1	3	Basal leaves.
15	<i>B. ciliatus</i>	231760	G-1850	New Hampshire	8	7	9	79	1	5	-	-	Appears to be annual - many seed culms (1960). Diseased, very late heading (1961).
16	<i>B. anomalus</i>	232193	G-1830	Utah	8	9	10	79	1	2	2	3	Basal leaves.
17	<i>B. marginatus</i>	232226	G-1809	Idaho	6	7	9	105	4	5	4	4	
18	"	232232	G-1810	Colorado	5	6	9	105	4	4	4	4	
19	<i>B. pumpellianus</i>	232242	G-1826	Montana	7	9	6	103	4	3	2	5	Soft leaves.
20	<i>B. inermis</i>	172391	G-1801	Turkey	5	4	2	130	3	3	3	5	
21	"	172393	G-1786	Turkey	6	6	2	129	3	3	3	4	
22	"	172395	G-1785	Turkey	6	5	4	123	2	2	2	3	
23	"	172759	G-1790	Turkey	6	5	3	118	2	3	3	4	
24	"	172760	G-1794	Turkey	6	5	5	120	3	2	3	4	
25	"	172761	G-1789	Turkey	6	5	3	118	2	2	2	5	
26	"	173645	G-1787	Turkey	6	5	3	123	2	2	2	5	
27	"	173646	G-1788	Turkey	6	6	4	128	3	3	3	4	
28	"	173647	G-1782	Turkey	6	4	4	129	3	3	3	5	
29	"	173648	G-1783	Turkey	6	5	3	125	3	3	3	5	
30	"	173650	G-1792	Turkey	6	7	5	119	2	2	2	3	
31	"	173651	G-1798	Turkey	6	4	3	131	2	3	3	4	
32	"	173652	G-1781	Turkey	6	6	4	132	4	3	3	3	
33	"	178843	G-1800	Turkey	6	3	3	136	3	4	4	3	
34	"	178844	G-1784	Turkey	5	4	3	133	3	3	4	3	
35	"	198064	G-1805	Sweden	6	5	5	131	3	3	3	3	
36	"	204432	G-1791	Turkey	7	6	4	139	3	3	3	3	Basal leaves.
37	"	204433	G-1793	Turkey	7	7	6	128	3	3	2	4	Basal leaves.
38	"	206264	G-1799	Turkey	5	10	-	-	-	-	-	-	100% winterkilled - all reps.
39	"	206418	G-1795	Turkey	6	5	3	128	3	3	3	4	Basal leaves.
40	"	206644	G-1796	Turkey	6	5	5	125	3	3	3	4	Basal leaves.
41	"	206678	G-1780	Turkey	5	2	1	123	2	3	4	3	Basal leaves; many young basal tillers.
42	"	232217	G-1803	Utah	6	6	5	133	3	3	4	2	Basal leaves.
43	"	232218	G-1804	Utah	6	7	5	136	3	3	3	2	Many seed culms.
44	"	233931	G-1802	Canada	7	8	3	103	4	2	2	5	Soft leaves.
45	"	Saratoga	G-1912	Canada	4	3	1	136	3	4	5	2	Extra good after. recovery.
46	"	251527	G-1914	Yugoslavia	5	3	3	134	3	3	3	3	Good aftermath recovery.
47	"	251681	G-1917	U.S.S.R.	5	2	2	129	3	3	3	4	Good aftermath recovery.
48	"	251682	G-1916	U.S.S.R.	5	4	3	123	2	4	4	4	Good aftermath recovery; late tillering.
49	<i>B. riparius</i>	251683	G-1915	U.S.S.R.	6	4	3	131	3	3	3	4	Soft leaves.

TEST 225: SURVEY OF PERENNIAL Bromus SPECIES, 1961

Purpose: To evaluate the potentiality of some perennial Bromus species and several introductions of B. inermis from Russia with regard to adaptation and usefulness in breeding or production programs.

Location: Section B, Range 8

Seeded: May 11, 1961

Plot size: 8-foot row, 3 feet between rows; 1 replicate only

Seeding rate: Approximately 2 lbs. per acre

Entries: Seed was obtained from Plant Introduction Station, Ames, Iowa, and Plant Introduction Division, Central Experimental Farm, Ottawa.

Entry No.	Species	P.I. No. or		Origin	Seedling Vigor Sep. 6/61	Remarks
		Ott. No.	G. No.			
1	Saratoga		2226		1	
2	B. ramosus	253299	2263	Yugoslavia	8	No heads
3	B. sp.	253300	2264	"	8	Mixture; very fine leaf
4	B. sp.	253301	2265	"	8	Mixture; fine leaf
5	B. inermis	255870	2266	Poland	2	
6	B. inermis	255871	2267	Poland	1	
7	"	258743	2269	U.S.S.R.	2	
8	"	258744	2270	"	1	Very leafy; soft
9	"	258745	2271	"	1	
10	"	258746	2272	"	3	
11	B. inermis	258747	2273	U.S.S.R.	2	
12	"	262454	2274	"	1	
13	"	262455	2275	"	2	
14	"	262456	2276	"	2	
15	"	262457	2277	"	3	
16	Saratoga		2226		1	
17	B. inermis	262458	2278	U.S.S.R.	1	Softer than Saratoga
18	"	Ott. 1561-165	2279	Ukraine	1	
19	"	1561-180	2280	Leningrad	4	
20	"	1561-214	2281	"	6	Mixture
21	B. inermis	1561-215	2282	Leningrad	-	No plants
22	"	1561-216	2283	"	6	Few plants
23	"	1561-217	2284	"	-	No plants
24	Saratoga		2226		1	
25	B. inermis	1561-218	2285	"	9	One plant only
26	B. inermis	1561-219	2286	Leningrad	5	Mixture
27	"	1561-220	2287	"	3	Mixture
28	B. latiglumis	1927-7153	2288	East Lansing	2	Late
29	"	1927-6602	2289	U. Wisconsin	-	No plants
30	"	1927-4052	2290	S. Edwards	-	No plants

PLOT UNIFORMITY STUDY ON PURE BROME STAND AND BROME-ALFALFA MIXTURE, 1961

Purpose: To determine the most efficient plot size required for strain testing and management studies, where small plots may be used.

Location: Section E, Range 18

Seeded: May 1961 by drill in a large block of pure brome and a mixture of brome and alfalfa (Vernal).

Seeding rate: Pure brome - 12 lbs./acre. Brome-alfalfa mixture - 10 lbs. brome, 10 lbs. alfalfa.

Companion crop: None; sprayed with 2,4-DB at early stage of growth.

Seedling year management: Clipped 3 times to 4" height.

BROME SYNTHETIC TEST, 1961 (TEST 223)

Purpose: To obtain comparative information on five synthetics or grouped polycross progenies of brome with commercial varieties.

Location: Section B, Range 8

Seeded: May 11, 1961

Plot size: 5' x 15'

Seeding rate: 12 lbs. per acre (pure stand)

Design: Randomized complete block, 4 replicates.

Weed Control: 2,4-DB at early growth. No companion crop.

Seedling year management: Clipped twice to 4" height.

Seedling Vigor July 12/61

Saratoga	1 (best)
G2252	2
G2253	2
S6213	3
S6214	4
Can. Common	4
S-5563	5
Lincoln	5

<u>Entry No.</u>	<u>Name</u>	<u>Origin</u>
1.	Saratoga	Commercial seed
2.	Lincoln	Commercial seed
3.	Can. Common	Commercial seed
4.	S-5563	Saskatoon
5.	S-6213	Saskatoon
6.	S-6214	Saskatoon
7.	G-2252	Guelph
8.	G-2253	Guelph

UNIFORM BROME VARIETY TEST, GUELPH - 1961 (TEST 224)

Purpose: To obtain comparative data on the performance of seven brome varieties or synthetics in a mixture with Vernal alfalfa under hay-pasture and pasture managements. The two Wisconsin synthetics are of particular interest as possible varieties and S-4088 as a recently released variety.

This test is planted at Ridgetown and Kemptville.

Location: Section B, Range 8

Seeded: May 11, 1961

Plot size: 5' x 15'

Seeding rates: Vernal 10 lbs./acre; bromes 10 lbs./acre.

Design: Split-plot. Managements - main plots. Varieties of brome - sub plots.

Seedling year management: Clipped twice to 4" height.

Brome Varieties: 1. Saratoga
2. Lincoln
3. Manchar
4. Can. Common
5. Wisconsin B55
6. Wisconsin B81
7. Carleton (S-4088)

STAND ESTABLISHMENT IN TEST 224 IN 1961

Stand counts were taken on June 5, and June 26. Two counts were made on each plot in the six replicates. This work was undertaken at the request of the Wisconsin station. They consider that Wisconsin B55 and B81 have greater resistance to seedling blights than other varieties. In this test, B55 and B81 did not show up any better than the other varieties. Seedling blight was present among the brome seedlings but did not appear to differentially attack any of the varieties. B55 and B81 are also more resistant to leaf disease according to Wisconsin.

Summary of Stand Counts

	<u>Grass</u>		<u>Legume</u>	
	Count 1 <u>June 5</u>	Count 2 <u>June 26</u>	Count 1 <u>June 5</u>	Count 2 <u>June 26</u>
Saratoga	17.2	14.5	34.0	37.5
Lincoln	16.1	20.2	31.3	31.8
Manchar	13.7	15.2	32.0	32.5
Can. Common	17.2	19.6	33.2	36.2
Wisc. B55	17.4	17.4	36.6	34.5
Wisc. B81	16.0	15.3	35.9	36.5
Carleton	22.9	21.4	34.2	33.8

Relative vigor of the brome varieties on July 12, 1961: Manchar (best)
Saratoga and Carleton (equal)
Can. Common
B81
B55 and Lincoln (equal; poorest)

ESTIMATION OF THE VARIABILITY AMONG BROME CLONES

This project was conducted in order to obtain some estimate of the variability among clones of brome grass for several characters. It is hoped that the data obtained may be of some use in designing future experiments which may involve estimation of variability among clones. Results of this study should be of benefit in determining the number of replications to use as well as the number of plants per replicate.

The data were obtained from the brome source nursery on D-1. This nursery is made up of plants which derive from 9 basic plants. The nursery was planted such that there were 22 plants per row and each row represented one of the nine plants. The rows were randomized and replicated. In total, 22 replicates were available. Only 20 plants per row were observed in the present study.

The data obtained in the study have not been analyzed yet but the proposed analysis will consider various combinations of replicates and plants per replicate with decisions being based largely on components of variance.

Observations were made on spring vigor, height at anthesis, heading date, leafiness, leaf width, disease, and stem coarseness.

SEED WEIGHT SELECTION PROGRAM IN BROME

Four polycross nurseries were set out to permit recombination to obtain a new bulk population. All of the nurseries established satisfactorily. Any plants which failed to survive were replaced. In the early spring of 1962 there appeared to be 100% stand. The nurseries and the selections included in them are outlined in the 1960 Progress Report.

Meadow Fescue
Meadow Fescue Variety Observation Nursery, 1959

Exp. 605

Variety	Vigour (1)			Height at Bloom (inches)
	May 8	June 1	June 23 ⁽²⁾	
Mefon	4.0	2.5	3.0	37
Mommersteeg's Hay	3.0	4.0	4.0	37
" Pasture	3.0	3.0	1.0	35
S-170 (Tall Fescue)	1.0	1.0	1.0	42
Barenza Pasture	3.5	3.5	3.0	36
Festa	4.0	4.0	2.0	34
Melle Pasture	3.5	4.0	3.0	36
Mimer	3.5	2.0	2.5	36
S-53	4.5	5.0	3.5	28
S-215	3.0	2.5	2.5	37
Sceempter	3.0	2.5	4.0	37
Trifolium II	3.0	2.5	3.0	37
" 6622	3.0	2.5	3.0	36
Prato (K.B.G.)	3.0	4.0	3.0	--

(1) Vigour rating: 1 (good) to 5 (poor).

(2) Aftermath rating for $\frac{1}{2}$ row cut June 2nd.

Meadow Fescue Row Test, 1960

Exp. 613

Entry	Vigour (1)			Bloom Height Date at Bloom	
	May 8	June 1	June 23 ⁽²⁾	(July)	(inches)
Barenza Hay	3.0	3.0	3.0	4	38
O280 (Sweden)	3.0	2.5	2.5	4	40
SU 01207 (Sweden)	2.5	3.0	3.0	4-5	39
SU 1218 (Sweden)	4.0	4.0	2.0	4-5	40
W.A.S. 22	3.0	3.5	2.5	4-5	38
Mimer	3.0	3.0	2.5	4-5	40
W.A.S. 9	3.0	3.5	2.5	4-5	39
C.B. Hay	4.0	4.0	3.0	4-5	38
SU01217 (Sweden)	4.0	4.5	2.5	5	37
SU 701 (Sweden)	4.0	4.0	2.0	5	38
C.B. Pasture	3.0	4.0	2.5	5	36
Climax (timothy)	2.0	3.0	1.5	7	38
Essex (timothy)	2.0	3.0	2.0	12	36

(1) Vigour rating: 1 (good) to 5 (poor).

(2) Aftermath vigour rating on $\frac{1}{2}$ row cut June 2nd.

Meadow Fescue - Variety Trials Seeded Spring 1961

A meadow fescue variety trial for pasture was seeded at Ottawa and Guelph in the spring of 1961. The following varieties were included:

<u>Ottawa:</u>	Mimer	SK6
	Ensign	S-215
	Ottawa Syn. 1	Mefon Common
 <u>Guelph:</u>	 Mimer	 Ottawa Syn. 1
	Ensign	" Syn. 2
		" Syn. 3

Exp. 615 Grass Species for Early Hay, 1960

<u>Treatment</u>	<u>Variety</u>	Yield - lbs. of D.M./Ac.			% Grass	
		Cut 1 ⁽¹⁾	Cut 2	Total	Cut 1	Cut 2
With Alfalfa	Climax T.	6,120	2,770	8,890	26	8
	Saratoga B.	5,960	2,650	8,610	20	18
	Lincoln B.	5,800	2,680	8,480	19	11
	Alta T.F.	5,180	3,010	8,190	17	22
	Common Reed C ⁽³⁾	4,970	2,740	7,710	17	27
	Frode O	3,900	2,310	6,210	33	35
Alone + 100 lbs. N ⁽²⁾	Climax	5,450	1,100	6,550		
	Saratoga	4,750	1,410	6,160		
	Lincoln	4,240	1,220	5,460		
	Alta.	3,970	1,420	5,390		
	Common Reed C ⁽³⁾	3,610	1,400	5,010		
	Frode	2,810	1,910	4,720		
Alone + 300 lbs. N	Climax	7,390	2,110	9,500		
	Saratoga	7,260	2,410	9,670		
	Lincoln	7,010	2,060	9,070		
	Alta	5,850	2,470	8,320		
	Common R. C.	5,790	2,210	8,000		
	Frode	5,130	2,610	7,740		

(1) Plots cut according to bloom date of grass:

O. orchardgrass - June 21, Aug. 8
 Reed C. reed canary grass - June 27, Aug. 15
 T.F. tall fescue - June 27, " "
 B. brome grass - July 5, Aug. 15
 T. timothy - July 12, " "

(2) Split applications of nitrogen: $\frac{1}{2}$ in early spring
 $\frac{1}{2}$ after first cut

(3) Reed canary grass plots with alfalfa and under low N were infested with couch grass.

For both cuts, mean squares for treatments and species were significant. The mean square for the interaction of treatments X species was significant for the second cut only.

Exp. 616 Miscellaneous Grass Species, 1960

Species	Variety	Vigour May 8 (1-5)	Bloom Date	Height at Bloom (inches)
Meadow Foxtail	-----	2	May 30	20
Reed Canary Grass	Ioreed	1	June 22	46
Meadow Fescue	C.B. Hay	4	"	36
Tall Fescue	Alta	3	"	40
Kentucky				
Blue Grass	Merion	5	"	23
Tall Oatgrass	-----	3	"	51
Orchardgrass	S-143	5	June 25	34
Bromegrass	Lincoln	3	July 2	48
Canada Blue	-----	4	July 4	23
Virginia Wild Rye	-----	2	July 5	35
Crested Wheatgrass	Fairway	1	July 6	32
Tall "	-----	3	"	42
Red Fescue	-----	4	"	28
Red Top	-----	3	July 7	30
Timothy	Climax	3	July 10	38
Perennial Rye	Barenza	5	"	24
Streambank				
Wheatgrass	-----	4	July 17	41
Intermediate				
Wheatgrass	-----	1	"	45
Slender "	-----	3	July 31	57

The following had not headed out by July 18th:

Canada Wild Rye	Atlai	3
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The following species were winter-killed:

Green stipa
 Westerwolth rye grass
 Italian
 Dallisgrass
 Crested Dogstail
 Bermuda grass
 Bahia "
 Buffalo "
 Johnson "

SURVEY OF ANNUAL FORAGE SPECIES

Westerwolth Annual Ryegrass

In the past 10 years or so in Europe considerable emphasis has been placed on breeding the so-called Westerwolth (Westerwold) annual ryegrasses. As well the superior feeding value of ryegrasses in general has attracted the attention of forage people.

The Guelph work has three general objectives: (1) the testing of varieties, including tetraploid types, (2) the description of the growth characteristics of the plant, and (3) the definition of cropping systems to make use of the species.

Variety testing is by no means completed. Early work at Guelph indicates a superiority of tetraploid types, particularly in relation to high fertility and with particular emphasis on nitrogen and potassium nutrition. The varieties tetraploid Westerwolth CB and Billion, both of Dutch origin, should be mentioned as looking very promising. In 1961 at Guelph, for example, the tetraploid Westerwolth CB planted on May 5 was cut 5 times and yielded in excess of 5 tons of D.M. pasture equivalent in the five cuts.

A preliminary growth curve response study of common Westerwolth at Guelph in 1961 showed that with a May 5 planting, yields by mid-July had advanced to approximately 3 tons of dry matter by July 21. The plant at this stage was in the late bloom stages. Three subsequent pasture clips on the July 21 cutting treatment advanced the total yield to over 5 tons of dry matter for the season.

In these studies nitrogen was added at the rate of approximately 200 lbs. of elemental N per acre. The soil test for potash indicated a starting point of approximately 250 lbs. K_2O per acre and at the end of the growth period a soil test of approximately 90 lbs. K_2O per acre. There was some indication of a shortage of potash on the fourth and fifth cutting treatments.

The characteristic growth pattern of Westerwolth ryegrass suggests that it is ready for pasture in 6-7 weeks after planting - has reached early bloom in 8-9 weeks and the late bloom or dough stage in 10-11 weeks after planting. There has been very little evidence of failure to regrow at any stage of cutting, particularly if fertility is available. More work is needed here, however.

No work has been done to establish seeding rates. All tests were sown at 15 lbs. per acre and stands were excellent.

Much work remains to be done on defining the place of annual ryegrass (if any) in cropping systems. Certainly the excellent growth and the reported excellent feeding value warrant a hard look at this specie. A number of possible uses suggest themselves.

(1) The use of this species on intensive livestock farms in simple sequence such as corn and ryegrass. The excess fertility on some of these farms could make this a very promising item.

(2) Part season pasture crop for late seeding on wet ground or seeding following a cereal crop.

(3) The specie shows promise for hay pasture or grass silage.

YIELD IN POUNDS OF DRY MATTER CUT AS PASTURE OF THREE WESTERWOLTH RYEGRASS VARIETIES,
TWO RESCUE GRASS VARIETIES AND GARRY OATS AT GUELPH IN 1961

Percent Dry Matter in Brackets

Average of Four Replications

Variety	Cutting Dates					Total
	June 23	July 13	August 1	September 5	October 26	
Rescue "A"	809 (18.4)	2079 (19.1)	1727 (15.3)	2883 (15.9)	1857 (15.6)	9355
Rescue "B"	710 (20.5)	2128 (19.9)	1775 (15.4)	3011 (18.2)	1559 (14.2)	9183
Tetraploid Ww CB	2414 (11.5)	2063 (14.9)	1599 (13.0)	2633 (15.1)	1305 (13.1)	10114
Common Ww	2447 (12.3)	2086 (15.7)	1540 (15.2)	2237 (16.0)	1118 (14.8)	9428
Ww CB	2373 (11.2)	2207 (15.7)	1514 (15.4)	2317 (17.3)	1080 (14.2)	9491
*Common Ww + DuPuits	1927 (12.8)	1822 (16.9)	1568 (15.0)	1969 (16.5)	971 (15.5)	8257
Garry Oats	2360 (12.0)	574 (16.3)	----	----	----	2934

* No separation made but yield mostly ryegrass.

NOTES: Planting date: May 5

Planting rate: Ww = 15 lbs./acre; Rescue grass = 15 lbs./acre; Oats = 2 bus./acre; Ww + DuPuits =
7½ + 8 lbs./acre.

Cutting treatment approximately 2½" high.

Soil type: Guelph loam

Fertility: 300 lbs. 16-8-8 at planting + 150 lbs. NH₄NO₃ after each cutting treatment

OBSERVATIONS

The 1961 season at Guelph was remarkable for its adequate rainfall and even more important, the uniform distribution of rainfall. This undoubtedly was the reason for the rather high yields.

It is important to realize that all yields reported are yields of grass. At no time did the cuts represent more than 5% of the material in the headed stage.

After each cutting, treatment regrowth was rapid and even after the October 26 cutting the ryegrass and the rescue grass varieties continued to grow.

These annual species of grass should be evaluated for (1) Hay, (2) silage, (3) pasture, and (4) part season pasture crop.

GROWTH CURVE RESPONSE OF COMMON WESTERWOLTH RYEGRASS AT GUELPH, 1961

Yield in pounds of dry matter per acre - Preliminary Study

Percent dry matter at harvest in brackets

Average of two replications

	June 12	July 5	July 21	August 15	September 18	October 26	Total
First Cut	637 (12.2)	2315 (14.7)	1067 (14.1)	1925 (7.4)	1352 (17.5)	388 (15.0)	7684
	<u>June 26</u>	<u>July 21</u>	<u>August 15</u>	<u>September 18</u>	<u>October 26</u>		
Second Cut	2573 (12.4)	2882 (15.6)	1325 (17.8)	1617 (20.9)	388 (15.0)		8785
	<u>July 5</u>	<u>July 21</u>	<u>August 15</u>	<u>September 18</u>	<u>October 26</u>		
Third Cut	3694 (15.7)	1546 (14.1)	1991 (16.5)	1613 (16.0)	388 (15.0)		9232
	<u>July 21</u>	<u>August 15</u>	<u>September 18</u>	<u>October 26</u>			
Fourth Cut	5852 (21.7)	2540 (16.1)	1552 (19.8)	388 (15.0)			10332

NOTES:

Planting date: May 5

Planting rate: 15 lbs./acre

Soil type: Guelph loam

Weed control: 2,4-DB at 16 oz./acre

Fertility: 300 lbs./acre 16-8-8 starter; 150 lbs. NH_4NO_3 after each cut

OBSERVATIONS: The subsequent cuts following the initial growth curve cuts were all in the vegetative stage.

SUDAX SX-11 AND SORGHUM ALMUM

Sudax SX-11 is a cross between a dwarf grain sorghum and sudan grass. It has been aptly described as a hybrid sudan grass. Sorghum almum is sometimes thought to be a natural cross between sorghum and Johnson grass. In any case, this specie is used in the same general way as Sudan and Sudan grass - i.e. as a supplementary summer pasture.

The objective on this work has been to describe growth characteristics of these two species. It is also hoped to characterize the feeding value of this material at the different growth stages. Effective weed control practices have also been described in conjunction with this study.

Both Sudan and Sorghum almum will produce quite acceptable yields at Guelph. Full season growth on both these items has averaged 5 tons of dry matter or more per year. Out as pasture, yields of course are much lower, but have been in the neighborhood of 3 tons of dry matter per season.

We are alarmed about the vitality of sorghum almum seed. We have discovered plants of sorghum almum appearing around the plot areas even well away from the areas where these plants have been tested. It has all the characteristics of a weed plant in this respect. Indeed, we intend to drop it partly for this reason but also because its production is less than Sudax.

We do not expect either of these species to become major crop specie in Southern Ontario. Their use will be confined to summer grazing, particularly in conjunction with zero grazing.

As silage items, these species do not rate with corn.

YIELDS OF SILAGE IN POUNDS OF DRY MATTER PER ACRE OF FIVE CORN
HYBRIDS IN COMPARISON WITH SUDAX, SUDAN GRASS, HYBRID FORAGE
SORGHUM, AND SORGHUM ALMUM - GUELPH 1961

Variety and Specie	Ear Dry Weight	% D.M. at harvest	Stover Dry Weight	% D.M. at harvest	Total
Pride 5	6167	42.2	4158	76.4	10325
Dekalb 56	6283	45.3	5112	74.7	11395
Pfister 44	6397	49.4	5274	78.2	11671
Pride 20	5128	49.5	4477	76.7	9605
Pride K300	4775	57.1	4794	78.4	9569
Sudax SX11 9"				77.6	11059
Sudax SX11 36"				75.8	9714
Piper Sudan 9"				64.2	8272
Piper Sudan 36"				68.5	7933
NK145 (Forage Sorghum) 9"				75.9	12010
NK145 (Forage Sorghum) 36"				73.0	10225
*Sorghum alnum 9"				75.9	10131
*Sorghum alnum 36"				79.5	7430

* Harvested August 30

NOTES: Planting date: May 30 Harvested: September 27 (no frost)

Planting rate: Corn - 14,520 plants per acre; Sudax - 9" 12 lbs./acre,
36" 5 lbs./acre; Piper - 9" 25 lbs./acre, 36" 10 lbs./acre;
NK145 - 9" 8 lbs./acre, 36" 3 lbs./acre; sorghum alnum -
9" 5 lbs./acre, 36" 2 lbs./acre.

Weed control: 4 lbs. propazine (50W) pre.

Fertility: 300 lbs. 16-8-8 per acre at planting + 150 lbs. NH_4NO_3

YIELD IN POUNDS OF DRY MATTER OF SEVERAL ANNUAL GRASS SPECIES AT
GUELPH, 1961

Percent Dry Matter in Brackets

Average of Three Replications

	Cutting Date				Total
	August 1	August 14	August 31	September 18	
Sudax SX-11	3785 (12.6)	----	----	3558 (15.6)	7343
Sorghum almum	2590 (10.9)	----	----	3620 (18.1)	6210
Sudan Grass (Piper)	2340 (13.8)	----	----	3475 (22.9)	5815
Corn	5251 (10.7)				5251
Corn		6464 (13.1)			6464
Corn			11993 (18.5)		11993

NOTES: Seeded: May 30

Weed control: Propazine 4 lbs. (50W) per acre pre.

Seeding rate in 9" drills: Corn - 50,000 plants per acre approximately
Sudax SX11 - 8 lbs. per acre
Sudan grass - 20 lbs. per acre
Sorghum almum - 3 lbs. per acre

Fertility: 300 lbs. 16-8-8 at seeding

GROWTH CURVE RESPONSE OF SUDAX SX-11 ON 9" SEEDING AND 27" SEEDING

GUELPH - 1961

Yields in pounds of dry matter per acre

Average of four replications

	Yield	% D.M.	Yield	% D.M.	Total
<u>First Cut</u>		<u>August 1</u>		<u>September 19</u>	
9"	1976	10.9	2303	16.6	4273
27"	1189	10.9	3278	13.3	4467
<u>Second Cut</u>		<u>August 14</u>		<u>September 19</u>	
9"	3670	12.3	684	14.0	4354
27"	1812	12.4	1512	13.3	3324
<u>Third Cut</u>		<u>September 5</u>			
9"	8474	19.0	---		8474
27"	7053	17.6	---		7053
<u>Fourth Cut</u>		<u>September 19</u>			
9"	9212	23.4	---		9212
27"	10992	24.0	---		10992

NOTES:

Planting date: June 7

Planting rate: 9" rows 4 lbs./acre; 27" rows 8 lbs./acre

Soil type: Guelph loam

Weed control: 4 lbs. Propazine pre-emergence

Fertility: Approximately 100 bus. corn