

Tenth Annual Report

1958

Northwestern Montana Branch
Montana Agricultural Experiment Station
Route 4, Kalispell, Montana

This report is by Projects, 12 in all, 4 fiscal and 8 research. Vern R. Stewart, Asst. Agronomist, has been primarily responsible for research with small grains, weeds, and annual forages. C. W. Roath, Sup't. has assumed responsibility for research with irrigation, perennial forages, potatoes and farm flock. Work with fertilizer has been shared on the basis of crops involved.

<u>Project Number</u>	<u>Title</u>	<u>Page</u>
1062	General Administration	2
1063	Physical Plant	3
1064	General Farm	4
1065	General Service and Consultation	5
5019	Irrigation	6
5020	Fertilizers	17
5021	Weeds	10
5022	Forage Investigations	43
5023	Small Grains Investigations	67
5027	Potato Production	96
5028	Preliminary Investigations	98
5029	Farm Flock	101

General Administration

Negotiations for a lease of additional land for the Northwestern Montana Branch Station were successful. Eighty acres just west of the Station has been leased for a period of 7 years. Fifty acres of this was available for use during the '58 season. All 80 acres will be used in '59.

Vern R. Stewart, Asst. Agronomist, was granted leave for study, was accepted as a candidate for a Doctors degree by the University of Minnesota, and left in pursuit of this Degree Sept. 1, 1958. Nearly all of the small grains harvest was completed at the time of his departure.

Plans for 1959 call for employment of a man trained in Soils to assist with the Research Projects during Mr. Stewart's absence, and remain on as Ass't. in Soils after his return.

Little progress has been made in preparation of Research Projects. Annual Work Plans were presented, and budgets provided, even though Project Committee approval of the formal project documents had not been received.

The '58-'59 budget for Administration expenditures which include travel and off-station expense, phone, clerical help, and that portion of the Superintendent's time spent on administrative matters, was \$3025.00.

Physical Plant

While not entirely completed in 1958, the 40 x 64 Crops Research Building was most useful throughout the year. The Crop Drying facility was moved into the building and the furnace installed. The shop portion of the building was ceiled over-head with Masonite secured through surplus channels. The sub-ceiling in the office part of the building was secured and put in. One additional coat of outside paint was applied.

High wind removed a portion of the roofing from the Potato Cellar making re-roofing necessary.

Tentative plans have been drawn for the additional building needed to replace rough lumber structure currently used for hay and machinery storage. Request was made in Special Items for funds for this building.

Additional varieties of named iris were added to the beds established in 1957.

A budget of \$3,455.50 was approved for this project for the 1958-59 fiscal year, which is considerably more than will be available because of increased costs of operation and lower revenue than anticipated.

General Farm

Under this Project are listed costs of machinery, labor, tractor fuel, and all operations items that cannot be legitimately charged to a particular research project. However in the final analysis all charges to this project contribute to research of one kind or another.

Leasing of additional land has increased general farm activities, such as tillage, seeding, harvesting, weed spraying, etc., and greatly increased the research that can be undertaken on the Station. Revenue from sale of surplus crops can be expected to increase due to production of additional acres. Increased efficiency in use of machines and labor during tillage, seeding, and harvest, will be the most noticeable effect, once temporary inconvenience caused by consolidation of small plots and change of crops to conform to revised rotations has been overcome.

Locally, County Agents are offering to assume greater responsibility for production of Certified seed grains, thus permitting the Staff and Station labor force to spend more time with production of Head-row seed and research.

The approved General Farm budget for 1958-59 was \$4,762.50.

Service and Consultation

Demand for the information coming from research seems to increase in proportion to the complexity of the farming business. Certainly demand for findings from this institution has not lessened during recent years.

In an attempt to inform our constituents a Field Day is held, a Progress Report issued annually, monthly letters are sent to County Agents, meetings are attended in all Northwestern Counties. And this year reports on some phases of our work have been made at meetings involving State-wide audiences. Articles for local and State publications are prepared on an occasional basis.

No Bulletins have been published as yet, but not because no backlog of information exists..

The authorized budget for this project for the year was \$1,437.50.

Irrigation

This years work furnishes additional proof of the efficiency of the irrigation schedules based on the B.P.I. pan. This helpfull tool enables one to apply the amount of water needed to crops during the year the irrigation is done, be the year wet or dry, hot or cool, humid or of low humidity.

Since these weather conditions determine the disappearance of water from the tank, adjustment to seasonal conditions is automatic. One need only to start the irrigation season with good moisture in the soil, bring soil moisture to optimum level by an early irrigation if needed, then apply the amount of water that disappears from the tank during the growth period of a particular crop, in order to keep moisture adequate for crop growth; and do it without wastefull applications that may be detrimental to crop or soil.

Dryland yields were unusually low for the Station this year. Yields of 7 tons of corn silage, 11 bushels of grain, and $1\frac{1}{2}$ tons of alfalfa per acre received this year were indeed disappointing. Irrigated crops produced up to 90 bushels of grain, 30 tons of silage and 6 tons of hay.

The irrigation budget for the 1958-59 year is \$1,567.50.

Table I. Irrigation data for Alfalfa, Creston, Montana, 1958.
Cured hay, two cuttings, plot size 60 sq. ft.

Rate		No. Irr.	Irrigation Dates	Total Inches
I	.2 in. day less rainfall	5	5/27, 6/23, 7/22, 7/25, 8/12,	14.5
II	2 in. By tank loss	5	5/27, 6/23, 7/11, 7/27, 8/12,	10
III	3 in. by tank loss	3	6/2, 6/30, 7/28	9

Rate	Cuttings	Pounds Cured Hay Per Plot				Total	Lbs/A
		1	2	3	4		
I	1	5.95	7.22	6.80	4.25	40.74	7394
	2	<u>3.95</u>	<u>3.59</u>	<u>5.03</u>	<u>3.95</u>		
		9.90	10.81	11.83	8.20		
II	1	5.95	7.65	4.25	6.37	40.02	7264
	2	<u>2.87</u>	<u>3.59</u>	<u>5.75</u>	<u>3.59</u>		
		8.82	11.24	10.00	9.96		
III	1	6.37	6.80	5.95	6.80	43.16	7833
	2	<u>3.59</u>	<u>3.59</u>	<u>5.03</u>	<u>5.03</u>		
		9.96	10.39	10.98	11.83		

Table II. Irrigation data for Barley, Creston, Montana, 1958.
Size of plot, 300 sq. ft.

Rate					
I	.2 in. day less rain fall, seeding to head, at jointing and heading				Total 7 inches
	4 inches 6/24-5, 3 inches at heading 7/14.				
II	Tank loss seeding to heading at jointing and heading				Total 76 inches
	4 inches 6/24, 2 inches 7/14				
III	Tank loss seeding to jointing ^{at} and jointing, 4 inches 6/24				Total 4 inches

Rate	Plot Yield in Pounds				Total	Bu/A
	1	2	3	4		
I	29	33	29	31	122	92.26
II	28	36	29	34	127	96.04
III	33	35	33	35	136	102.85

Mean Yield.....97.1
S. E. \bar{x}2.212
L. S. D.....N. S.
C. V.....2.26%

Note: Lodging in Rates I & II may have accounted for reduced yield.

Table III. Irrigation Data for Corn, Creston, Montana, 1958.
Size of Plot 53.28 sq. ft. Green Silage.

Rate		No. Irr.	Irrigation Dates	Total Inches
I	.2 in. day less rain from seeding	4	6/24, 7/14, 7/25, 8/12	13
II	Tank loss, seeding to 9/1	4	6/24, 7/14, 7/25, 8/12	9½
III	Tank loss, seeding 9/1, 3 in. rate	3	6/30, 7/28, 8/12.	9

Rate	Pounds per Plot				Total	T/A
	1	2	3	4		
I	60	66	70	62	258	26.87
II	56	60	72	44	232	24.16
III	66	58	62	54	240	25.00

Table IV. Irrigation Data for Pasture, Creston, Montana, 1958
Size of Plot 60 sq. ft. four clippings, four rips

Rate		No. Irr.	Irrigation Dates	Total Inches
I	.2 in. day less rainfall	5	5/27, 6/23, 7/12, 7/28, 8/12	14½
II	Tank loss, 2 in. rate	5	5/27, 6/23, 7/12, 7/28, 8/12	10
III	Tank loss, 3 in. rate	3	6/2, 6/30, 7/28.	9

Rate	Ounces Dry Wt. per Plot				Total Ounces	Lbs./A
	1	2	3	4		
I	84.5	85.0	118.5	104.0	392.0	4446.75 ×
II	60.25	57.0	94.75	90.5	302.50	3431.48
III	58.50	51.35	71.00	77.75	258.60	2933.49

Note: Spring moisture not plentiful. Tank rate will not overcome deficiency.

Table V. Irrigation Data for Potatoes, Creston, Montana, 1958.
100 ft. of 38 in. rows or 316.66 sq. ft.

Rate	No. Irr.	Irrigation Dates	Total Inches
I .2 in. dry, emergency to 9/1	4	7/11, 7/25, 8/12, 8/25	12
II Tank loss, emergence to 9/1, 2 in. rate	4	7/11, 7/28, 8/11, 8/26	8
III 2 in. ea bloom & in. by tank thereafter	4	7/11, 7/28, 8/11, 8/25	8

Rate	Pounds per Plot				Total Pounds	CWT/A
	1	2	3	4		
I	225	250	217	279	971	333.93
II	253	254	233	267	1007	346.31
III	193	254	249	246	942	323.95

Table VI. Pounds of Crops per Acre per Inch of Water
Two year average. Two rates:
Rate 1 -- Tank
~~Tank~~ Rate 2 -- .2 in. day less rain

Crop	Rate	2 yr. ave.		Lbs. per inch of Water					
		Lbs.	Ins.	0	2	4	6	8	10
Alfalfa	1	7400	8	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-925					
	2	7200	12.15	xxxxxxxxxxxxxxxxxxxxxxxx-593					
Barley	1	4258	4.6	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-925					
	2	4032	6.6	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-611					
Corn (Silage)	1	50,500	6.75	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx-7481					
	2	52,100	9.6	xxxxxxxx-5645					
Pasture (Dry Clippings)	1	4500	9.0	xxxxxxxx-500					
	2	4870	13.65	xxxxxxx-357					
Potatoes	1	34,800	6.0	xxxxxxxxxxxxxxxxxxxxxxxx-5800					
	2	32,300	10.0	xxxxxx-3230					

Weeds

Weed control work in 1958 included checking and reporting results of chemicals applied to Quackgrass plots in 1957, and making a study of pre-planting applications of chemicals to plots of corn, potatoes, barley and wheat. Plus control of weeds in Station crops.

The 1958-59 approved budget for this project was \$1000.00.

Summary of work with Wild Oats

Partial control of wild oats in corn and potatoes was obtained from pre-planting use of four chemicals. Most effective of the chemicals used was EPTC at 5 lbs. per acre.

No detrimental effect was noted on corn and potatoes. Comparative potato yields from treated plots is shown in Table 1.

Used as pre-planting treatments in plots seeded to wheat and barley, none of the chemicals showed promise of being of value, although some reduced stands of planted grains very little. Barley was more seriously affected than wheat.

Tables 2 and 3 show treatments and control estimates.

Table 1. Potato yields following weed treatment of Herbicides, 1958.
16 ft. rows, harvested Sept. 22, (53.28 sq. ft.)

Herbicide	Lbs/A	Lbs. per Plot			Total Pounds	Cwt/A
		Rep 1	Rep 2	Rep 3		
Eptc	2½	20	18	22	60	163.5
Eptc	5	14	19	24	57	155.3
Eptc	10	15	22	27	64	174.4
L.P.C.	4	11	18	26	55	149.9
L.P.C.	6	14	15	22	51	139.0
Dalapon	4	13	17	16	46	125.3
Dalapon	6	11	17	26	54	147.1
Dalapon	8	15	19	15	49	133.5
Teterachloro Benzene	10	13	13	19	45	122.6
Teterachloro Benzene	20	20	17	23	60	163.5
Teterachloro Benzene	30	12	18	24	54	147.1
Check	0	8	20	23	51	139.0

Herbicide application 5/15/58. Potatoes planted 5/28.

Table 2. Chemical for Control of Wild Oats, Corn and Potatoes, with application of chemical, pre-planting. Creston, Montana, 1958.

Herbicide	Acid Equiv. Pounds/A	Rate of Control 0-10*			Average
		I	II	III	
EPTC	2½	10	9	4	7.7
EPTC	5	10	9	9	9.3
EPTC	10	10	8	9	9.0
IPC	4	9	3	8	6.7
IPC	6	8	9	6	7.7
Dalapon	4	4	9	3	5.3
Dalapon	6	1	2	5	2.7
Dalapon	8	1	1	1	1.0
Teterochloro Benzene	10	1	1	8	3.3
Teterochloro Benzene	20	2	6	6	4.7
Teterochloro Benzene	30	1	7	8	5.3

* 0- No Control
10-Complete Control

Table 3. Data from chemical weed control study used on Frija Barley and Pilot Spring Wheat, Creston, Montana, 1958. Two seeding date on crops.

Herbicide	Acid Equiv. Pounds/A	Effect of Herbicide on Cereal Crops *							
		Frija Barley				Pilot Spring Wheat			
		I	II	III	Ave.	I	II	III	Ave.
EPTC	2½	5	1	4	3.3	5	3	6	4.7
EPTC	5	2	0	0	.7	2	1	0	1.0
EPTC	10	0	0	0	.0	0	1	0	.3
IPC	4	5	6	3	4.7	3	6	7	5.3
IPC	6	4	6	9	6.3	2	6	5	4.3
Dalapon	4	6	6	8	6.7	4	8	10	7.3
Dalapon	6	5	7	6	6.0	5	8	3	5.3
Dalapon	8	3	5	1	3.0	5	7	10	7.3
Teterochloro Benzene	10	4	7	4	5.0	7	8	8	7.7
Teterochloro Benzene	20	3	6	10	6.3	5	5	10	6.7
Teterochloro Benzene	30	0	1	2	1.0	8	1	7	5.3
Check	0	10	5	2	5.7	10	5	5	6.7

* Effect of chemical ^{ON} ~~an~~ cereal crop 0-no crop stand; 10-100% stand of crop seeded.

Table 4. Control of Quackgrass (*Agropyron repens*)

Using Heribicides and Tillage in Combination
Treatments made May 17, 1958.
Plots 15 x 20 feet.
1 Replication

Chemical	Acid Equiv. Pounds/A	Rate of Control 0-10*
Dalapon	20	5
Dalapon	30	6
Dalapon	40	7
Weedazol	3	5
Weedazol	6	5
Weedazol	12	4
T.C.A.	20	6
T.C.A.	40	9
T.C.A.	60	9
Check	0	0

*Tillage included in this trial

* (0-10) 0 equals no control

10 equals complete control

Table 5. Chemical Control of Quackgrass (*Agropyron repens*)

Located on the Flathead County Airport, Kalispell, Montana

Treatments Dates as Follows:

CMV and Ureabor April 8, 1957.

Others May 17, 1957.

Plots 15 x 20 feet.

Four replications

Chemical	Acid Equiv. Pounds/A	Rate of Control 0-10 1/
Dalapon	20	4.2
Dalapon	30	4.7
Dalapon	40	4.2
C.M.U.	20	10.0
C.M.U.	40	10.0
C.M.U.	60	10.0
T.C.A.	40	5.5
T.C.A.	60	9.0
T.C.A.	80	7.8
Ureabor	435	10.0
Ureabor	217.5	10.0
Ureabor	652.5	10.0
Weedazol	3	.8
Weedazol	12	2.7
Weedazol	6	3.2
*Dalapon	10	8.0
*Weedazol	3	1.5
Check	0	0.0

* Total pounds of Material Per Acre.

1/ 0 No Control, 10 complete Control

Chemical Control of Quackgrass
Agropyron repens

In 1957 three experiments on quackgrass were established. Two in combination with tillage and one without tillage. A complete description as to technique is found in the 1957 annual report of the Northwestern Montana Branch of the Agricultural Experiment Station.

Results and Discussion

To determine the effectiveness of these herbicides reading was made of the tillage.

Herbicide Plots May 2, 1958

No results were obtained from the plot on the Carr farm. This was brought about by the tillage operation which eliminated all quackgrass including that in the check plot.

TCA in combination with tillage gave the most effective control of quackgrass in the trial located on the station.

Dalapon at 40 pounds per acre was effective in control but to a lesser degree than TCA. Table 4 shows the complete data for this experiment.

Ureabor and CMU were the only herbicides that gave complete control of Agropyron repens in the plots located on the Flathead County Airport. The rate use of these two herbicides were high enough to obtain soil sterilization.

Quackgrass in Dalapon plots was reduced in stand, however, the remaining plants were a deeper green color and more vigorous plants than those found in the check plot. Table 5 shows percent of kill as of July 12, 1958.

Fertilizers

Fertilizer trials harvested this year include four on winter wheat, three on barley, two on Bromegrass, four on Kenland clover, one on native hay, and one each on Fescue seed and pasture.

One new trial on mixed hay was seeded in Ravalli County involving 16 treatments.

Not yields only, but chemical analysis for Protein and Phosphorous has been obtained in some cases.

Some outstanding results from use of phosphorous fertilizers at rather high rates have been obtained. Such increases as 21 bushels of wheat, 25.7 bushels of barley, 304 lbs. of grass seed, as received in this years trials make it seem foolish to continue ~~to~~ the farm phosphorous deficient soils without use of adequate phosphate fertilizer. In one fertility level study on the Station, 70 dollars in additional wheat has been produced in 3 years to pay for 17 dollars worth of phosphorous fertilizer.

The main fertilizer effort for the coming year according to present plan is to cooperate with Mr. Klages of the Agronomy and Soils Department and County Agents in the area in a study of fertilizer response and nutrient uptake in irrigated spring grains.

The approved budget for this project of 58-59 was \$3,342.50.

Table I. Off-Station Fertilizer on Barley 1958. Ben Johnson place, Ronan.
Seeded May 5, Harvested August 12, four row plots, 18 ft. 4 replications,
32 sq. ft.

	Lbs. per Acre		Grams Per Plot				Total ^{cut} _{1/4 ft}	Bu./A	% Pro.
	N	P ₂ O ₅	I	II	III	IV			
1	0	0	385	499	431	589	1904	29.76	11.6
2	25	40	520	735	675	599	2529	39.53 ¹⁰	8.00
3	50	40	575	460	744	550	2329	36.40 ⁷¹⁵⁰	5.40
4	100	40	690	840	185	335	2050	32.04 ³⁴	2.40
5	0	40	565	674	674	760	2673	41.78 ¹⁰	7.6
6	25	80	545	830	515	675	2565	40.09 ⁸⁰⁰	12.3
7	50	80	554	730	445	915	2644	41.32 ⁷⁶	14.0
8	100	80	645	490	460	575	2170	33.92 ²³⁸⁰	15.1
9	0	80	693	625	565	435	2318	36.23 ⁵	40
10	25	160	775	590	640	755	2760	43.14 ¹²	760
11	50	160	900	796	710	494	2900	45.33 ¹⁰⁴⁹	12.8
12	100	160	774	691	500	900	2865	44.78	14.8
13	0	160	685	858	615	488	2646	41.36	12.9
14	25	0	628	709	450	485	2272	35.51 ⁵	40
15	50	0	486	719	536	500	2241	35.03 ⁵	40
16	100	0	385	581	315	317	1598	24.98	15.8

Analysis of Variance

Source	D. F.	Sum of Sq.	Mean of Sq.	F
Replications	3	181,132.12	60,377.3733	
N.	3	86,513.62	28,837.8733	1.5278 N. S.
P.	3	311,813.25	103,937.7500	5.5064 **
N. P.	9	89,689.63	9,965.5144	
Error	45	849,409.38	18,875.7640	

Table II. Off-Station Fertilizer on Barley 1958. Jim Houser place, Sanders Co. Seeded May 8, harvested August 18, four row plots, 18 ft. four replications. One not harvested, (32 sq. ft.)

Lbs per Acre		I	II	III	IV	Total	Bu/A
N	P ₂ O ₅						
0	0	570	--	379	500	1449	30.20
25	40	795	--	665	730	2190	45.64
50	40	404	--	975	411	1790	37.30
100	40	555	--	685	701	1941	40.45
0	40	706	--	645	600	1951	40.66
25	80	647	--	850	885	2382	49.64
50	80	881	--	-	935	--	*56.77
100	80	865	--	699	580	2144	44.68
0	80	1190	--	686	805	2681	55.87
25	160	760	--	905	565	2230	46.47
50	160	1050	--	502	786	2338	48.72
100	160	875	--	425	555	1855	38.66
0	160	925	--	845	565	2335	48.66
25	0	1155	--	490	495	2140	44.60
50	0	1008	--	718	-	--	*53.95
100	0	700	--	175	145	1120	23.34

Analysis of Variance

Source	D. F.	Sum of Sq.	Mean of Sq.	F
Replications	2	342,707.52	171,353.76	
N.	3	259,446.95	86,482.3166	2.2850 N.S.
P.	3	356,321.00	118,773.6666	3.1382 *
N. P.	9	319,261.58	35,473.5088	
Error	28	1,059,731.86	37,847.5664	

* Ave. 2 plots only.

Table III. Off-Station Fertilizer on Barley, 1958. Doug Potts farm Flathead Co. Seeded May 8, Harvested August 21, 1958. Four row plots 18 ft. Four replications, 32 sq. ft.

N	P ₂ O ₅	I	II	III	IV	Total	Bu/A	% Pro.
0	0	300	450	325	270	1345	21.02	15.0
25	40	645	518	561	551	2275	34.08 ^{11.20} <i>make</i>	12.4
50	40	600	500	806	409	2315	36.18 ^{12.00} <i>make</i>	14.1
100	40	715	630	565	560	2470	38.61 ^{13.6} <i>leaf</i>	14.9
0	40	498	564	590	596	2248	35.14 ^{11.20} <i>make</i>	13.9
25	80	733	660	560	812	2765	34.22 ^{14.4} <i>make</i>	12.4
50	80	670	642	550	660	2522	39.42 ^{15.6} <i>leaf</i>	13.7
100	80	815	855	616	760	3046	47.61 ^{18.0} <i>leaf</i>	14.6
0	80	560	520	550	425	2055	32.12 ^{10.0} <i>make</i>	10.7
25	160	624	459	723	571	2377	37.15 ^{12.8} <i>leaf</i>	11.2
50	160	715	855	625	775	2970	46.42 ^{20.0} <i>leaf</i>	12.0
100	160	734	798	705	664	2901	45.34 ¹⁹ <i>leaf</i>	13.9
0	160	630	728	608	555	2521	39.40 ^{14.4} <i>make</i>	11.2
25	0	302	435	416	335	1488	23.26 ¹⁶⁰ <i>leaf</i>	15.5
50	0	380	405	325	325	1435	22.43 <i>leaf</i>	15.3
100	0	350	435	443	318	1546	24.16 ²⁰ <i>leaf</i>	15.5

Analysis of Variance

Source	D. F.	Sum of Sq.	Mean of Sq.	F
Replications	3	27,032.36	9,010.7867	
N.	3	104,128.73	34,709.5766	4.950 **
P.	3	995,119.11	331,706.3700	47.309 **
N. P.	9	63,382.21	7,042.4678	1.004 N.S.
Error	45	315,517.39	7,011.4976	

Table IV. Fertilizer on Winter Wheat, 1958. Gilbertson Farm. Applied in the fall at seeding time 1957. 32 sq. ft. Harvested, three replications

Treatment		Bundle Weight	Grams Per Plot			Total	Bu/A	%Pro	Lb/Bu
N	P ₂ O ₅	Av. Ozs.	I	II	III				
0	0	43.08	345	490	660	1495	24.92	9.3	62.4
0	15	42.50	612	595	425	1632	27.20	9.0	62.5
0	30	50.92	765	675	689	2129	35.48	9.0	62.1
15	0	52.75	694	635	670	1999	33.32	10.2	62.9
15	15	62.65	1005	750	785	2540	42.33	9.7	63.0
15	30	63.33	886	804	625	2315	38.58	9.5	63.4
30	0	54.50	591	736	660	1987	33.12	11.5	62.0
30	15	62.92	910	845	705	2460	41.00	10.5	62.5
30	30	64.27	990	648	845	2483	41.38	10.5	62.0
0	60	58.50	780	795	678	2253	37.35	9.3	61.2
15	60	64.42	890	865	745	2500	41.67	9.5	62.5
30	60	57.0	788	691	749	228	37.13	10.5	61.9
0	90	55.08	600	874	676	2151	35.85	10.3	63.0
15	90	59.25	768	725	880	2373	39.55	10.1	62.5
30	90	54.08	835	675	690	2200	36.67	11.0	62.6

Mean 36.38

Analysis of Variance

Source	D. F.	Sum of Sq.	Mean of Sq.	F
Replications	2	33,049.73	16,524.865	
N.	2	162,041.20	81,020.600	7.477 **
P.	4	167,516.20	41,879.050	3.865 *
N.P.	8	106,629.93	13,238.741	1.230 N.S.
Error	28	303,396.94	10,835.605	

Table V. Fertilizer on Winter Wheat, 1948. Gilbertson Farm. Nitrogen applied in Spring. 32. sq. ft. Harvested, three replications.

Treatment		Bundle Weight Av. ozs.	Grams Per Plot				Total	Bu/A	% Pro.	Lb/Bu.
N	P ₂ O ₅		I	II	III					
0	0	37.58	390	445	495	1330	22.17	10.2	63.5	
0	15	50.58	565	630	701	1896	31.60	9.9	63.4	
0	30	44.92	720	565	515	1800	30.00	8.9	63.1	
15	0	51.50	665	590	688	1943	32.38	10.0	63.4	
15	15	48.08	625	616	645	1886	31.43	9.6	62.3	
15	30	52.83	882	594	650	2126	35.43	9.4	62.3	
30	0	49.08	555	744	735	2034	33.90	9.9	62.0	
30	15	58.42	910	660	740	2310	38.50	10.2	62.5	
30	30	62.66	830	785	774	2389	39.82	10.1	63.0	
0	60	42.75	725	405	536	1666	27.77	9.3	62.9	
15	60	51.58	721	674	635	2030	33.83	9.5	63.0	
30	60	60.58	505	970	820	2295	38.25	10.0	62.8	
0	90	37.75	565	445	424	1434	23.90	9.4	63.0	
15	90	46.42	559	525	710	1794	26.50	9.0	62.2	
30	90	62.92	590	736	985	2311	38.52	9.7	63.0	

Mean 32.27

Analysis of Variance

Source	D. F.	Sum of Sq.	Mean of Sq.	F
Replication	2	15,266.80	7,633.40	
N.	2	344,208.4	172,104.20	11.735 **
P.	4	76,248.0	19,062.00	1.2998 N. S.
N.P.	8	46,645.46	5,830.683	
Error	28	410,644.54	14,665.876	

Table VI. Fertilizer on Winter Wheat 1958. Off-Station, Ravalli County, Fall application at seeding time, 32 sq. ft. harvested.

N	P ₂ O ₅	Grams Per Pound			Total	Bu/A	Lb/Bu
		I	II	III			
0	0	905	965	860	2730	45.50	60.3
0	15	875	775	1080	2730	45.50	60.0
0	30	900	644	910	2454	40.90	59.5
15	0	940	665	795	2400	40.00	58.0
15	15	920	664	700	2284	38.07	58.0
15	30	661	605	1160	2426	40.43	59.0
30	0	930	674	625	2229	37.15	57.5
30	15	1000	805	665	2470	41.17	57.9
30	30	1145	615	690	2450	40.83	59.5
0	60	885	846	875	2606	43.43	58.4
15	60	636	830	920	2386	39.80	59.5
30	60	926	720	825	2471	41.18	59.5
0	90	1365	951	815	3131	52.18	62.5
15	90	1400	920	675	2995	49.92	59.5
30	90	1195	710	860	2765	46.08	59.9

Analysis of Variance

Source	D. F.	Sum of Sq.	Mean of Sq.	F
Replication	2	376,684.00	188,342.00	
N.	2	65,768.8	32,884.4	1.041 NS
P.	4	197,149.10	49,287.275	1.561 NS
N.P.	8	42,101.43	5,262.679	
Error	28	884,084.67	31,574.453	

Table VII. Yield data from long term effort of fertilizer practices on high organic matter and low phosphate yields on Westmont Winter Wheat. Seeded September 21, 1957, harvested Aug. 7, 1958. Size of plot 300 sq. ft.

Treatment	Rate per A.	Plot Yield in Pounds per Plot				Total Pounds	Ave. Bu/A
		I	II	III	IV		
1 Check		15	20	22	21	78	47.2
2 N. on each grain crop	20#	20	22	23	23	88	53.2
3 N. & P ₂ O ₅ on each grain crop	20-40	33	20	22	30	105	63.5 *
4 Build P. level at (1956) 160# P ₂ O ₅ & maintain with 40 P ₂ O ₅ on spring grain.		26	29	28	31	114	69.0 *

* Treatments yielding significantly more than the check 5%.

Analysis of Variance

Source	D. F.	Mean Sq.	F	Mean Yield	
Replications	3	9.2293		S. E. \bar{x}	58.2
Treatment	3	66.0627	4.34 *	L. S. D. (5%)	4.7219
Error	9	15.2291		C. V.	15.1
Total	15				8.11%

H. O. O. M. 4.9
Low P₂O₅ 27

Table I Yield of Pilot Spring Wheat seeded at two rates, three fertility trials, two replications.

Fertility level	Seeding Rate 1			Seeding Rate 2			Sum for both rates
	I	II	Sum	I	II	Sum	
6" spacing							
240# P ₂ O ₅ 20 N annually	19.1	26.8	45.9	65.3	28.8	94.1	140.0
40# P ₂ O ₅ 20 N annually	55.3	69.6	124.9	59.5	75.6	135.1	260.0
Check Sum	<u>56.3</u> 130.7	<u>39.3</u> 135.7	<u>95.6</u> 266.4	<u>31.5</u> 156.3	<u>46.5</u> 150.9	<u>78.0</u> 307.2	<u>173.6</u> 573.6
12" spacing							
240# P ₂ O ₅ 20 N annually	27.0	18.3	45.3	48.0	47.0	95.0	140.3
40# P ₂ O ₅ 20 N annually	48.3	36.3	84.6	52.5	53.8	106.3	190.9
Check Sum	<u>42.8</u> 118.1	<u>34.3</u> 88.9	<u>77.1</u> 207.0	<u>56.0</u> 156.5	<u>53.8</u> 154.6	<u>109.8</u> 311.1	<u>186.9</u> 518.1
24" spacing							
240# P ₂ O ₅ 20 N. annually	32.5	22.8	55.3	52.0	53.5	105.5	160.8
40# P ₂ O ₅ 20 N annually	47.8	45.8	93.6	48.3	56.3	104.6	198.2
Check Sum	<u>33.8</u> 114.1	<u>32.8</u> 101.4	<u>66.6</u> 215.5	<u>31.4</u> 131.7	<u>30.7</u> 130.5	<u>62.1</u> 272.2	<u>128.7</u> 487.7
Sum of Three Spacing	362.9	326.0	688.9	444.5	446.0	890.5	1579.4

The variation of weight per bushel within plots was not significant.

Table II Protein data from rate, spacing, and fertility level study.
Creston, Montana, 1955.

Seeding Rate	240 P ₂ O ₅ 20 N (a)	40 P ₂ O ₅ 20 N (b)	Check (c)	Ave. for Seeding Rate
6" spacing				
30#	12.0	13.0	12.9	12.6
60#	13.0	13.3	15.6	13.9
Ave.	<u>12.5</u>	<u>13.2</u>	<u>14.3</u>	<u>13.3</u>
12" spacing				
30#	11.3	13.5	14.4	13.1
60#	13.4	13.9	14.7	14.0
Ave.	<u>12.4</u>	<u>13.7</u>	<u>14.6</u>	<u>13.6</u>
24" spacing				
30#	12.7	12.7	14.4	13.3
60#	13.6	12.8	13.7	13.4
Ave.	<u>13.2</u>	<u>12.8</u>	<u>14.1</u>	<u>13.4</u>
Ave. all Spacings	12.7	13.2	14.3	13.4

Summary of this data: Seed in 12 inch rows, 60#/A, with no fertilizer.

Table III Mean yields of two plots of each fertility land and average yields for both rates and average yields of fertility levels for all spacings.

Rate	240 P ₂ O ₅ (a)	20 N	40 P ₂ O ₅ (b)	20 N	Check (c)	Ave. for Seeding Rates
6" spacing						
30#	22.9		62.5		47.8	44.4
60#	<u>47.1</u>		<u>67.6</u>		<u>39.0</u>	<u>51.2</u>
Ave.	35.0		65.1		43.4	47.8
12 " spacing						
30#	22.7		42.3		38.6	34.5
60#	<u>47.5</u>		<u>53.2</u>		<u>54.9</u>	<u>51.9</u>
Ave	35.1		47.8		46.8	43.2
24" spacing						
30#	27.7		46.8		33.3	35.9
60#	<u>52.8</u>		<u>52.3</u>		<u>31.1</u>	<u>45.4</u>
Ave.	40.3		49.6		32.2	40.7
Average of all Spacings	36.8		54.1		40.8	43.9

Summary--Best combination 6 inch spacing, level b, at 60#/A

Fertilizers for Grain

1958 Summary

Barley

Significant increases from Phosphorous fertilizers were obtained in trials at Ronan, Lonepine, and Swan River. The three location average increase from 40 lbs. P_2O_5 was 19.1 bu.

Increases in yield due to Nitrogen were found to be significant at Swan River.

Protein content was increased over checks by use of Nitrogen at Ronan, 11.6 percent to 15.0 percent with 50 pounds N. at Swan River use of Phosphorous and N. P. combinations reduced the protein percentage below checks as much as 4 percent.

Winter Wheat

No increase in yield of significance was obtained in a fertilizer trial in Ravalli County. Check yield was 45.5 bu.

Phosphorous increase was found significant in one of two trials in the Stillwater area of Flathead County; Nitrogen increases were significant in both trials.

All fertilizers were applied in the fall in one of the Stillwater trials, Phosphate in fall and Nitrogen in spring in the other. Mean Yields and protein percentages were higher where all treatments were fall applied.

Application of 160 pounds P_2O_5 to wheat land in 1956, increased winter wheat yields from 47.2 bu. to 69.0 bu. in one Station trial.

Table 8. Long Term Pastures (1) Orchard & Ladino. First year of harvest
10 sq. ft., 5 clippings.

N	Treatment	Seasons Yield Ozs.					Total	T/A
	P ₂ O ₅	I	II	III	IV			
0	0	21.75	26.00	27.25	27.00	102.00	3.47	
50	0	26.75	27.75	40.00	31.00	125.50	4.27	
100	0	30.25	29.50	26.50	30.50	116.75	3.97	
0	40	23.25	26.25	40.50	29.00	119.00	4.05	
50	40	24.25	29.75	36.00	27.50	117.50	4.00	
100	40	28.25	36.25	31.75	25.50	121.75	4.14	
0	80	25.75	29.25	31.75	29.75	116.50	3.96	
50	80	29.25	33.75	20.00	24.00	107.00	3.64	
100	80	29.00	24.25	29.25	32.75	115.25	3.92	

Table 9 Long Term Pastures (2) Orchard & Trefoil. First year of harvest
10 sq. ft., 5 clippings.

N	Treatment	Ounces per Plot Dry					Total	T/A
	P ₂ O ₅	I	II	III	IV			
0	0	18.00	21.25	16.50	23.50	79.25	2.70	
50	0	22.50	21.00	21.25	21.25	86.25	2.93	
100	0	35.00	27.25	20.50	24.75	107.50	3.66	
0	40	24.25	11.75	20.25	23.25	79.50	2.70	
50	40	28.00	22.50	22.00	26.75	99.25	3.38	
100	40	28.75	28.50	28.00	21.25	106.50	3.62	
0	80	31.75	21.75	20.00	17.50	91.00	3.10	
50	80	29.75	24.25	13.50	25.75	93.25	3.17	
100	80	37.00	23.75	23.50	27.00	111.25	3.78	

Table 10. Long Term Pastures (3) Troy & Ladino. First year of harvest. 10 sq. ft., 5 clippings.

N	Treatment	Ounces per Plot Dry				Total	T/A
	P ₂ O ₅	I	II	III	IV		
0	0	14.00	27.50	25.75	29.25	96.50	3.28
50	0	21.75	35.25	30.50	27.00	114.50	3.90
100	0	27.75	38.50	20.50	33.00	119.75	4.07
0	40	26.50	21.50	25.75	19.75	93.50	3.18
50	40	32.25	23.50	35.00	26.50	117.25	3.99
100	40	30.75	24.75	31.50	27.25	114.25	3.89
0	80	27.25	25.00	28.75	28.75	109.75	3.73
50	80	28.75	28.75	17.75	19.75	95.00	3.23
100	80	25.50	26.00	22.75	24.75	99.00	3.37

Table 11. Long Term Pastures (4) Troy & Trefoil. First year of harvest. 10 sq. ft., 5 clippings.

N	Treatment	Ounces per Plot Dry				Total	T/A
	P ₂ O ₅	I	II	III	IV		
0	0	10.25	17.75	12.25	14.75	55.00	1.87
50	0	9.00	13.00	11.75	16.25	50.00	1.70
100	0	16.50	17.75	13.75	15.00	63.00	2.14
0	40	11.25	10.75	14.00	5.75	41.75	1.42
50	40	19.00	17.00	12.50	17.50	66.00	2.24
100	40	18.75	14.50	20.50	14.25	68.00	2.31
0	80	20.50	19.25	15.75	13.50	69.00	2.35
50	80	18.75	20.00	12.00	11.25	62.00	2.11
100	80	25.75	13.50	14.50	14.25	68.00	2.31

Table 8. Long Term Pastures (1) Orchard & Ladino

ANALYSIS OF VARIANCE				
<u>Source*</u>	<u>D.F.</u>	<u>Sum of Sq.</u>	<u>Mean Square</u>	<u>F</u>
R	3	111.9358	37.311933	
A	2	12.0660	6.033000	N.S.
AR	6	85.6423	14.273717	
B	2	16.8472	8.423600	N.S.
AB	4	74.1111	18.527775	N.S.
BR	6	139.6528	23.275467	
ABR	12	274.3472	22.862267	
	18	414.0000	23.000000	
Total	35	714.5024	(60000-Idx.)	
Error	24	499.6423	20.818429	

* "R" denotes replications
 "A" denotes "N"
 "B" denotes "P205"

Table 9. Long Term Pastures (2) Orchard & Trefoil

ANALYSIS OF VARIANCE				
<u>Source*</u>	<u>D.F.</u>	<u>Sum of Sq.</u>	<u>Mean Square</u>	<u>F.</u>
R	3	293.7274	97.909133	
A	2	241.7639	120.881950	7.376
AR	6	61.8195	10.303250	
B	2	21.1493	10.574650	N.S.
AB	4	25.6840	6.421000	N.S.
BR	6	121.6007	20.266783	
ABR	12	209.8993	17.491608	
	18	331.5000	18.416667	
Total	35	975.6441	(60000-Idx.)	
Error	24	393.3195	16.388312	

* "R" denotes replications
 "A" denotes "N"
 "B" denotes "P205"

Table 10. Long Term Pastures (3) Troy & Ladino

ANALYSIS OF VARIANCE

<u>Source*</u>	<u>D.F.</u>	<u>Sum of Sq.</u>	<u>Mean Square</u>	<u>F</u>
R	3	18.3125	6.104167	
A	2	52.0451	26.022550	N.S.
AR	6	84.7188	14.119800	
B	2	33.7118	16.855900	N.S.
AB	4	135.0278	33.756950	1.227 N.S.
BR	6	404.9688	67.494800	
ABR	12	170.6249	14.218742	
	18	575.5937	31.977428	
Total	35	899.4097	(60000-Idx)	
Error	24	660.3125	27.513021	

* "R" denotes replications
 "A" denotes "N"
 "B" denotes "P₂O₅"

Table 11. Long Term Pastures (4) Troy and Trefoil

ANALYSIS OF VARIANCE

<u>Source*</u>	<u>D.F.</u>	<u>Sum of Sq.</u>	<u>Mean Square</u>	<u>F</u>
R	3	56.4635	18.821167	1.924 N.S.
A	2	47.1285	23.564250	
AR	6	70.8854	11.814233	
B	2	43.3785	21.689250	1.771 N.S.
AB	4	88.2986	22.074650	1.802 N.S.
BR	6	147.2188	24.369800	
ABR	12	76.8541	6.404508	
	18	223.0729	12.392939	
Total	35	529.2274	60000	
Error	24	293.9583	12.248262	

* "R" denotes replications
 "A" denotes "N"
 "B" denotes "P₂O₅"

Table 12. Long Term Pastures, four mixtures, nine fertilizer treatments, first year of harvest.

Treatment		T/A				Total	Ave.* T/A
N	P ₂ O ₅	1	2	3	4		
0	0	3.47	2.70	3.28	1.87	11.32	2.83
50	0	4.27	2.93	3.90	1.70	12.80	3.20
100	0	3.97	3.66	4.07	2.14	13.84	3.46
0	40	4.05	2.70	3.18	1.42	11.35	2.84
50	40	4.00	3.38	3.99	2.24	13.61	3.40
100	40	4.14	3.62	3.89	2.31	13.96	3.49
0	80	3.96	3.10	3.73	2.35	13.14	3.28
50	80	3.64	3.17	3.23	2.11	12.15	3.04
100	80	3.92	3.78	3.37	2.31	13.38	3.34
<i>Mixture</i> Moisture Ave.		3.70 _x	3.23 _x	3.63	2.05		

*T/A four plot Ave. for Season for four pasture mixtures treatment.

Table 13. Fertilizer on Native Hay, 1958, 60 sq. ft. Harvested August 6.
Treatments made 8/30/56. Pounds per plot.

Tr.	N	K	No P ₂ O ₅	160 P ₂ O ₅	Total	T/A	2 Yr. Ave.		
0	33	0	3.65	4.87	5.48	4.26	18.26	1.66	2.64
0	66	0	6.32	5.48	5.48	5.48	22.76	2.06	2.78
0	99	0	5.48	5.75	4.87	6.32	22.42	2.03	2.81
0	198	0	7.47	5.75	6.32	4.26	23.80	2.16	3.19
0	297	0	8.05	5.48	5.48	4.26	23.27	2.11	3.29
0	396	0	8.05	5.75	6.90	4.87	25.57	2.32	3.72
0	495	0	8.05	4.87	5.48	5.75	24.15	2.19	3.39
0	0	0	5.75	5.48	5.75	4.87	21.85	1.98	2.61
X	0	0	5.48	4.26	4.87	miss		*1.77	^{1.57} 3.13
0	0	60	5.75	8.05	6.32	5.48	25.60	2.32	2.81
X	99	0	5.75	5.75	5.48	3.65	20.63	1.87	2.73
X	99	60	7.47	4.87	6.32	6.32	24.98	2.27	3.21
0	99	60	8.05	5.75	6.32	5.48	25.60	2.32	3.01

* Ave. 3 Plots only

Tr. Trace minerals applied with Es-Min-El.

Table 14. Fertilizers on Bromegrass, 1958. N. W. Branch Station.
High Organic Matter, Low Phos. Soil. Second Harvest year.
60 sq. ft. Cut 7/8/58.

N	P ₂ O ₅	Pounds per plot				Total	T/A	2 Yr. Ave.
		I	II	III	IV			
0	0	5.95	6.38	7.65	6.80	26.78	2.43	2.62
50	40	4.61	7.12	7.96	7.12	26.81	2.43	2.79
100	40	3.74	8.73	9.56	6.23	28.26	2.56	2.77
200	40	4.74	6.47	9.06	9.49	29.76	2.70	3.13
0	40	5.77	9.32	8.43	7.54	31.06	2.82	2.60
50	80	7.25	7.70	9.97	9.52	34.44	3.12	3.28
100	80	5.77	7.99	9.32	7.54	30.62	2.78	3.27
200	80	5.77	8.88	9.76	7.99	32.40	2.94	3.15
0	80	5.40	9.45	9.45	9.90	34.20	3.10	3.40
50	160	5.33	8.43	8.88	7.99	30.63	2.78	2.58
100	160	6.21	9.76	9.32	8.88	34.17	3.10	3.54
200	160	6.30	9.90	8.10	9.00	33.30	3.02	3.37
0	160	6.30	10.80	9.00	7.65	33.75	3.06	3.26
50	0	6.21	6.21	7.99	7.10	27.51	2.50	3.01
100	0	6.47	6.04	6.90	7.76	27.17	2.46	2.66
200	0	7.88	6.56	8.31	7.87	30.62	2.78	2.77

Table 15. Fertilizer on Bromegrass. Lake Co. 1958. One Cutting July 10, 60 sq. ft., 2nd harvest year. (Lulew).

N	P ₂ O ₅	Lbs. per Plot				Total	T/A	2 Yr. Ave.
		I	II	III	IV			
0	0	4.67	7.65	7.65	6.37	26.34	2.39	2.04
50	40	4.88	8.44	9.32	5.77	29.41	2.67	2.28
100	40	5.77	8.44	9.77	4.44	28.42	2.58	2.61
200	40	6.66	7.55	5.77	7.10	28.08	2.46	2.96
0	40	5.95	6.35	6.75	3.18	22.23	2.02	1.82
50	80	5.24	6.99	7.43	6.55	26.21	2.38	2.18
100	80	6.90	7.33	5.17	5.17	24.57	2.23	2.30
200	80	8.39	8.85	8.39	7.46	33.09	3.00	3.33
0	80	9.48	8.19	6.03	4.31	28.01	2.54	2.61
50	160	9.00	7.20	9.00	5.85	31.05	2.82	2.70
100	160	8.88	6.66	7.55	6.66	29.75	2.70	2.83
200	160	9.14	5.77	8.18	7.21	30.30	2.75	3.01
0	160	7.54	8.38	9.22	4.19	29.33	2.66	2.49
50	0	9.48	6.18	8.24	5.36	29.26	2.65	2.47
100	0	8.44	8.44	7.55	6.22	30.65	2.78	2.95
200	0	7.55	5.33	8.88	6.66	28.42	2.58	2.87

Table 16. Fertilizers on Fescue Seed, 1958. 16 ft. of 40 in. row or 52.28 sq. ft.

N	P ₂ O ₅	Seed in				Total	Lb/A
		I	II	III	IV		
0	0	164	193	120	152	629 157	283.4
33	0	168	134	122	85	509 127	229.3
66	0	158	163	139	128	588 147	264.9
99	0	172	172	175	236	755 189	340.2
0	80	160	167	143	161	631 158	284.3
33	80	161	195	158	127	641 160	288.8
66	80	215	178	178	220	791 198	356.4
99	80	162	214	173	143	692 173	311.8
0	160	200	245	198	197	840 210 +	378.5
33	160	375	245	323	248	1191 298 +	536.7
66	160	373	289	380	222	1264 316 +	569.5
99	160	300	288	363	292	1243 310 +	560.0

Table 17. Fertilizers on Fescue Seed, 1958. 16 ft. of 40 in. rows or 53.28 sq. ft.

N	P ₂ O ₅	I	II	III	IV	Total Pounds	T/A
		Bundle weight in Lbs. Per Plot before threshing					
0	0	5	5	3	4	17	1.74
33	0	3	4	5	3	15	<u>1.53</u>
66	0	4	5	3	4	16	1.60
99	0	5	6	4	8	23	2.35
0	80	6	5	6	5	22	2.25
33	80	6	6	6	5	23	<u>2.35</u>
66	80	7	6	5	8	26	2.65
99	80	6	5	6	6	23	2.35
0	160	7	8	6	7	28	2.86
33	160	11	10	10	10	41	<u>4.19</u>
66	160	10	13	11	13	47	4.80
99	160	14	14	15	11	54	5.51

Table 18. Fertilizer on Kenland Clover, N. W. Branch Station, 1958.
60 sq. ft. 2 cuttings, Fertilizer applied prior to seeding in
1956, Irrigated.

N	P ₂ O ₅	No Gypsum		Gypsum		Total	T/A
0	0	6.66	11.83	8.36	13.31	40.16 <i>10.04</i>	3.64
10	80	10.44	12.21	10.88	8.99	42.52 <i>10.63</i>	3.86
20	80	12.13	11.69	11.25	9.59	44.66 <i>11.17</i>	4.05
40	80	12.34	11.25	11.70	9.47	44.76 <i>11.20</i>	4.06
0	80	12.58	9.28	10.08	11.63	43.57 <i>10.89</i>	3.95
10	160	11.69	11.47	10.35	12.85	46.36 <i>11.60</i>	4.21
20	160	14.89	12.41	12.65	13.63	53.58 <i>13.40</i>	4.86
40	160	12.28	13.28	9.86	11.78	47.20 <i>11.80</i>	4.28
0	160	13.56	11.37	12.83	11.10	48.86 <i>12.21</i>	4.43
10	0	10.25	9.96	8.60	7.45	36.26 <i>9.07</i>	3.29
20	0	8.78	10.51	7.93	10.16	37.38 <i>9.35</i>	3.39
40	0	8.88	7.41	9.63	11.11	37.03 <i>9.26</i>	3.36

Table 19. Fertilizer on Kenland Clover, Lake Co. 1958. Two cuttings, 60 sq. ft. Fertilizer applied prior to seeding 1956. 300 #/A Gypsum (Lulow)

N	P ₂ O ₅	Pounds per Plot				Total	T/A	2 Yr. Ave.	
		I	II	III	IV				
0	0	10.84	10.84	9.57	5.87	37.12	3.37	3.90	
10	80	13.03	9.64	13.85	9.78	46.30	4.20	3.72	
20	80	9.99	7.68	12.50	11.29	41.46	3.76	3.60	
40	80	10.72	11.00	12.22	5.63	39.57	3.59	3.66	
0	80	11.85	11.99	14.81	11.63	50.28	4.56	4.16	
10	160	11.62	8.14	12.41	12.55	44.72	4.06	4.13	
20	160	12.17	10.63	12.10	8.38	43.28	3.93	3.85	
40	160	9.12	9.42	9.42	7.71	35.67	3.24	3.59	
0	160	8.67	6.80	15.84	7.79	39.10	3.55	3.57	
10	0	9.58	10.08	14.40	6.04	40.10	3.64	3.48	
20	0	9.27	8.63	16.00	7.59	41.49	3.76	3.57	
40	0	9.99	14.24	14.69	7.04	45.96	4.16	3.66	
							Mean	3.74	

Table 20. Fertilizer on Kenland Clover, Lake Co., 1958. (Lulow) No Gypsum
60 sq. ft. Two cuttings, Fertilizer applied prior to seeding
in 1956.

N	P ₂ O ₅	I	Pounds per Plot			Total	T/A	2 Yr. Ave.
			II	III	IV			
0	0	8.29	11.06	13.96	12.59	45.90	4.16	3.59
10	80	8.21	11.13	11.53	15.56	46.43	4.21	3.80
20	80	7.63	12.56	13.77	10.94	44.90	4.07	3.63
40	80	7.27	10.54	13.36	13.13	44.30	4.02	3.59
0	80	8.63	11.36	13.13	16.48	49.60	4.50	3.91
10	160	6.82	15.13	15.73	10.75	48.43	4.39	3.85
20	160	7.30	9.97	11.31	9.96	38.54	3.50	3.46
40	160	8.15	11.35	17.46	14.49	51.45	4.67	3.86
0	160	9.43	13.46	12.58	8.94	44.41	4.03	3.61
10	0	8.37	9.49	12.42	8.37	38.65	3.51	3.38
20	0	7.68	13.73	12.14	7.48	41.03	3.72	3.30
40	0	8.90	9.19	11.36	9.08	38.53	3.50	3.69
							Mean	3.64

Fertilizers for Forages

1958 Summary

This is the first harvest year for nine fertilizer treatments on four pasture mixtures. The plot area is very fertile, on one of the best sites on the Station. Analysis prior to seeding, showed no lack of phosphorous, and above five percent organic content. Even so, four mixture averages indicate slight increase from 80 lbs. P_2O_5 , and from 50 and 100 lbs. of Nitrogen.

Carryover effect of fertilizers applied to Native Hay in the fall of '56 were slight when compared to effect on the '57 crop. This meadow is wet most of the year and doubtless some leaching of soluble materials occurred.

Lincoln Bromegrass appears to have been a poor choice of variety for fertilizer trials on grass, since in no case has a second crop materialized. One cutting, 2 year, 2 location averages show a .66 T/A increase from 80 lbs. of P_2O_5 , which is greater than that received from 200 lbs. N.

Phosphorous fertilizer helped grass seed yields materially on the Station when used on Aota Fescue; more yet when Nitrogen was used in addition to Phosphate. Plots receiving 160 lb. P_2O_5 prior to seeding in 1956, plus 66 lbs. N. in '57 and '58 produced 286 lbs. more seed per acre than Checks. Bundles when cut for seed were 3 Tons per acre heavier than checks.

Clover hay responded with additional yield to 80 lbs. P_2O_5 at Creston and Polson. At Creston the Response to 160 lbs. P_2O_5 was greater than from 80 lbs. An attempt to measure response of clover seed to fertilizer treatments on 5 by 16 ft. plots failed. Plot yields obtained were too erratic to be of value.

Mean 2 yr. yields of Clover plots treated with 300 lbs. per acre of Gypsum at Polson were .10 Ton more plots with no Gypsum, much too little to be of definite value.

Forages

All work with forages, annual or perennial, is included in this project. For convenience in this report the material presented is grouped in what appears to be a logical manner under Perennials and Annuals as shown in the Table of Contents.

Perennials

Varieties of Alfalfa, Bluegrass, Orchardgrass, and Wheatgrasses have been harvested this year, and varieties of Bromegrass and Fescue seeded. A species study was seeded in a Native Meadow. A "Type" study of alfalfa made.

Mixtures containing grasses and legumes for hay have been harvested, others seeded.

Seeding rate and spacing studies have been harvested, and study made of harvest methods.

Annuals

Work with annual forages included a study of millets, sudan grass, and oats. Also considerable work has been done with silage corn varieties and populations.

The approved 1958-59 budget for this work as \$4,325.00.

Table 1. Dryland Creeping Alfalfa, 1958. First cut only.
60 sq. ft. Seeded 1952. Reps 1 & 2 Alfalfa alone,
Reps 3 & 4 with crested.

Variety	I	II	III	IV	Total	T/A
Nomad	4.06	5.94	5.00	5.31	20.31	1.84
Rhizoma	3.60	4.80	4.80	6.00	19.20	1.74
Ladak	4.41	3.23	4.70	4.99	17.33	1.57
Selelra	4.50	4.80	6.00	5.40	20.70	1.88
A-224	5.10	4.78	5.10	5.10	20.08	1.82
Ranger	4.05	6.07	4.39	7.09	21.60	1.96
637-G37	4.73	4.73	5.36	6.00	20.82	1.89
Buffalo	3.47	4.42	4.10	5.36	17.35	1.57
A-169	3.90	5.85	5.85	5.52	21.12	1.92

Table 2 IntraState Irrigated Alfalfa, 1958. First harvest year.
60 sq. ft. harvested. Two cuttings.

Variety	I	II	III	IV	Total	T/A
Lahontan	12.50	15.05	15.40	15.45	58.40	5.30
Ranger	15.94	17.85	16.36	17.85	^{68.00} 67.80	6.15 (5)
Vernal	15.84	16.51	16.34	17.61	66.30	6.02 (7)
Wilt Res Ladak	16.65	16.92	17.90	17.50	68.97	6.26 (4)
Ladak	15.07	16.51	16.31	16.57	64.46	5.85
Sevelra	16.97	17.78	16.31	16.54	67.60	6.13 (6)
Rhizoma	17.50	18.92	18.12	18.50	73.04	6.63 (9)
Rambler	11.96	16.37	14.01	12.24	54.58	4.95
Du Ruitts	16.12	18.24	18.04	19.15	71.55	6.49 (2)
Grim	16.06	17.54	18.41	17.12	69.13	6.27 (3)

Note: Analysis of single samples indicates a variation of
3.97 protein and .06% of Phosphorous in these varieties.
This will be checked further.

6.27

Table 3. Orchard Grasses, nine varieties, Irr. Two cuttings
2nd year of harvest, 60 sq. ft.

Variety	June 1, Maturity	Alone			Mean 3.84 T		
		Pounds per Plot			Total	T/A	% Pro.
		I	II	III			
Potomac	Headed	9.69	8.71	7.51	25.91	3.13	7.9
P-2453	Heads Showing	12.41	10.76	8.25	31.42	3.80	7.2
Akaroa	Headed	11.44	12.80	9.44	33.68	4.07	6.5
Cornell Syn. 2F	Heads Showing	11.60	10.80	7.60	30.00	3.63	6.5
Iowa No. 6	Headed	14.00	12.26	10.29	36.55	4.42	6.5
Trogdon	Headed	11.94	11.23	9.23	32.40	3.92	8.3
Commercial	Headed	12.66	12.42	8.98	34.06	4.12	6.3
Utah Syn. #2	Headed	11.09	10.75	7.81	29.65	3.59	6.5
Iowa No. 1	Headed	11.00	10.94	9.88	31.82	3.85	7.1
		With Alfalfa			Mean 5.51 T		
Potomac		13.93	14.10	15.94	43.97	5.32	
P-2453		14.14	14.91	16.50	45.55	5.51	
Akaroa		13.83	14.75	16.19	44.77	5.42	
Cornell Syn. 2F		14.34	13.98	15.38	43.70	5.29	
Iowa #6		16.25	14.73	16.95	47.93	5.80	
Tragdon		16.00	14.40	14.70	45.10	5.46	
Commercial		14.11	14.98	14.38	43.47	5.26	
Utah Syn. #2		14.06	15.25	17.44	46.75	5.66	
Iowa #1		15.60	16.00	17.10	48.70	5.89	

Table 4. Wheatgrasses for Hay. Irr. First year harvested, two cuttings, 60 sq. ft.

Variety or Mix with Alfalfa	Pounds per Plot			Total	T/A	% Pro.
	I	II	III			
Nordan Crested <i>a</i>	8.05	5.57	6.29	19.91 ^{6.63}	2.41	9.4
Intermediate <i>b</i>	7.62	7.33	8.03	22.98 ^{7.66}	2.78	9.8
Pubescent <i>c</i>	9.18	6.94	8.18	24.30 ^{8.16}	2.94	7.7
Tall Wheat Grass <i>d</i>	7.34	9.53	9.29	26.16 ^{8.12}	3.16	7.2
Western <i>e</i>	3.83	5.61	6.64	16.08 ^{5.36}	1.94	7.7
Orchard (check) <i>f</i>	7.03	10.26	7.64	24.93 ^{8.31}	3.02	8.6
Nordan & Alfalfa <i>a₁</i>	18.54	16.12	15.44	50.10 ^{16.70}	6.06	
Interm & Alfalfa <i>b₁</i>	19.00	16.35	13.53	48.88 ^{16.30}	5.91	
Pubese & Alf. <i>c₁</i>	17.84	14.92	13.31	46.07 ^{15.36}	5.57	
Tall Wheat & Alf <i>d₁</i>	18.63	19.07	15.70	53.40 ^{17.80}	6.46	
Western Wheat & Alf. <i>e₁</i>	15.21	15.33	12.01	42.55 ^{14.18}	5.15	
Orchard & Alf. <i>f₁</i>	15.45	14.40	13.43	43.28 ^{14.42}	5.24	

5 Wheatgrasses

Table 5. Grasses with Alfalfa for Hay, 1958. FFA Farm, First cut only
60 sq. ft.

Variety	Lbs. Per Plot			Total	T/A
Intermediate	3.16	5.05	4.42	12.63	1.53
Nordan Crested	3.47	4.51	3.47	11.45	1.38
Standard Crested	4.16	4.16	4.86	13.18	1.59
Pubescent Wheat	3.90	4.20	5.10	13.20	1.60
Tall Wheatg.	3.08	4.10	3.84	11.02 11.02	1.33
Manchar Brome	4.72	3.04	5.40	13.16	1.59
Slender Wheat	4.14	4.46	4.46	13.06	1.58
Reed Canary	3.16	3.79	3.47	10.42	1.26
Potomac Orchard	2.67	3.26	3.56	9.49	1.15
Sherman Big Blue	3.75	3.75	4.87	12.37	1.50
Tall Oat	2.65	3.97	2.65	9.27	1.12
Meadow Foxtail	1.95	4.80	3.60	10.35 10.25	1.25
Meadow Foxtail	1.54	5.12	4.87	11.53	1.39
Creep Meadow Foxtail	2.49	3.92	7.84	14.25	1.72
Alta Fescue	3.01	5.35	4.68	13.04	1.58
Troy Blue	2.75	4.75	2.50	10.00	1.21
Lincoln Brome	4.50	3.00	3.37	10.87	1.31
Hopkins Timothy	3.02	5.22	5.22	13.46	1.63

Field conditions where this trial is located are very spotty. Variation between plots in extreme. Alkalinity obviously interferes with moisture penetration, and while some plots appear to be drowning out others obviously have too little moisture for growth. No second cutting was taken because of variations greater than for the first cutting.

Table 6. Dryland Legumes, Station, 1958. 60 sq. ft. 2 Cuttings when growth justified, 6/18 and 8/5, Second harvest year.

Cuts	Variety & Seed Rate	I	II	III	Total	T/A	2 Yr. Ave.
2	Rambler 3#, Crested 6#	11.63	7.28	6.02	24.93	3.02	2.69
2	Ladak 3#, Crested 6#	12.01	7.03	5.16	24.20	2.93	2.86
3	Wilt Res. Ludak 3#, Crested 6#	13.13	7.71	8.35	29.19	3.53	3.23
1	Cicer 8#, Crested 6#	9.37	5.47	5.86	20.70	2.50	2.52
1	Sickle 8#, Crested 6#	8.53	3.66	6.09	18.28	2.21	2.20
1	Crested 6#	5.95	7.35	4.90	18.20	2.20	2.25
2	Rambler 3#	7.26	7.89	4.37	19.52	2.36	2.40
2	Ladak 3#	3.58	7.29	8.58	19.45	2.35	2.24
2	Wilt. Res. Ladak 3#	4.18	7.34	3.67	15.19	1.84	1.99
1	Cicer 8#	1.97	6.97	2.42	11.36	1.37	1.30
1	Sickle 8#	1.47	3.82	2.35	7.64	.92	1.05

Table 7. Seeding Rate and Spacing for Alfalfa, 1958. Seeded in 1954, Split plot, 3 reps. Irrigated, 2 cuttings, 60 sq. ft. harvested.

Spacing		<u>Rate 1</u>			Total	T/A
		1	2	3		
6	1	5.42	13.71	11.47	46.70	5.65
	2	<u>3.50</u> 8.92	<u>6.30</u> 20.01	<u>6.30</u> 17.77		
12	1	6.12	7.51	9.18	40.51	4.90
	2	<u>5.00</u> 11.12	<u>7.20</u> 14.71	<u>5.50</u> 14.68		
24	1	6.82	8.66	7.09	37.07	4.48
	2	<u>4.00</u> 10.82	<u>6.50</u> 15.16	<u>4.00</u> 11.09		
<u>Rate 2</u>						
6	1	4.78	12.43	7.65	40.56	4.91
	2	<u>4.50</u> 9.28	<u>7.20</u> 19.63	<u>4.00</u> 11.65		
12	1	7.51	10.01	8.06	42.88	5.19
	2	<u>6.00</u> 13.51	<u>6.30</u> 16.31	<u>5.00</u> 13.06		
24	1	7.88	9.98	7.35	42.81	5.18
	2	<u>6.30</u> 14.18	<u>6.30</u> 16.28	<u>5.00</u> 12.35		

Table 8. Seeding Rate and Spacings for Alfalfa-Brome, 1958. Seeded 1954, Split plot, 3 reps, Irrigated, 2 cuttings, 60 sq. ft. harvested

		Rate 1				
Spacing		1	2	3	Total	T/A
6	1	6.56	6.30	7.35	34.21	4.14
	2	<u>4.00</u>	<u>5.00</u>	<u>5.00</u>		
		10.56	11.30	12.35		
12	1	6.99	5.91	7.79	33.19	4.01
	2	<u>4.00</u>	<u>4.00</u>	<u>4.50</u>		
		10.99	9.91	12.29		
24	1	7.72	7.72	7.12	36.96	4.47
	2	<u>4.00</u>	<u>5.40</u>	<u>4.00</u>		
		11.72	13.12	12.12		
		Rate 2				
6	1	5.77	6.56	9.71	37.34	4.52
	2	<u>5.00</u>	<u>4.00</u>	<u>6.30</u>		
		10.77	10.56	16.01		
12	1	5.11	6.18	9.14	33.83	4.09
	2	<u>4.00</u>	<u>4.00</u>	<u>5.40</u>		
		9.11	10.18	14.54		
24	1	6.53	7.12	8.61	35.76	4.33
	2	<u>5.00</u>	<u>4.00</u>	<u>4.50</u>		
		11.53	11.12	13.11		

Table 9. Seeding Rate & Spacing Alfalfa-Orchard, 1958. Seeded 1954.
Split plot, 3 reps., irrigated, 2 cuttings, 60 sq. ft. harvested.

		Rate 1			Total	T/A
Spacing		1	2	3		
6	1	7.65	4.72	5.62	30.99	3.75
	2	<u>5.00</u> 12.65	<u>4.00</u> 8.72	<u>4.00</u> 9.62		
12	1	7.52	5.64	8.60	35.26	4.27
	2	<u>5.00</u> 12.52	<u>3.50</u> 9.14	<u>5.00</u> 13.60		
24	1	9.45	6.30	5.25	34.00	4.11
	2	<u>5.00</u> 14.45	<u>4.00</u> 10.30	<u>4.00</u> 9.25		
		Rate 2				
6	1	5.85	6.30	7.87	35.02 34.92	4.22
	2	<u>5.50</u> 11.35	<u>4.50</u> 10.80	<u>5.00</u> 12.87		
12	1	6.45	6.45	8.60	35.00	4.23
	2	<u>5.00</u> 11.45	<u>3.50</u> 9.95	<u>5.00</u> 13.60		
24	1	7.09	7.09	7.61	36.69	4.44
	2	<u>5.50</u> 12.59	<u>4.00</u> 11.09	<u>5.40</u> 13.01		

Table 10. Row Spacings & Seeding Rates, 1958. Four years. Three Mixtures, three spacings, two rates.

Spacing Rate		1955	1956	1957	1958	Total	4 Yr. Ave.
Alfalfa							
6	1	5.53	4.42	5.98	5.65	21.58	5.39
6	2	5.66	4.27	5.63	4.91	20.47	5.12
12	1	5.37	4.27	5.95	4.90	20.49	5.12
12	2	4.62	4.42	6.05	5.19	20.28	5.07
24	1	4.15	4.20	5.89	4.48	18.72	4.68
24	2	4.19	4.20	6.11	5.18	19.68	4.92
Alfalfa-Brome							
6	1	5.98	5.25	5.35	4.14	20.72	5.18
6	2	6.23	4.97	5.93	4.52	21.65	5.41
12	1	6.34	5.16	4.91	4.01	20.42	5.10
12	2	6.92	5.22	4.95	4.09	21.18	5.29
24	1	6.25	5.54	5.38	4.47	21.64	5.41
24	2	5.98	5.12	5.97	4.33	21.40	5.35
Alfalfa-Orchard							
6	1	5.16	5.40	5.61	3.75	19.92	4.98
6	2	5.33	5.17	6.19	4.22	20.91	5.23
12	1	5.89	5.63	6.02	4.27	21.81	5.45
12	2	5.92	5.21	6.57	4.23	21.93	5.48
24	1	5.68	5.07	5.88	4.11	20.74	5.13
24	2	6.08	5.12	6.29	4.44	21.93	5.48

Table 11. Seeding Rates & Methods for Hay, 1958. Irrigated, two cuttings
60 sq. ft. Harvested. First Harvest Year.

Lbs/A	Method	I	II	III	IV	Total	T/A
2	1 ft. rows	15.07	14.42	12.75	15.07	57.31	5.20
2	2 ft. rows	12.62	10.44	9.02	13.70	45.78	4.15
2	Broadcast	14.55	12.43	14.34	15.18	56.50	5.13
4	1 ft. rows	16.32	14.23	12.96	15.28	58.79	5.33
4	2 ft. rows	15.36	15.98	12.73	13.58	57.65	5.23
4	Broadcast	14.87	16.15	16.15	16.79	63.96	5.80
6	1 ft. rows	14.45	17.05	17.10	13.20	61.80	5.61
6	2 ft. rows	13.54	13.35	12.66	16.44	55.99	5.08
6	Broadcast	14.10	11.41	18.27	16.43	60.21	5.46
8	1 ft. rows	13.89	17.53	16.25	15.83	63.50	5.76
8	2 ft. rows	13.93	17.09	18.55	16.55	66.12	6.00
8	Broadcast	9.25	18.25	19.50	19.10	65.10 66.10	5.91

Method	Ton per Acre by Rates				Total	By Method Ave. T/A
	2 lbs. Per A	4 lbs. Per A	6 lbs. Per A	8 lbs. Per A		
1 ft. rows	5.20	5.33	5.61	5.76	21.90	5.47
2 ft. rows	4.15	5.23	5.08	6.00	29.46	5.11
Broadcast	5.13	5.80	5.46	5.91	22.30	5.57
2 lbs/A	5.20	4.15	5.13		14.48	4.83
4 lbs/A	5.33	5.23	5.80		16.36	5.45
6 lbs/A	5.61	5.08	5.46		16.15	5.38
8 lbs/A	5.76	6.00	5.91		17.67	5.89

Table 12. Preliminary Hay Harvest Methods. Irrigated.
60 sq. ft. Harvested.

Method 1. Clip early May. Cut 7/5 and 8/25.
Method 2. Three cuts, aprox. 6/10, 7/20, and 8/30
Method 3. Two cuts. 7/5 and 8/25.

Method	Lbs per plot 2 cuts				Total	T/A	% Pro.		% Phos.	
	1	2	3	4			1	2	1	2
Reps.										
1	8.73	12.63	11.87	11.30	44.53	4.04	14.9	16.8	.16	.15
2	12.38	12.70	10.57	13.33	48.98	4.44	13.5	14.1	.15	.14
3	14.31	10.98	12.14	13.51	50.94	4.62	14.0	14.3	.15	.14

Results of analysis of single samples do not reflect expected decline due to over maturity so may not be reliable.

Table 13. Preliminary Hay Harvest Methods. Dryland.
60 sq. ft. Harvested.

Method 1. First cut early June, Second when ready.
Method 2. Cut at early bloom stage
Method 3. Cut July 5 and Second when ready.

Method	Lbs per Plot				Total	T/A	% Pro.		% Phos.	
	1	2	3	4			1	2	1	2
Reps.										
1	11.25	7.95	9.27	7.68	36.15	3.28	15.0	17.2	.19	.22
2	10.11	9.52	8.93	8.45	37.01	3.36	19.2	16.8	.18	.24
3	10.08	11.65	10.70	11.65	44.08	4.00	14.8	17.1	.22	.25

In this trial total protein harvested was greatest when cut neither too early nor too late.

Report on Use of Vermer Krusher-Krimper

Alfalfa hay when cut had 76.25% moisture. Crimping was done immediately after cutting. .15 inches of rain fell shortly after crimping, and .09 inches fell during the night following crimping.

Moisture Content of Hay:	Crimped	Not Crimped
8 hrs. after cut	76.88	74.06
32 hrs. after cut	50.00	58.75
56 hrs. after cut	25.94	36.88

In this case crimped hay was dry enough to bale the evening of the second day after cutting, non-crimped hay one day later.

Report on Bluegrass 1958

Seed was Harvested again this season from 12 fr. of 2 ft. row, and grass weight taken of green leaves and dry seed stems.

Cereal No.	Type	Green T/A	Suggested Use	Cereal No.	Type	Green T/A	Suggested Use
P-13819	M. Sod.	4.36	Pasture	P-15397	M. Sod	2.78	
P-18327	L. Sod	3.46		13783-301	H. Sod	3.35	Lawn
13838-513	M. Sod	4.31	Pasture	13833-211	H. Sod	4.26	Lawn
4729-11	M. Sod	4.42	Hay	P-13946	M. Sod	3.35	
P-14093	M. Sod	3.51		P-13824	L. Sod	3.28	
P-15391	M. Sod	4.94	Pasture	4808-523	H. Sod	3.86	Lawn
P-11040	M. Sod	2.32		4694-8	H. Sod.	2.10	
P-13818	H. Sod	3.74	Lawn	P-13791	Bunch	2.72	
P-15396	M. Sod	6.52*		13948-204	L. Sod	3.06	
14095-803	M. Sod	5.50	Hay	5971-208	H. Sod	2.44	Lawn
13949-308	M. Sod	5.78	Pasture	13775-212	M. Sod	3.57	
P-15395	M. Sod	4.99	Pasture	P-14094	H. Sod	3.57	
13703-208	M. Sod	5.78	Hay	13783-507	H. Sod	3.80	
4249-1P-3128	H. Sod	3.35		P-8093	Bunch	3.80	Hay
13783-29	M. Sod	3.57		P-15398	L. Sod	2.67	
P-13821	H. Sod	4.14	Lawn	13775-202	H. Sod	2.95	Lawn
13838-305	M. Sod	4.71	Pasture	5971-408	M. Sod	3.35	
13783-33	L. Sod	4.94	Pasture	13949-410	L. Sod	3.80	Pasture or Hay
P-846	Bunch	3.96	Pasture	13775-211	M. Sod	3.86	
P-14093L-468	M. Sod	4.36	Pasture	13802-409	H. Sod	4.14	Lawn
P-5731	Bunch	3.23	Hay	4260-1P-410	M. Sod	2.95	

* Mostly quack and vol. clover.

Report on "True to Type" study of Montana Alfalfa Seed Lots, 1958.

Single row plots of each lot were seeded April 28, 1958. Rows 24 ft. long, 2 ft. between rows, 3 lots received late were given a number and seeded May 5. Seedlings were sprinkler irrigated and cultivated. When cut August 20, they were past full bloom and setting seed.

The main purpose of the study was to determine the percentage of tall, off-type, fall regrowth, said in a Minnesota study to be non-hardy.

Readings were taken October 7, with the help of Art Shaw, Extension Agronomist. These readings are considered accurate so far as percent of off-type plants are concerned. Plantings will be left over winter to determine whether or not winter killing occurs at this location.

Montana Summary of All Lots Received

<u>Number</u>	<u>Variety</u>	<u>Variation</u>	<u>Ave. %</u>
28	Grimm	5% to 88%	31.03
23	Ladak	0 - 80%	13.30
13	Ranger	20 - 80%	44.54
6	Vernal	15 - 48	30.00
3	Cossack	10 - 50	33.33
13	No Name Given	3 - 100	35.69
4	919	24 - 36	32.75

Summary of 1958 Work with Perennial Forages

First cutting alfalfa on dryland, seeded in 1952, gives measure of longevity of 9 varieties. Ranger most productive 6 years after seeding.

First years harvest of 10 irrigated alfalfa varieties, seeded in 1957, shows Rambler low with 4.95 T/A from two cuttings, Rhizoma high with 6.63 T/A. Marked differences were noted in recovery following cutting, however this slow start was not reflected in low second cutting yields.

Certain Bluegrass Introductions show promise for hay, others for pasture, others for lawns. Seed has been saved to permit yield study of selections.

This years data shows variations in Orchardgrass varieties in maturity, yield, and protein percentage. These characteristics will be carefully noted in next years trials.

Tall Wheatgrass led other wheatgrass varieties in production the first year of harvest, both alone and with alfalfa. Differences over a period of years are more important. Others were higher in protein content.

Percentages of tall plants following fall cutting varied from 0 to 100% in a type study of Montana seed lots and lots offered for sale in Montana. Within variety variations were nearly as great, from 5% to 88% in lots of Grimm. Hardy plants are presumed to have a low, bushy fall growth characteristic.

Reliable information about 18 hay mixtures seeded off-station in 1956 seems not to be forthcoming because of spotty field conditions. See Table five.

Milkvetches have not produced as much as alfalfas in a two year trial on dryland.

Four year yields from hay seeded at 3 spacings and two rates have not been greatly different. In other words, grass-legume mixtures seeded at light rates in 24 inch rows have produced as well as from heavier rates in 6 inch rows.

In the first harvest year of another study of seeding rates, plots seeded with 4, 6, and 8 lbs. of alfalfa have produced some better than plots seeded with 2 lbs. per acre.

In preliminary harvest methods trials, clipping to delay maturity of alfalfa reduced yeilds slightly, cutting at early bloom stage permitted harvest of greatest total amount of protein. A Vermer Krusher-Krimper speeded hay drying.

Annual Forages

In 1957 a request was made by the advisory council to do more work on annual forage using the crops listed in the table. Nine entries were included in the Annual forage Nursery in 1958, very similar to those used in 1957.

Results and Discussion

Temperatures during the growing season were higher than normal. This promoted very rapid and heavy growth of the Sudan grasses in the nursery.

Common Sudan grass is the highest yielding crop in this nursery. However there is no significant difference in crops used, except the vetch were significant lower than all the other crops used. Table 1 shows complete data for this test.

Table 1. Yield data from annual forage study grown at Creston, Montana in 1958. Planted May 23, 1958. Harvested August 18, 1958. Size of Plot 64 sq. ft.

Crop	Seeding Rate in lb/A	I	II	III	IV	Total Pounds	Ave. Tons per Acre	2/ T/A	% Pro.
Germin Millet	20	11.9	12.3	13.2	15.3	52.7	4.5	5.0	9.6
Siberian Millet	20	16.9	12.3	12.3	12.9	54.4	4.6	5.2	8.5
Piper Sudangrass	20	16.6	10.6	16.6	8.6	52.4	4.5	5.0	6.9
Sweet Sudangrass	20	15.4	7.5	19.0	12.2	54.1	4.6	5.2	11.2
Common Sudangrass	20	19.2	18.1	13.3	19.1	68.7	5.9	6.6	10.3
Bridger oats	80	17.1	14.6	18.2	10.7	60.6	5.2	5.8	8.1
Bridger oats	160	16.0	17.4	14.6	11.7	59.7	5.1	5.7	6.6
Common Vetch	30	7.1	4.3	4.8	4.3	20.5	1.7	1.9**	12.2
Vetch PI. 220, 890 ^{1/}	30	8.3	7.2	5.2	3.9	24.6	2.1	2.4**	16.5

Mean Yield4.7 2/
 S.E. \bar{x}508
 L.S.D. (5%).....1.5
 L.S.D. (1%).....2.
 C.V.....10.81%

1/ From Belgium

2/ Correct to 12% moisture

** Crops Yielding Significantly less than check (1%)

Note: Bridger is used as a check in this Nursery- 80 seeding rate

Analysis of Variance

Source	D. F.	Mean Sq.	F
Replication	3	20.8537	2.93
Crop	8	66.2558	9.32*
Error	24	7.1057	
Total	35		

Table 2. Corn Maturity Class--Population Study, N. W. Montana Branch Station, 1958. Irrigated, 53.28 sq. ft. harvested. Three reps. Planted May 22, harvested Sept. 8 & 9.

Variety	Class	Ave. Plants/A	Lbs per Plot			Total green	T/A green	(1)	T/A dry	(2)	
			1	2	3			% dry		Maturity	
Kingscrot	KF	E-20	27,445	50	41	43	134	18.26	20.15	3.68	Hard Dough
"	"	E-40	47,049	62	60	50	172	23.44		4.72	
"	"	E-60	62,733	64	69	61	194	26.43		5.32	
"	"	E-80	100,195	75	61	58	194	26.43		5.32	
Idahybrid	544	E-20	22,653	62	72	65	199	27.11	13.75	3.73	Soft Dough
"	"	E-40	44,000	72	63	89	224	30.52		4.20	
"	"	E-60	64,911	78	82	67	227	30.93		4.25	
"	"	E-80	92,792	88	80	90	258	35.15		4.83	
Phister	55	M-20	25,267	94	58	49	201	27.39	18.27	5.00	Soft Dough
"	"	M-40	47,485	66	65	55	186	25.34		4.63	
"	"	M-60	62,733	68	77	64	209	28.48		5.20	
"	"	M-80	95,842	76	62	73	211	28.75		5.25	
Funks	G6	M-20	26,139	64	69	45	178	24.25	15.2	3.69	Denting
"	"	M-40	43,564	71	69	66	206	28.07		4.26	
"	"	M-60	61,426	72	63	66	201	27.39		4.16	
"	"	M-80	88,871	82	95	80	257	35.02		5.32	
DeKalb	222	L-20	24,396	62	56	52	170	23.16	16.72	3.78	Soft Dough
"	"	L-40	48,790	72	67	57	196	26.71		4.46	
"	"	L-60	50,970	76	71	58	205	27.93		4.67	
"	"	L-80	92,356	84	72	71	227	30.93		5.17	
DeKalb	3x2	L-20	21,782	76	72	50	198	26.98	12.4	3.35	Blisters
"	"	L-40	48,792	87	60	65	212	28.89		3.58	
"	"	L-60	59,683	87	68	93	248	33.79		4.19	
"	"	L-80	88,871	94	80	85	259	35.29		4.37	
Northern King	"	L-20	24,832	42	62	42	146	19.89	22.35	4.44	Dented
"	"	L-40	44,871	62	55	55	172	23.44		5.24	
"	"	L-60	58,812	76	61	60	197	26.84		6.00	
"	"	L-80	90,178	80	63	50	193	26.30		5.88	
DeKalb	1024	L-20	21,244	83	66	64	213	29.02	15.12	4.39	Blisters
"	"	L-40	43,129	112	76	87	275	37.47		5.66	
"	"	L-60	65,782	74	98	93	265	36.11		5.46	
"	"	L-80	93,228	94	77	68	239	32.57		4.92	

(1) Ave. 4 samples for Variety

(2) Based on corn in ears

Table 3. Irrigated Corn Varieties, N. W. Branch Station, 1958. 53.28 sq. ft. Planted May 22, Harvested Sept. 5.

Entry	Maturity*	Lbs. per Plot				Green Total	Green T/A	Dry %	Dry T/A
		I	II	III	IV				
Funks G35A	Milk	84	70	63	63	280	28.61	19.7	5.64
Funks G6	Milk	80	65	65	87	297	30.35	18.2	5.52
Funks G20	Milk	69	60	60	50	254	25.96	20.0	5.19
Funks G44	Blisters	84	92	77	69	322	32.91	15.6	5.13
DeKalb 46	Dough	61	50	73	62	256	26.16	24.2	6.33
DeKalb 58	Silking	72	62	50	61	245	25.04	18.0	4.51
DeKalb 59	Silking	63	68	59	68	257	26.26	18.4	4.83
DeKalb 66	Silking	69	60	68	61	258	26.37	18.7	4.93
DeKalb 222	Silking	90	61	84	48	283	28.92	19.4	5.61
DeKalb 251	Silking	84	71	62	68	285	29.12	15.6	4.54
DeKalb 253	Blisters	59	72	68	70	269	27.49	19.9	5.47
DeKalb 414	Silking	76	69	66	73	284	29.02	18.7	5.43
Magill N.D.502	Milk	58	63	55	63	239	24.42	20.1	4.91
Magill W 642	Blisters	72	65	79	65	281	28.72	19.6	5.63
D.A.G. 32	Dough	70	62	60	66	258	26.37	20.0	5.27
D.A.G. 33	Dough	55	61	44	59	219	22.38	19.3	4.32
D.A.G. 55	Blisters	83	67	50	72	272	27.80	17.2	4.78
D.A.G. 57	Silking	75	86	78	60	299	30.56	17.3	5.29
D.A.G. 62	Blisters	70	78	64	60	272	27.80	18.7	5.20
D.A.G. 485	Tasseling	81	89	66	64	300	30.67	17.3	5.31
Idahybrid 216	Dough	58	52	50	75	235	24.01	19.4	4.66
Idahybrid 313	Milk	67	73	51	73	264	26.98	18.7	5.04
Idahybrid 544	Silking	78	74	70	64	286	29.23	17.2	5.03
DeKalb 1051	Tasseling	76	83	81	62	302	30.86	17.6	5.43
Mexican June	Tassels showing	97	90	79	78	344	35.16	17.6	6.19

*Maturity based on Kernels when present.

Table 3. Cont'd. Performance data obtained from corn silage variety trial Grown on the Northwest Montana Branch Station, Kalispell, Montana, in 1958.

Entry	Yield Silage adj. to 70% Moisture	Alfalfa hay equiva- lent	Moisture content at harvest	Stage of ear devel- opment at harvest	Maturity Rating
	T/A	T/A	%		days
120-140 day maturity rating					
Mexican June	20.7	7.1	82.4	Tasseling	120-140
DeKalb 1051	18.1	6.2	82.4	Tasseling	120-140
P.A.G. 485	17.6	6.0	82.7	Tasseling	120-140
Funks G-44	17.1	5.8	84.4	Blister	124-128
Mean	18.4	6.3	83.0		
100-119 day maturity rating					
Magill W 642	18.8	6.4	80.4	Blister	110
DeKalb 222	18.7	6.4	80.6	Silk	110-119
Funks G6	18.4	6.3	81.8	Milk	105-109
DeKalb 253	18.2	6.2	80.1	Blister	100-119
DeKalb 414	18.0	6.1	81.3	Silk	100-119
P.A.G. 57	17.6	6.0	82.7	Silk	108-112
Funks G-20	17.3	6.9	80.0	Milk	108-112
P. S.G. 62	17.3	6.9	81.3	Blister	107-111
Idahybrid 330	16.8	5.7	81.3	Milk	100
Idahybrid 544	16.8	5.7	82.8	Silk	100-119
DeKalb 66	16.4	5.6	81.3	Silk	100-119
DeKalb 59	16.2	5.5	81.6	Silk	100-119
P.A.G. 55	15.9	5.4	82.8	Blister	105-109
DeKalb 251	15.1	5.1	84.4	Silk	100-119
DeKalb 58	15.0	5.1	82.0	Silk	100-119
Mean	17.1	5.8	81.6		
80-99 day maturity rating					
Funks G 35A	18.8	6.4	80.3	Milk	94-98
P.A.G.	17.6	6.0	80.0	Dough	89-93
DeKalb 46	16.8	5.7	80.0	Dough	80-89
Magill N.D. 502	16.4	5.6	79.8	Milk	92
Idahybrid 216	15.5	5.3	80.6	Dough	90
P.A.G. 33	14.4	4.9	80.7	Dough	94-98
Mean	16.6	5.7	80.2		
Grand Mean	17.2	5.9	81.5		
L.S.D. at 5% level	3.2				

Dates: Planted May 22

Harvested September 5

Plot Technique: Four replications of single row plots. 53.3 square feet per plot harvested for yield.

C.V.: 13%

Source	Variance Analysis (T/A) Degrees of Freedom	Mean Square
Replications	3	22.7**
Entries	24	8.1*
Error	72	5.0

Table 4. Off-Station Corn Varieties 1958 N. W. Montana Branch Located on Vic Laselle in Missoula County. Planted May 21. 32 ft. of row (106.56 sq. ft.) Harvested Sept. 8.

Variety	Class	Lbs. per Plot				Green Total	Green T/A	Dry %	T Dry
		I	II	III	IV				
Kingscrost K. F.	Early	37	29	61	54	181	8.17*	25.0	---
Idahybrid 544	Early	35	64	89	43	231	11.80	19.5	2.3
Phister 55	M	25	43	54	38	160	8.17	19.4	1.58
Funks G6	M	44	35	52	46	177	9.04	20.0	1.81
DeKalb 1024	Late	51	66	70	68	255	13.03	26.2	3.41
Northern King	Late	31	45	62	40	17.8	9.09	23.8	2.16

* Average 3 plots only

Table 5. Off-Station Corn Varieties 1958. N. W. Branch Station. Located on Ralph Green Farm. Mineral County. Planted May 21, 32 ft. of row (106.56 sq. ft.) Harvested Sept. 8.

Variety	Class	I	II	III	IV	Green Total	Green T/A	Dry %	T Dry
Idahybrid 544	Early	114	126	105	109	454	23.20	15.6	3.62
Phister 55	M	134	118	130	101	483	24.68	14.6	3.60
Funks Q6	M	119	130	119	124	492	25.14	16.2	4.07
DeKalb 1024	Late	132	157	118	111	518	26.47	13.1	3.47
Northern King	Late	86	67	80	80	313	15.99	21.9	3.50

Light frost before harvest

Summary of Work with Annual Forages

Common sudangrass produced slightly more than oats or millets in this years trials, and had slightly higher protein content based on single samples.

Twenty five silage corn varieties varied in silage yields from 22.38 tons to 35.16 tons per acre. In dry matter the varieties were from 4.3 to 6.3 tons. Protein, based on single samples varied from 3.6 to 6.4 percent.

Not in every case did the greatest corn population produce the greatest tonage of corn in this years trials. On the average the greatest yield was from the highest seeding rate.

Northern King may be a variety to watch because of maturity and total production of dry matter.

Small Grains

Variety nurserys grown in 1958 include four of spring wheat, six of winter wheat, five of oats, five of spring barley, and two of winter barley. In addition to these variety nurseries, field plots of spring wheat and winter wheat were grown for quality determination and yield comparisons under varied conditions.

In all, over 1200 plots were seeded, observed and harvested. Weights and measurements taken each year in an attempt to provide Northwestern Montana with suitable small grains probably exceed 5000.

The approved 1958-59 budget for this work was for \$4025.00.

Table 1. Agronomic data from the Advanced Yield Nursery grown under irrigation at the Northwestern Montana Branch Station at Creston, Montana, in 1958.
Planted: May 1, 1958 Plot sizes: 16 sq. ft. Repls. 5

Variety	Sel. No.	C.I. No.	Head Date	Height Ins.	% Lodge	1	2	3	4	5	Total Bu./A	Test Weight
Selkirk	-----	13100	6/25	41	15	415	686	569	602	595	2867	60.5
Ceres	-----	6900	6/26	42	71	490	479	484	465	400	2318	62.3
Thatcher x Lee	B55-21	-----	6/22	42	21	502	482	510	588	526	2608	60.9
1898 x Lee	B52-57	-----	6/26	44	28	705	760	500	638*	540	3143	62.0
Th ⁶ x Kenya F	CT233	13345	6/23	42	29	468	520	472	520	384	2364	61.2
Rescue x 1831	B51-9	13304	6/28	43	70	650	528	635	521	495	2829	61.5
Lee	-----	12488	6/21	41	29	500	475	465	430	540	2410	59.6
Centana	N2170	12974	6/26	41	54	532	491	310	440	575	2348	62.5
Thatcher	-----	10003	6/23	42	29	425	495	550	440	410	2320	61.0
Lake	Canada	-----	6/30	44	9	471	549	415	500	590	2525	61.5
1953 x Lee	B52-91	13242	6/23	42	5	545	575	614	492	650	2876	61.5
Lee x Kenya F	C.T. 231	13221	6/21	40	39	581	545	375	495	502	2498	59.6
Chinook	H4258	13220	6/25	42	62	416	600	517	492	441	2466	61.9
Rescue	-----	12435	6/26	41	100	385	375	400	484	339	1983	59.5
Thatcher x Lee	B55-4	-----	6/23	40	27	660	555	355	525	685	2780	60.9
Conley	N.D.1	13157	6/27	41	60	555	425	549	580	470	2579	60.5
Pilot	-----	11945	6/25	39	66	522	596	464	500	465	2547	61.0
Overby Sel	S. Dak.	13346	6/23	44	32	360	400	429	462	406	2057	61.4
Thatcher x Lee	B55-8	-----	6/27	41	21	565	534	592	705	531	2927	60.5
1953 x Lee	B-52-94	-----	6/21	41	45	615	370	578	529	525	2617	62.1
Thatcher x Lee	B-55-5	-----	6/22	39	12	585	525	611	550	435	2706	62.0

Mean Yield
S. E. \bar{x} 15.2
L. S. D. (P = .05) 3.3
C. V. = 6.45% 9.4

*Calculated as a missing plot

Table 2. Agronomic data from an irrigated spring wheat nursery grown in Missoula County on the Roy Willis ranch, Fotomac, Montana, 1958.

Planted: May 6, 1958 Plot Size: 16 sq. ft. Reps.: four

Variety	C.I. No.	Plant Height	Test Weight	I	II	III	IV	Total	Ave. Bu. Per Acre
Centana	12974	48	54.8	503	670	600	680	2453	61.32
Pilot	11945	43	55.8	500	562	580	552	2194	54.85
1953 x Lee (B52-91)	13242	45	56.4	448	476	600	578	2102	52.55
Rescue x 1831 (B51-9)	13304	48	53.6	477	612	503	452	2044	51.10
Ceres	6900	46	58.1	490	568	465	506	2029	50.72
Thatcher	10003	42	56.7	435	410	441	393	1679	41.97
Selkirk	13100	45	56.2	362	395	377	446	1580	39.50
Lemhi 53	13258	47	47.6	423	340	437	375	1575	39.37
Lee	12488	43	54.6	260	243	520	310	1333	33.32
Conley	13157	49	-----	228	375	287	368	1258	31.45
Lemhi	11415	46	42.8	323	305	278	287	1193	29.82

Mean Yield
 S. E. \bar{x} .
 L.S.D. (p = .05)
 C. V. = 7.01%

44.2
 3.1
 9.0

Table 3. Agronomic data from the Eastern Regional Dryland Spring Wheat Nursery Grown on the Northwestern Montana Branch Station in 1958.
Seeded: 4/27/58 Harvested: 8/19/58

Variety	C.I. No.	Plant Height	First Headed	% Lodging	Test Weight	I	II	III	Total	Bu/A
Lemhi	11415	39	6/26	22	59.4	520	602	517	1639	54.63
Baart	1697	38	6/24	35	62.0	453	389	601	1443	48.10
2236 x Lee (B52-107)	13305	39	6/22	2	58.1	495	392	515	1402	46.73
Lemhi 53	13258	38	6/25	18	59.4	531	446	402	1379	45.97
Onas 53	13257	36	6/27	15	59.0	345	424	599	1368	45.60
Onas	6221	38	6/28	17	59.0	349	480	539	1368	45.60
Lemi x Hope Fed.	13053	38	6/26	20	58.4	410	410	476	1296	43.20
Henry	12265	35	6/25	17	60.0	351	515	426	1292	43.07
52Ab 9702	13435	39	6/27	13	59.8	351	555	340	1246	41.53
Kenya x Lemhi ²	13268	33	6/24	10	59.0	395	410	421	1226	40.86
Federation	4734	40	7/1	8	59.0	502	386	326	1214	40.47
Idaed	11706	32	6/17	25	60.0	435	370	365	1170	39.00
Thatcher	10003	35	6/23	22	59.2	360	420	330	1110	37.00
Marfed	11919	35	7/1	5	60.5	205	362	476	1043	34.77

Mean Yield 43.3
S.C. \bar{x} 4.9
L.S.D. (P = .05) N. S.
C. V. = 11.32%

Note: C. V. for Regional Report = 19.63%.

Table 4. Agronomic data from a dryland off-station spring wheat nursery grown in Mineral County on the Charles Fry ranch, Tarkio, Montana, 1958.

Planted: May 6, 1958 Harvested: August 26, 1958 Plot size: 16 sq. ft. Repls. 4

Variety	C.I. No.	Plant Height	I	II	Grams Per Plot	III	IV	Total	Ave. Bu. Per Acre
Centana	12974	25	194	170	115	150	629	15.72	
Rescue x 1831 (B51-9)	13304	27	170	95	105	135	505	12.62	
Conley	13157	24	139	145	105	114	503	12.57	
Pilot	11945	25	165	124	90	115	494	12.35	
Ceres	6900	25	176	74	145	85	480	12.00	
1953 x Lee (B52-91)	13242	24	150	135	90	105	480	12.00	
Thatcher	10003	23	115	125	108	65	413	10.32	
Selkirk	13100	22	70	95	105	135	405	10.12	
Lemhi 53	13258	21	88	44	101	90	323	8.07	
Lemhi	11415	23	60	60	90	60	270	6.75	
Lee	12488	20	65	40	90	50	245	6.12	

Mean Yield
 S. E. \bar{x}
 L.S.D. (P = .05)
 C.V. = 12.96%

10.8
 1.4
 4.0

Table 5. Agronomic data from Dryland Milling and Baking plots. Creston, Montana, 1958. Planted April 28, 1958. Harvested August 22, 1958. Size of plot 552 sq. ft.

Variety or Cross	C.I. No.	Head Type	Heading /Date	Height in Inches	Lodging %	Bushels per Acre	Bushel Wt. in Pounds
Centana	12974	Bearded	6-27	35	90	----	----
Thatcher	10003	Beardless	6-24	33	90	36.8	58.7
Lee	12488	Bearded	6-22	32	35	32.9	58.1
Rescue	12435	Beardless	6-24	30	100	34.2	58.3
1953 x Lee (52-91)	13242	Bearded	6-23	33	60	39.5	59.0
Rescue x 1831 (51-9)	13304	Beardless	6-28	33	90	38.1	----
Ceres	6900	Bearded	6-26	30	95	34.2	59.0
Selkirk	13100	Beardless	6-26	34	80	32.9	57.0
Pilot	11945	Bearded	6-26	29	90	35.5	57.9
Chinook	13220	Beardless	6-24	31	85	30.2	59.8

Spring Wheat Summary

Recent reports on quality of spring wheats that are less favorable to Pilot than could be desired indicate need for a new area recommended irrigated spring wheat variety. Centana seems acceptable quality-wise and could fill in temporarily. Main objection locally to Centana would stem from high incidence of leaf rust and lodging. Five varieties in the irrigated advanced yield nursery grown on the N. W. Branch Station this season were significantly higher in yield than Centana.

Lemhi, the feed wheat presently recommended, comes in for criticism because of yield reduction, even below standard hard reds, when stem rust is a factor. In one irrigated off-station trial this year Lemhi produced 31.5 bushels less than Centana.

Table 6. Agronomic data from the Western Uniform Hard Red Winter Wheat Nursery. Grown on the Conrad Gilbertson farm in the Stillwater area, Kalispell, Montana. Four row plots Four replications. Planted September 19, 1957 Size of Plot: 16 sq. ft.

Variety or Cross	C.I. or N. No.	Heading Date	Height in Inches	Broken Straw 0-10*	Stand in %	Dwarf in %	Grams Per Plot				Total Grams	Ave. Bu. /A	Bu. Wt. in Lbs.
							I	II	III	IV			
Westmont	12930	6/4	29	2.0	85	.16	260	342	170	486	1258	31.5	62.5
Columbia	12928	6/5	29	2.0	91	.20	335	360	295	370	1360	34.0	63.5
Itana	12928	6/8	34	1.0	86	.30	309	394	375	460	1538	38.5	62.0
Kharkof	1442	6/7	32	4.0	74	.13	346	239	300	108	993	24.8	62.5
Rio	10061	6/8	33	4.5	76	.22	354	190	324	270	1138	28.5	62.5
Burt	12696	6/6	30	.8	76	.08	485	345	250	350	1430	35.8	62.5
Comanche	11675	6/3	30	4.3	66	.09	155	324	321	85	885	22.1	62.5
Wasatch	11925	6/6	37	1.3	86	.02	465	315	212	220	1212	30.3	63.0
Cheyenne	8885	6/7	36	2.3	79	.20	435	432	180	365	1412	35.3	63.0
Cheyenne-57	13426	6/7	32	1.8	88	.19	455	444	320	188	1407	35.2	63.0
Itana Selection	12933-1	6/6	33	.5	95	.11	490	440	355	299	1584	39.6	62.5
Yogo x Turkey/Oro 66	13427	6/9	34	3.3	83	.09	300	419	225	291	1235	30.9	63.0
Yogo x Turkey/Oro 88	13428	6/8	35	2.8	85	.11	359	174	328	265	1126	28.2	62.5
Yogo x Turkey/Oro 121	13429	6/7	33	3.3	84	.17	449	319	215	122	1105	27.6	62.5
Agrotricum	13430	6/12	40	1.8	71	.06	200	85	145	95	525	13.1**	57.4
Mint. x Tim/Vulgare ²	12806	6/15	39	.3	96	.19	360	281	302	270	1213	30.3	61.5
H-44 x Minturk ⁴	2844	6/6	36	1.3	89	.06	325	319	375	176	1195	29.9	62.0
Kharkof -17-7	13263	6/6	35	1.8	84	.02	433	315	369	230	1347	33.7	61.1
Paw x Med x Hope/Com													
x Oro x TK x Fl.	K53423	6/2	31	1.8	75	.02	318	285	190	170	963	24.1	61.1
Comanche x C.I. 12250	-----	6/3	28	2.3	75	.02	374	283	237	186	1080	27.0	61.9

*0-10
 0 - No Straw broken
 10 - All broken over
 Note: Westmont used as a check in this nursery
 ** Varieties yielding significantly less than the Check (1%)

ANALYSIS OF VARIANCE

Source	D.F.	Mean Square	F
Replications	3	46,667.33	
Varieties	19	15,015.00	
Error	57	6,879.98	
Total	79		82.9456

Mean Yield
 S.E. \bar{x} 30.1
 L.S.D. (5%) 4.1473
 L.S.D. (1%) 11.7
 C.V. 15.5
 13.82

Table 7. Agronomic data from Short Straw Selection grown at Creston, Montana in 1957-58. Single row plot. One replication. Planted September 20. Harvested July 31, 1958. Plot size 16 sq. ft.

Entry	Height in Inches	Grain Weight in Lbs Per Acre	Straw Weight in Lbs Per Acre	Straw/ Grain Ratio	Yield in Bu. Per Acre
Huntley 5Bx 130A 57-18	27	7912		.92	68.7
57-16	26	9656		1.13	74.5
57-215	28	5147		1.11	40.6
57-44	27	7827		1.05	63.5
81	26	7061		1.14	55.0
72	28	3403		1.36	24.0
191	29	8422		1.28	61.6
62	28	3786		1.34	27.0
194	30	6976		1.37	49.0
146	27	8295		1.21	62.5
7	26	5062		1.58	41.0
46	28	8167		1.09	65.0
246	27	5445		1.21	40.9
74	28	3063		1.48	20.6
159	29	10192		1.19	77.5
26	27	3020		1.50	20.1
140	28	5956		1.02	49.0
Burt	32	8550		1.24	63.5
Huntley 5B x 130 A 57-93	28	3871		1.08	31.0
186	27	4977		1.24	37.0
91	28	8167		1.07	65.8
12	29	1872		1.50	12.5
235	28	8678		.98	72.7
173	29	6381		1.22	48.0
57	30	5445		1.22	40.9
58	35	7147		2.50	34.0
3	30	8721		.96	74.0
92	30	5360		.96	45.5
161	29	5615		1.31	40.5
89	27	6508		1.17	50.0
252	32	6211		1.13	48.5
220	30	4041		1.32	29.0
236	29	9359		1.18	71.4
199	26	3786		1.10	30.0
182	28	6041		1.12	47.5
55	32	8976		1.23	67.1
256	36	4594		1.55	30.0
10	27	4467		1.71	43.5
76	28	8338		1.19	63.5
57-240	28	6296		1.10	50.0
143	29	6891		1.05	56.0
6	25	8976		.98	75.5
147	26	4977		1.30	36.0
224	28	7402		1.07	59.4
253	31	7317		1.00	61.0

Cont'd

Table 7. Continued.

Entry	Height in Inches	Grain Weight in Lbs per Acre	Straw Weight in Lbs per Acre	Straw/ Grain Ratio	Yield in Bu. Per Acre
Seun Seun x Pawnee (32)	31	7359		1.56	48.0
Seun Seun x Pawnee (31)	30	4467		2.05	24.4
Seun Seun x C.I. 12500 (7)	27	7657		2.04	42.0
(Norin 10 x Breval-17) -45	19	5530		1.17	42.5
" " -19	18	5785		1.01	48.0
Westmont	39	11783		1.18	90.0
Itana	40	6296		1.44	43.0
Rego	45	12294		1.51	81.5
Cheyenne	41	5105		1.33	36.5
Omar	36	7147		1.34	51.0

Table 8. Agronomic data from the inter-state hard red winter wheat nursery, Creston, Montana, 1958. Four row plots, four replications.

Planted: September 20, 1957 Harvested: August 6, 1958 Size of Plot: 16 sq. ft.

Variety or	C.I. or	Heading Height in Stand Inches	% Lodg.	% Bunt	Draw	I	II	III	IV	Total Grams	Ave. Bu/A	Bushel Wt. in Pounds
Commanche x C. I.	12250	33	74	2	.4	591	570	565	711	2437	60.9	64.0
Columbia	12928	36	81	1	--	500	481	690	570	2241	56.0	63.9
Westmont	12930	38	88		1.0	509	760	545	781	2595	64.9	63.5
Rego	31381	44	91	32	--	510	600	625	660	2395	59.8	61.5
Itana	12933	43	88		.3	645	507	705	565	2422	55.6	63.5
Burt	12696	33	70	4	.1	292	515	745	605	2157	53.9	61.8
Wasatch	11925	42	89	15	.3	540	435	510	486	1971	49.3*	63.5
Kharkof 17-7	13263	43	85	29	.2	528	506	532	545	2111	52.8	62.5
Cheyenne	8885	43	73	21		451	360	570	580	1961	49.0*	63.5
Cheyenne 57	13426	43	84	18	.1	505	536	560	560	2161	54.0	63.1
Newtunk	6935	41	80	38	.3	455	457	615	448	1975	49.4*	62.5
Logo	8033	41	86	38		340	551	477	609	1977	49.4*	62.5
Karmont	6700	43	83	64	.1	406	436	524	452	1818	45.5*	62.5
Triplet	5408	42	93	4	.6	602	625	580	690	2497	61.9	63.5
Omar	13072	39	89	11	.4	542	535	675	689	2441	61.0	61.4
Minturki x Timophevi	xVuH12806	45	96	3	--	468	548	470	351	1837	45.9*	62.0
H44 x Mintark ⁴	Minn 2844	43	91	36	.6	452	541	570	478	2041	51.0*	62.2
Yogo x Turkey/Oro-66	13427	45	86	28		634	583	490	615	2322	58.1	63.0
Yogo x Turkey/Oro-88	13428	45	89	75	.1	416	576	649	565	2206	55.2	62.5
Yogo x Turkey/Oro-121	13429	43	89	65		465	569	466	531	2031	50.8*	63.0

* Varieties yielding significantly less than the check (5%)
NOTE: Westmont used as a check in the nursery.

Mean Yield 54.5
S.E. \bar{x} 3.9586
L.S.D. (5%) 11.1
C. V. 7.26%

ANALYSIS OF VARIANCE

Source	D.F.	Mean Square	F
Replications	3	32,215.67	5.14**
Varieties	19	13,249.69	2.11*
Error	57	6,268.09	
Total	79		

Table 9. Agronomic data from off-station Winter Wheat Nursery grown in Sanders County, on the Rodney Kruger farm, Plains, Montana. Single row plots, four replications
 Planted: September 16, 1957 Harvested: July 15, 1958 Size of Plot: 16 sq. ft.

Variety or Cross	C.I. or N. No.	Height in Inches	Lodging Stand % in %	Grams Per Plot				Total Grams	Ave Bushel Per Ac.	Bushel Wt. in Pounds
				I	II	III	IV			
Wasatch	11925	39	3	490	415	370	380	1655	41.4	62.5
Itana	12933	39		530	190	400	320	1440	36.0	62.0
Burt	12696	34		370	190	210	299	1069	26.7	62.0
Westmont	12930	37	12	324	355	605	285	1569	39.2	61.8
H-44x Minturki ⁴ Minn	2844	39		480	280	120	450	1330	33.3	63.5
Minturki x tim/Vulgar ²	12806	42		280	250	310	230	1070	26.8	62.4
Omar	13072	39		380	380	395	405	1560	39.0	58.0
Triplet	5408	38		335	355	355	120	1165	29.1	61.5
Columbia	12928	34		180	325	375	235	1115	27.9	61.4

NOTE: Westmont is used as a check in this nursery.

Source	D.F.	ANALYSIS OF VARIANCE		F.
		Mean Square		
Replications	3	11,087.00		
Varieties	8	13,833.62		1.23
Error	24	11,201.13		
Total	35			

Mean Yield	33.3
S.E. \bar{x}	5.2918
L.S.D. (5%)	N.S.
C.V.	15.91%

Table 10. Agronomic data from off-station Winter Wheat Grown in Ravalli County, on the L. B. McFadgen farm, Stevensville, Montana. Single row plots, four replications. Planted: September 24, 1957 Harvested: August 11, 1958 Size of Plot: 16 sq. ft.

Variety or Cross	C.I. or N. No.	Height in Inches	Grams Per Plot				Total Grams	Ave. Bushel Per Ac.	Bushel Wt. in Pounds
			I	II	III	IV			
Wasatch	11925	49	362	595	640	640	2237	55.9	60.2
Itana	12933	47	494	375	800	620	2289	57.2	62.0
Burt	12696	37	290	430	194	335	1249	31.2	54.9
Westmont	12930	40	305	400	491	610	1806	45.2	60.5
H-44X Mintruki ⁴	2844	50	235	328	475	450	1488	37.2	58.0
Minturki x tim/Vulgare ²	12806	54	474	392	607	540	2013	50.3	54.5
Omar	12072	39	440	414	400	235	1489	37.2	57.3
Triplet	5408	44	226	405	463	270	1364	34.1	60.0
Columbia	12928	39	280	555	349	594	1778	44.5	49.0

NOTE: Westmont used as a check in this nursery

Source	D. F.	ANALYSIS OF VARIANCE	
		Mean Square	F.
Replications	3	38,958.33	3.90
Varieties	8	35,543.37	2.74*
Error	24	12,994.29	
Total	35		

Mean Yield	43.6
S. E. \bar{x}	5.6996
L. S. D. (5%)	16.6
L. S. D. (1%)	-----
C. V.	13.06%

Table 11. Agronomic data from off-station Winter Wheat Nursery grown in Lake County, on the Hugh Burnside farm at Polson, Montana. Single row plots, four replications. Planted: September 18, 1958 Harvested: August 4, 1958 Size of plot: 16 sq. ft.

Variety or Cross	C.I. or N. No.	Height in Inches	Grams per Plot				Ave. Bu/A	Bushel Wt. in Pounds
			I	II	III	IV		
Wasatch	11925	46	410	433	225	435	37.6	60.0
Itana	12933	42	405	426	285	500	40.4	60.0
Burt	12696	38	370	345	450	380	38.6	58.9
Westmont	12930	42	395	245	290	510	36.0	60.0
H-44X Minturki ⁴	2844	42	326	265	435	419	36.1	60.2
Minturkixtim/Vulgare ²	12806	48	250	255	173	190	21.7	
Omar	13072	42	345	590	405	655	49.8*	58.2
Triplet	5408	42	495	500	505	550	51.3**	61.9
Columbia	12928	38	295	430	315	470	37.8	60.5

NOTE: Westmont used as a check in this nursery

* Varieties yielding significantly more than Westmont (5%)

Source	D. F.	ANALYSIS OF VARIANCE	
		Mean Square	F
Replication	3	21,791.67	3.47*
Varieties	8	29,512.87	4.70 *
Error	24	6,278.75	
Total	35		

Mean Yield
S. E. \bar{x} 38.8
L. S. D. 5% 3.9619
L. S. D. 1% 11.5
C. V. 15.7
10.21 %

Table 12. Agronomic yield data from Westment Winter Wheat grown on summerfallow and land in Cultivated corn crops previous year. Planted Sept. 21, 1957. Harvested August 7, 1958. Size of plot 300 sq. ft.

Treatment	I	II	III	IV	Total Pounds	Ave. Bu/A
Fallow land	18	17	25	29	89	53.9
Corn	13	17	13	13	56	33.9

Mean Yield	43.9
S. E. \bar{x} .	6.105
L.S.D.	N.S.
C. V.	13.91%

Analysis of Variance

<u>Source</u>	<u>D. F.</u>	<u>Mean Square</u>	<u>F</u>
Replications	3	11.459	x
Treatment	1	136.125	5.35
Error	3	25.4577	
Total	7		

Table 13. Yield of Grain from Strips cut by L. B. McFadgen, Stevensville, Montana.

Variety	Area Harvested in Square Ft.	Yield in Pound Per Plot	Yield in Bu/A
Karmont (check)	14,880	683	33.3
Itana	14,556	680	33.9
Westmont	14,400	678	34.1
Cheyenne	15,480	582	27.3
Cheyenne (28" rows)	14,100	525	27.0

Winter Wheat Summary

Emergence was good, moisture adequate and winter killing unimportant in the Western Regional Hard Red Winter Wheat nursery grown in the Stillwater area of Flathead County, yields were greater than in past years. Considerable interplot variation contributed to a high C. V. Dwarf bunt was found in all entries. Itana Selection 12933-1 was high in yield.

Westmont was the highest yielding variety in a single row plot short straw selections nursery, also quite good in grain straw ratio.

Westmont was high in yield in the Intrastate Hard Red Nursery on the Station, followed by Triplet, Omar, Commanche x C.I. 12250 and Itana in that order.

In off-station nurseries Triplet was high yielding variety in Lake County but 10 bu/A below Westmont in Sanders and Ravalli Counties.

Westmont was high in a large strip demonstration in Ravalli County.

Table 14. Irrigated Oats Nursery. Creston, Montana, 1958.
Seeded May 1, 1958. Harvested August 13, 1958.

Variety	C. I. No.	Head Height		Lodge	Grams per Plot			Total	Bu/A	Lbs/ Bu.
		Date	Inches		%	1	2			
Burnett	6537	6/22	42	15	320	502	560	1382	86.40	39
Palomino	5636	6/23	40	3	435	345	565	1345	84.09	33.9
And. x Clinton	5657	6/22	42	--	430	340	465	1235	77.21	31.6
R.L. 1273 x Spooner	6939	6/25	50	5	450	295	450	1195	74.71	33.0
Centore	3865	6/27	42	13	635	535	500	1670	104.41	35.4
Cody	3916	7/2	39	8	530	500	500	1530	95.65	33.0
Clinton "59"	4259	6/22	38	--	474	310	505	1289	80.59	36.6
Overland	4181	6/27	42	5	645	650	555	1850	115.66	38.0
Clint. x O ²	5345	6/30	45	--	432	665	455	1552	97.03	38.0
Park	6611	6/30	46	2	633	500	510	1643	102.72	32.4
Markton	2053	6/27	44	63	510	345	400	1255	78.46	37.1
C.I. 4189 x O	7263	6/28	45	66	470	455	405	1330	83.15	38.2
Ajax	4157	6/26	48	58	410	555	525	1490	93.15	36.5
Simcoe	6767	6/26	46	33	187	492	325	1004	62.77	30.7
Eagle	4113	7/1	46	50	565	515	340	1420	88.78	36.0
Exeter	4158	7/2	45	50	605	580	410	1595	99.72	37.0
Sauk	5946	6/28	48	5	680	502	530	1712	107.03	36.5
Rodney	6661	7/1	47	15	195	402	195	792	49.51	26.0
Imp. Gary	6662	6/27	50	0	630	583	445	1658	103.66	37
Victory	1145	7/2	52	17	448	475	475	1398	87.40	35.7
Weibulls 16004	7257	7/2	46	18	550	345	497	1392	87.03	39.2
Libertas	7254	6/26	48	3	595	505	570	1670	104.41	36.5
Sun II	4962	7/1	50	8	505	345	340	1190	74.40	34.1
Maine	5163	6/30	46	7	636	406	517	1559	97.47	34.5
Bannock	2592	7/2	45	23	655	450	390	1495	93.47	37.0
Cherokee	3846	6/21	37	5	305	277	493	1075	67.21	24.4
Ld. x (Min. x H. J.)	7083	6/21	42	43	410	295	465	1170	73.15	32.1
	6878	6/21	44	10	293	195	275	763	47.70	23.5
Ld. x (min. x H. J.)x A	6936	6/22	41	10	165	155	300	620	38.76	26.0
Ld x (min. x H.d.)x C	6935	6/24	40	7	232	155	330	717	44.83	27.0
Clinton x O ²	5346	7/1	46	5	555	548	358	1461	91.34	34.8
C x O ² A. B.	5989	7/1	44	2	580	690	820	2090	130.66	37.0
Andrew x Land.	6620	6/22	43	25	442	452	526	1420	88.78	33.6
H. x Marion	1037	6/28	51	33	290	310	435	1035	64.71	34.9
M. x Hancock	1195	7/2	45	18	445	577	194	1216	76.02	31.0
C. I. 4189 x O	6613	7/2	49	8	698	504	525	1727	107.97	36.1

Table 15. Dryland Oats Variety Nursery, Creston, Montana, 1958.
Seeded April 30, 1958. Harvested July 13.

Entry	C.I. No.	Head Height			Grams per Plot			Total	Bu/A	Lbs/ Bu.
		Date	Inches	% Lodge	1	2	3			
Burnett	6537	6/21	43	32	210	365	315	890	55.64	33.2
Palomino	5636	6/21	41	12	280	288	180	748	46.76	26.0
Andrew x Clinton	5657	6/23	41	28	376	293	295	964	60.27	30.3
R.L. 1273 x Spooner	6939	6/26	49	30	202	284	265	751	46.95	28.0
Centore	3865	6/29	42	43	317	398	375	1080	67.52	31.5
Cody	3916	7/2	39	13	260	267	277	799 ⁸⁰⁴	49.95	27.8
Clinton "59"	4259	6/21	40	7	388	275	298	961	60.08	35.0
Overland	4181	6/27	41	20	600	387	370	1357	84.84	34.5
Clinton x 0 ²	5345	6/29	43	27	410	260	395	1065	65.58	33.7
Park	6611	6/30	43	27	475	265	275	1015	63.47	32.4
Markton	2053	6/27	45	50	337	200	302	839	52.45	31.6
C.I. 4189 x 0	6613	7/3	45	45	490	430	395	1315	82.21	38.0
C.I. 4189 x 0	7263	6/29	45	33	505	480	396	1381	86.34	39.1
Ajax	4157	6/27	50	32	375	345	350	1070	66.90	34.6
Simcoe	6767	6/28	51	12	120	262	232	614	38.39	27.0
Eagle	4113	7/3	40	23	440	190	390	1020	63.77	33.8
Exeter	4158	7/4	47	60	250	350	345	945	59.08	33.2
Sauk	5946	6/30	47	37	410	34	377	1155	61.70	35.5
Rodney	6661	7/3	46	87	55	60	110	225	14.07	----
Imp. Gary	6662	6/29	49	53	255	318	290	863	53.95	30.0
Victory	1145	7/3	46	63	220	345	225	790	49.39	33.3
Weibulls 1600 ⁴	7257	7/4	44	55	212	320	295	837	52.33	33.5
Liberatas	7254	6/28	44	57	215	255	220	690	43.14	31.1
Sun II	4962	7/2	48	40	260	430	470	1160	72.52	31.8
Marne	5163	7/3	43	35	230	395	350	975	60.96	28.7
Bannock	2592	7/3	42	53	467	490	276	1233	77.09	32.6
Ld. x (mindoxH.J.) x A	6936	6/22	42	11	260	200	160	620	38.76	23.5
Dupree	4672	6/20	40	8	275	345	245	865	54.08	29.2
Sac x Gaj-Jaon	5927	6/19	42	5	250	337	362	949	59.33	35.8
C x Boone-Cartier	6833	6/21	41	7	355	278	303	936	58.52	34.7
Clinton x O. A.B.	6014	6/30	39	32	365	192	277	834	52.14	26.3
Mission	2588	6/26	47	37	262	206	320	788	49.26	31.9
C.I. 4189 x 0	5347	7/1	46	10	370	293	335	998	62.39	34.7
Abegweit	4990	6/28	47	33	460	325	272	1058 ¹⁰⁵⁹	66.15	28.0
Ld. x Min x H.J. x Clin.	6935	6/24	40	2	210	140	160	510	31.88	19.0
Andrew x Clinton	5658	6/23	41	13	430	230	210	870	54.39	26

Table 16. Advance Yield Oats, Creston, Montana.
Seeded 4/30, Harvested August 13, 32 sq. ft.

Entry	C.I. No.	Head Date	Height Ins.	Lodge %	Grams per Plot				Total	Bu/A	Lb/Bu.
					1	2	3	4			
Clinton x Overland ²	5345	7/2	31	17.5	525	650	539	526	2240	52.52	33.0
Clinton x Overland ²	5346	7/1	32	12.5	568	490	644	569	2271	53.24	35.3
C x O ² A. B.	5989	7/2	30	16	492	571	601	490	2154	50.50	31.8
Centore	3865	6/30	30	20	600	600	685	700	2585	60.6	35.5
D.I. 4189 x 0	5347	6/30	30	32	555	565	484	516	2120	49.70	34.0
Mission	2588	6/29	34	8	511	591	548	475	2125	49.82	34.0
Gopher	2027	6/27	29	10	382	386	430	455	1653	38.75	27.5
Park	6611	7/2	29	12.5	595	585	464	594	2238	52.47	32.6

Protein percentages based on single samples were:

C x O² 5345, 16.1
 C x O² 5346, Not rec'd
 C x O² AB5989, 13.7
 Centore, 12.4
 Mission, 14.8
 Gopher, 15.0
 Park, 13.9

Table 17. Off-Station Oat Nursery grown at Roy Willis ranch, Potomac, Montana, 1958. Planted May 6, Harvested Sept. 3. Single row plots, 4 replications, 16 sq. ft.

Variety	C.I. No.	Height Ins.	Grams per Plot				Total Grams	Bu. per Acre
			I	II	III	IV		
Park	6611	51	660	583	525	602	2370	111.13 ✓
Bridger	2611	60	602	500	495	500	2097	98.33
Mission	2588	53	450	375	295	597	1717	80.51
Gopher	2027	50	342	370	485	298	1495	70.10
Clinton x Overland ²	5345	50	530	440	530	604	2104	98.66
Clinton x Overland ²	5346	50	520	585	623	545	2273	106.58 <i>Down</i>
Clinton x 0 ² A. B.	5989	49	530	775	665	512	2482	116.38
Abegweit	4970	53	615	428	496	575	2114	99.13
Centore	3865	51	520	700	540	368	2130 2128	99.87
Ajax	4157	54	492	308	396	520	1716	80.46

96.1

Table 18. Dryland Off-Station Oat Nursery grown at Chas. Fry ranch, Superior 1958. Single row plots, four replications Seeded May 6, Harvested August 26, 16 sq. ft.

Variety	C.I. No.	Height Ins.	Grams per Plot				Total Grams	Bu. per Acre
			I	II	III	IV		
Park	6611	19	120	105	90	130	445	20.87
Bridger	2611	23	160	120	130	160	570	26.73
Mission	2588	18	100	70	105	116	391	18.23
Gopher	2027	18	81	85	100	124	390	18.29
Clinton x O ²	5354	18	94	95	80	130	399	18.71
Clinton x O ²	5346	18	104	65	145	135	449	21.05
Clinton x O ² AB	5989	18	101	100	110	101	412	19.32
Abegweit	4970	18	120	130	105	140	495	23.21
Centore	3865	16	100	85	50	175	410	19.22
Ajax	4157	20	88	90	80	80	338	15.85

Summary of Oats Work, 1958

Irrigated oats were harvested on the Station and in Missoula County. Clinton x Overland² A.B. 5989 were high in yield in both these nurseries. Park did well both places.

Dryland oats were harvested off-station in Mineral County and on the station in two nurseries. Comparing yields from Mineral County and the Advance yield nursery at Creston for a few varieties we find Clinton x Overland crosses higher in yield than Mission and Gopher. C.I. 4189 x Overland 6613 and 7263 both did very well in yield and weight per bushel in the 36 variety nursery this season.

Table Agronomic data from Irrigated Interstate Barley Yield Nursery, Creston, Montana, 1958. Four row plots, five replications.

Planted: May 1, 1958
Harvested:

Size of plot: 16 sq. ft.

Variety or cross	C.I. No.	Heading date	Height (In.)	Lodging %	Loose Smut	Sample yield					Total Ave. Grams Bu./A.	Bushel wt. in pounds	
						I	II	III	IV	V			
Trail	9538	6/20	37	26	0	730	962	636	841	696	3865	96.65	51.0
Glacier x Titan (2)	50-5639-12-II	6/17	33	33	0	625	785	780	850	822	3862	96.58	47.5
Ingrid	10083	6/26	30	15	0	806	820	794	725	630	3775	94.40	50.6
Herta	8097	6/26	33	26	0	930	627	645	689	806	3697	92.45	54.0
Svalof 50-109	----	6/23	26	10	0	870	631	790	630	745	3666	91.68	52.5
Glacier x Titan (1)	50-5639-12-I	6/17	32	21	0	880	388	755	772	760	3555	88.90	48.4
Liberty	5449	6/19	36	27	20	786	755	560	713	713	3527	88.20	50.4
Hiland	9530	6/20	34	26	0	625	685	667	750	770	3497	87.45	47.1
Utah 570-8	----	6/25	31	45	0	655	835	590	550	835	3465	866.5	45.4
Freja	7130	6/23	28	14	4	590	585	840	610	765	3390	84.78	53.7
Vantmore	9555	6/19	38	16	10	585	785	481	840	617	3308	82.73	44.5
Helmi	221307	6/24	30	17	0	670	694	715	505	695	3279	82.00	53.0
Vantage	7324	6/22	38	31	5	525	714	650	655	730	3274	81.88	49.6
Pirolina ^a	9558	6/23	32	11	2	470	699	765	740	542	3216	80.42	52.6
Glacier x Titan	10421	6/18	34	44	0	681	685	585	629	575	3155	78.90	46.1
Wolfe	----	6/17	33	15	0	610	522	540	694	765	3131	78.30	50.0
Heines Hanna	9532	6/25	35	52	0	610	809	455	521	531	2926	73.17	52.5
Dekap	3351	6/18	30	95	0	576	559	564	624	565	2888	72.22	49.0
Betzes	6398	6/24	31	31	0	555	610	705	550	455	2875	71.90	52.8
Glacier x Compana	47-7415-V-9	6/22	32	37	0	830	505	500	502	495	2832	70.82	43.3
Titan	7055	6/17	33	22	0	465	520	669	518	500	2672	68.82	44.6
B855-14-2 ^b	----	6/27	28	12	0	590	345	610	755	448	2748	68.72	53.0
Compana	5438	6/19	29	94	0	460	595	460	430	460	2405	60.14	47.1
B855-13 ^b	----	6/27	29	15	0	330	565	515	400	557	2367	59.19	55.8
Forrest	9187	6/20	37	25	0	325	460	560	515	470	2330	58.27	52.8
Glacier	4976	6/17	28	5	17	419 ^c	445	458	430	375	2127	53.19	39.0

Mean yield = 78.7 Bu./A.
C.V. = 7.9%

L.S.D. at 0.05 = 11.2 Bu./A S.E. \bar{X} = 6.208 Bu.
^a/ Stem rust ^b/ Hulless variety

F value for variety yield = 4.02⁺⁺
^c/ Yield calculated by missing plot technique.

Table Agronomic data Malting Barley Advance Yield Nurserie dryland, grown at Creston, Montana in 1958.
Eight row plots, three replications.

Planted: April 30, 1958
Harvested: August 13, 1958

Size of plot: 32 sq. ft.

Variety or cross	C.I. No.	Heading date	Height (In.)	Lodging %	Loose Smut	Sample yield			Total Grams	Ave. Bu./A.	Bushel wt. in pounds
						I	II	III			
Ingrid	10083	6/28	31	2	2	1635	1306	1545	4486	93.49	52.5
Betzes	6398	6/22	31	57	1	1405	1493 ^a	1060	3958	82.49	53.2
Freja	7130	6/24	28	7	1	1135	1555	1220	3910	81.48	53.0
Piroline	9558	6/23	31	10	-	1347	1211	1115	3673	76.54	52.3
Vantage	7324	6/24	37	7	1	1045	1335	1240	3620	75.44	47.4
Hiland	9530	6/20	32	0	-	1076	1185	1150	3411	71.08	45.6
Glacier x Titan	10421	6/19	36	13	1	1224	1674	489	3387	70.58	48.5
Traill	9538	6/18	37	30	-	1375	1276	224	2875	59.91	51.5
Compana	5438	6/17	31	75	0	1135	1224	300	2659	55.41	48.9
Heines Hanna	9532	6/23	31	70	-	1268	1000	330	2598	54.14	51.5

Mean yield = 72.0 Bu./A.

S.E. \bar{x} = 11.121 Bu.

F value for variety yield = not significant.

C.V. = 15.4%

F value for replication = 6.52⁺⁺

a/ Yield calculated by missing plot technique.

Table Agronomic data from dryland Advanced Yield Nursery grown at Creston, Montana, 1958. Eight row plots, 3 replications.

Planted: April 28, 1958
Harvested: August 13, 1958

Size of plot: 32 Sq. Ft.

Variety or cross	C.I. No.	Heading Date	Ht. In.	Lodging %	Sample yield			Total Grams	Ave. Bu./A.	Bushel wt. in pounds
					I	II	III			
Glacier x Titan (50-5639-12)	10421	6/19	25	55	1155	1272	1150	3577	74.54	46.9
Vantage	7324	6/24	28	35	1236	1115	801	3152	65.69	45.0
Dekap	3351	6/22	21	66	1004	1110	1009	3123	65.08	49.2
Titan	7055	6/19	25	32	1165	1055	765	2985	62.21	43.5
Freja	7130	6/24	22	22	1163	1040	721	2924	60.94	49.3
Piroline	9558	6/24	24	10	1212	735	960	2907	60.58	52.0
Betzes	6398	6/24	23	22	925	835	805	2565	53.45	48.0
Compana	5438	6/23	19	90	645	612	610	1867	38.91*	45.0

Mean yield = 60.2 Bu./A.

S.E. \bar{x} = 4.834 Bu.

F value for variety yield = 4.66⁺⁺

L.S.D. at 0.05 = 14.7 Bu./A.

C.V. = 8.0%

F value for replications = 4.97⁺

* Indicates varieties yielding significantly less than Titan at 0.05.

Table Agronomic data from dryland Off-Station Barley Nursery grown in Mineral County on the Charles Fry Ranch, Tarkio, Montana. Single row plot, 4 replications.

Planted: May 6, 1958

Size of plot: 16 sq. ft.

Harvested: August 26, 1958

Variety or cross	C.I. No.	Height (In.)	Sample yield Grams per plot				Total Grams	Ave. Bu./A.
			I	II	III	IV		
Vantage	7324	19	170	105	145	185	605	18.91
Glacier x Titan	10421	19	140	100	130	140	510	15.94
Ingrid	10083	16	115	136	137	120	508	15.88
Traill	9538	18	75	174	100	155	504	15.75
Betzes	6398	16	125	130	56	125	436	13.63*
Piroline	9558	17	85	85	115	115	400	12.50*
Dekap	3151	13	105	60	74	135	374	11.69*
Freja	7130	16	80	85	70	120	355	11.10*
Compana	5438	14	75	75	65	60	275	8.60*
B-855-14-2 ^a	----	14	25	10	55	50	140	4.38*

Mean yield = 12.8 Bu./A.

S.E. \bar{x} = 1.620 Bu.

F value for variety yield = 6.73⁺⁺

L.S.D. at 0.05 = 4.7 Bu./A.

C.V. = 12.6%

* Indicates varieties yielding significantly less than Vantage at 0.05.

a - Hulless variety.

Table Agronomic data from Irrigated Off-Station Nursery grown in Missoula County on the Ray Wills Ranch, Potomac, Montana. Single row plot, 4 replications.

Planted: May 6, 1958

Size of plot: 16 sq. ft.

Harvested: September 3, 1958

Variety or cross	C.I. No.	Height (In.)	Sample yield				Total Grams	Ave. Bu./A.	Bushel wt. in pounds
			I	II	III	IV			
Glacier x Titan	10421	40	303	485	558	748	2094	65.46 <i>Antos</i>	46.8
Vantage	7324	43	491	520	430	375	1816	56.77	----
Piroline	9558	34	418	500	485	412	1815	56.74	50.6
Ingrid	10083	32	350	400	448	532	1730	54.08	----
Dekap	3151	30	536	370	293	400	1599	49.98	----
Traill	9538	39	313	456	430	373	1572	49.14	----
B-855-14-2 ^a	----	33	472	393	238	333	1436	44.89	54.2
Freja	7130	34	405	370	233	293	1301	40.67	----
Betzes	6398	33	266	278	405	330	1279	39.98	----
Compana	5438	27	40	126	153	220	539	16.85*	----

Mean yield = 47.4 Bu./A.

S.E. \bar{x} = 5.962 Bu.

F value for variety yield = 4.98⁺⁺

L.S.D. at 0.05 = 17.2 Bu./A.

C.V. = 12.6%

* Indicates varieties yielding significantly less than Vantage at 0.05.

a - Hulless variety

Table 24. Winter Barley, Ravalli County, 1958. Lb B. McFadgen farm. Single row plots, four replications
Seeded Sept. 24, 1957, 17 sq. ft. Harvested August 11, 1958.

Variety	C.I. No.	Grams per Plot				Total Grams	Bu/A	Lbs/Bu
		I	II	III	IV			
Alpine	----	399	180	170	265	1014	31.70	39.5
Ellis	9529	125	275	545	465	1410	44.08	44.0
Olympia	----	335	300	285	280	1200	37.51	43.6
Winter Club	592	174	10	50	75	309	9.66	----
CCX-242	9176	465	135	556	176	1332	41.64	45.3
Ohio Winter	7072	240	239	315	240	1034	32.32	47.0
W. Va. CCX-1-4522	7582	292	495	115	210	1112	34.76	42.4
Kearney	7580	65	220	233	201	719	22.47	43.0
CCX-51-449	----	637	285	445	170	1537	48.05	45.3

Potatoes

Project 5027

Detailed studies with potatoes have been interrupted, temporarily, until former dryland and irrigated, potato areas have been consolidated into one irrigated potato rotation, and until some new work is decided upon.

Preliminary work in control of scab by use of soil fumigants (See Preliminary Investigations) and work with chemicals for control of weeds (See Weeds) in progress. Also work with irrigation.

Acreage seeded to potatoes for the production of Certified seed was the usual four acres plus, and production was normal.

The approved budget of \$1237.50 will, we hope, be recovered in the sale of seed.

For Scab Notes on eight varieties grown for observation of incidence of scab see Table I.

Table 1. Scab on Potato Varieties, Creston, Montana, 1958.
Single row, 20 hills. Plots planted May 29, Dug Sept. 20

<u>VARIETY</u>	<u>DESCRIPTION</u>	<u>SCAB READINGS</u>
Redbake	Mature. Good size & type	Very scabby
Osseo	Good size type and maturity	Very scabby
Sheridan	Good size type & maturity	Very scabby
Norland	Mature fair size, good type	Moderate scab
Maritta	Late small	Scab usually not deep
Early Gem	Early Mature	No scab

From this work and the appearance of Norland in garden plots on-station this season it would appear likely that Norland would have limited value as an early red potato in the area, and possibly have more scab resistance than other reds being grown.

Preliminary Investigations

Project 5028

High incidence of scab on all susceptible varieties when grown on the Northwestern Montana Branch Station, plus occasional scab on even the most resistant varieties, has led to a search of some means of scab control other than varietal resistance.

Some workers suggest the possibility of controlling scab with soil fumigants. This reported possibility led to use of fumigants for the purpose on the N. W. Branch Station

Another reported benefit from fumigants is that of control of organisms causing root rot in Strawberries. This is also being explored.

The work at N. W. Branch Station is being done with the Horticulture Department and the Botany and Bacteriology Department of Montana State College as cooperators or consultants. Extension Horticulturists are also involved in planning and observations.

\$812.50 is the 1958-59 budget.

Report on Use of Fumigants on Strawberries

Vapam, Terrachlor, and Mylone were uniformly distributed on the surface of 11 x 20 ft. plots April 28. Materials were disced in, then plots sprinkled with 1/2 in. of water. Three rows, 3 1/2 ft. apart of Senator Dunlap Strawberries were set May 25. Good stands were obtained in all plots, equally as good on treated as on check plots. No detrimental effects were evident from the rates used.

No effect could be noted on weed growth within the plots due to rates used. Most troublesome of the weeds present was Purslane.

Plots will be watched for a period of three or more years for development of root-rot in strawberries.

Rates:

Vapam	2-1/4 qts. on 220 sq. ft.
Terrochlor	2-1/2 lbs. on 220 sq. ft.
Mylone	1-3/4 lbs. on 220 sq. ft.

Report on Fumigants Used for Scab
Control on Potatoes-Station 1958

In a garden known to produce scab on susceptible varieties, plots 11 ft. x 20 ft. were treated with fumigants April 25, 1958. Treatments were randomized in three replications.

Terracholor, terrachlor and Vapam, and Vapam were used. Terrachlor, was spread uniformly, Vapam sprinkled, then desced lightly, then irrigated with sprinkler system using one half inch of water. One row of a scab resistant variety and two rows of a susceptible variety were hand planted in each plot, May 28th.

<u>Treatment</u>	<u>Rate</u>	Rep. 1		Rep. 2		Rep. 3		Rep. 4	
		No. Harv.	Hill Lbs.	Hill-	Lbs	Hill-Lbs	Hill-Lbs	Hill-Lbs.	Hill-Lbs.
None	0	8	21	11	56	13	50	11	42
Terracholor	2- $\frac{1}{2}$ lbs	14	64	13	80	14	73	14	72
Vapam & Terracholor	1- $\frac{1}{8}$ qt & 1- $\frac{1}{4}$ lbs	16	96	13	54	13	67	14	72
Vapam	2- $\frac{1}{4}$ qt	12	59	16	74	16	81	15	71

Stands were poor in all plots, some less in checks than treated plots.

Scab was heavy to very heavy in susceptible variety in all plots.

No weedicial effect could be noted from the rates used.

No detrimental effect of treatments were evident.

Farm Flock
Record for 1958

Project 5029

The gross return for 1958 from a flock of 40 ewes at the beginning of the year which included 9 ewe lambs has been \$172.32 from wool \$195.00 from sale of 3 rams, \$355.92 from sale of lambs, plus 10 x \$20.00 for inventory increase from 40 to 50 for a total of \$923.24 or \$23.08 per ewe of all ages.

Average fleece weights at shearing time were 13.67 lbs. These were evidently quite damp when shorn, or at any rate the 601.5 lbs. total of individual fleece weights had dwindled to 464 pounds the weight paid for when consigned to Portland Hide and Wool Company.

No advantage in weight or condition resulted from weaning one twin @3-3½ months of age, placing the weaned lamb on irrigated pasture and leaving the ewe only one lamb to raise. Weaned lambs gained 11.49 pounds in 48 days, lambs left with ewes 17.3 pounds. Both of twins left with mothers gained 16.9 pounds average for the same period.

Actually the early weaning resulted in quite heavy losses when dogs got into the weaned lambs killing four and crippling others.

Lamb losses were heavy throughout the season. Of 55 lambs born only 39 reached sale age and weight. Eight were lost at birth or before turnout, nine after being turned out on grass. Losses after turnout were primarily due to dogs and to summer with rubbers, obviously not a safe practice.

Advantage was taken of the policy of the U. S. Range Sheep Station at Dubios, Idaho of supplying outstanding rams to Institutions at \$100.00 each.

A yearling Reg. Columbia Ram was secured that, it is hoped, will improve finenes and density of fleeces in offspring. Need for this is shown by the 1958 account of sale from Portland Hide & Wool showing that 93 lbs. of the 1958 clip was 3/8 blood, 271 pounds 1/4 blood, and 100 pounds low 1/4.

Plans for the coming season call for early weaning only if the practice is dictated by lack of satisfactory gain of individual lambs. For selection of a few good ram lambs to be kept and offered for sale as yearlings. And for seeking assistance from the Department of Animal Industry with measuring and recording desirable heritable characteristics in individuals in the flock, such record to be used as a basis of flock improvement.

The approved budget for work with sheep for 58-59 was \$1437.50.

Weather Record

	'57 Sept.	'57 Oct.	'57 Nov.	'57 Dec.	'58 Jan.	'58 Feb.	'58 Mar.	'58 Apr.	'58 May	'58 June	'58 July	'58 Aug.	Total Or Ave. Season
Precipins													
Current Year	.10	1.59	.96	1.56	1.56	2.69	.92	1.65	2.20	2.56	.84	.58	17.41
Ave. 1949-57-8	.77	1.57	1.08	1.61	1.65	1.33	.96	1.24	1.66	3.05	1.58	1.59	18.09
Current yr. Mean Temp °F	55.8	42.3	35.8	32.4	29.3	30.3	32.2	43.6	59.7	62.2	64.0	67.9	55.55 46.29
Ave 149-57-8	54.1	43.6	33.0	26.9	20.9	26.7	30.6	42.5	52.3	57.4	63.9	63.7	42.96
Last Kill Frost '58													
Ave. 49-58					May 14, (31)								June 3, (30.5) <i>May 28</i>
1958 First Kill Frost					Sept. 27, (31)								
Ave 49-58					Sept. 11, (29.6)								
1958 Frost Free Period					136 days								
Ave. 49-58					110 days								
Max Sum. Temp					94								August 11
Min. Winter Temp.					2								above Jan. 1

SUPPLEMENT TO THE 1958 ANNUAL REPORT

Northwestern Montana Branch Station

This supplement will consist of the analysis of variance of several research trials that were not included in the original Annual Report.

Page 7, Table I

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05).....N.S.
Replications	3	1.3035633	---	C.V. 5.62%
Treatment	2	.67645	---	
Error	6	1.349883		
Total	11			

Page 8, Table III

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05).....N.S.
Replications	3	107.8889	3.01	C.V.%..... 4.92
Treatment	2	44.33335	1.23	
Error	6	35.888833		
Total	11			

Page 8, Table IV

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05).....453.7#/a
Replications	3	723.6674		L.S.D. (.05).....742.5#/a
Treatment	2	1155.5424	29.6	C.V.%..... 3.92
Error	6	38.9092		
Total	11			

Page 9, Table V

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)..... N.S.
Replications	3	1007.7776	---	C.V.% 4.15
Treatment	2	265.08335	---	
Error	6	408.861116		
Total	11			

Page 11, Table I

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05).....N.S. C.V.% 17.21
Replications	3	141.9074		
Treatment	2	61.61115	1.61	
Error	6	38.1574166		
Total	11			

Page 25, Table I

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>
Blocks	1	34.8100	
Seeding Rate	1	1128.9600	15.16**
Fert. level	2	988.13365	13.27**
Spacing	2	158.1003	2.12
F x R	2	430.7858	5.78**
F x Sp	4	235.1261	3.10*
Sp x R	2	90.3675	
Error	21	74.449238	
Total	35		

L.S.D. (.05) Rate of Seeding 6.0
L.S.D. (.05) Fert. Level 7.3

Page 33, Table 12

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)... .21#N/a C.V.% 4.04
Replications	3	6.137758	91.89	
Nitrogen	2	.600886	8.99*	
Phosphorous	2	.020670		
N x P	4	.0204040	3.05	
Error	24	.066790		
Total	35			

Page 35, Table 14

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)... .26PT/a L.S.D. (.01)... .36PT/a C.V.% 6.72
Replications	3	25.215633	---	
Nitrogen	3	.790900	---	
Phosphorous	3	6.730200	6.3267**	
Error	24	.114583		
Total	33			

Page 36, Table 15

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)....	N.S.
Replications	3	12.683533	6.81	C.V.%	9.63
Nitrogen	3	1.844233	---		
Phosphorous	3	2.2082	1.19		
N x P	9	1.557211	---		
Error	45	1.862417			
Total	63				

Page 37, Table 16

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)....N	16.2
Replications	3	2,319.14	1.73	L.S.D. (.05)....P	12.6
Nitrogen	3	6,362.8066	4.76*	L.S.D. (.01)....P	16.2
Phosphorous	2	77,973.0650	56.62*	C.V.%	8.99
N x P	6	3,743.45	2.80		
Error	33	1,337.04789			
Total	47				

Page 38, Table 17

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)N...	.37T/A
Replications	3	.687767	---	L.S.D. (.01)N... <td>.50T/A</td>	.50T/A
Nitrogen	2	16.5211	13.56**	L.S.D. (.05)P... <td>.25T/A</td>	.25T/A
Phosphorous	3	111.8475	90.84**	L.S.D. (.05)P... <td>.34T/A</td>	.34T/A
N x P	6	8.93767	7.33**	C.V.%	7.91
Error	33	1.217778			
Total	47				

Page 39, Table 18

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)P...	.97 T/A
Replications	3	1.709733	---	L.S.D. (.01)P... <td>1.34 T/A</td>	1.34 T/A
Nitrogen	3	1.710094	---	C.V.%	7.01
Phosphorous	2	31.971581	13.71**		
N x P	6	.945393	---		
Error	33	2.332836			
Total	47				

Page 40, Table 19

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	N.S.
Replications	3	46.393367	---	C.V.%	9.45
Nitrogen	3	1.368938	---		
Phosphorous	2	4.075829	---		
N x P	6	6.041706	---		
Error	33	3.954270			
Total	47				

Page 41, Table 20

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	N.S.
Replications	3	56.683099	15.46	C.V.%	8.64
Nitrogen	3	3.40001	---		
Phosphorous	2	8.856804	2.42		
N x P	6	4.380945	1.20		
Error	3	3.667213			
Total	47				

Page 44, Table 1

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	N.S.
Replications	3	3.130544	7.33	C.V.%	6.59
Varieties	8	.613251	1.43		
Error	24	.427033			
Total	35				

Page 45, Table 2

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	.43 T/A
Replications	3	5.63263	8.47*	L.S.D. (.01)...	.58 T/A
Varieties	9	8.289331	12.47**	C.V.%	2.46
Error	27	.664978			
Total	39				

Page 46, Table 3 (Grasses alone)

Analysis of Variance

Source	D.F.	Mean Square	F	L.S.D. (.05)...	N.S.
Replications	2	5.111138	--	C.V.%	3.09
Varieties	8	1.131809	--		
Error	16	.659466			
Total	26				

(With alfalfa)

Replications	2	22.539205		L.S.D. (.05)...	.43 T/A
Varieties	8	3.091995	6.71	L.S.D. (.01)...	.59 T/A
Error	16	.460803		C.V.%	3.71
Total	26				

Page 47, Table 4

Analysis of Variance

Source	D.F.	Mean Square	F	L.S.D. (.05)...	.94 T/A
Replications	2	7.145288	3.07	L.S.D. (.01)...	1.27 T/A
Mixtures	11	61.556711	26.44**	C.V.%	7.57
Error	22	2.327925			
Total	35				

Page 48, Table 5

Analysis of Variance

Source	D.F.	Mean Square	F	L.S.D. (.05)...	N.S.
Replications	2	6.864680	--	C.V.%	14.64
Varieties	17	.770994	--		
Error	34	.998242			
Total	53				

Page 49, Table 6

Analysis of Variance

Source	D.F.	Mean Square	F	L.S.D. (.05)...	N.S.
Replications	2	10.668039		C.V.%	21.34
Varieties	10	12.416236	2.27		
Error	20	5.463262			
Total	32				

Page 50, Table 7

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D.(.05)...	N.S.
Total	17	---	---		
Block	2	49.9982	---		
Rate	1	.2156	---		
Spacing	2	2.27115	---		
Sp x R	2	6.2475	---		
Error	10	6.18779			

Page 51, Table 8

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>
Total	17	---	---
Blocks	2	12.57005	---
Rate	1	.3670	---
Spacing	2	1.5106	---
S x R	2	.7870	---
Error	10	1.8181	

Page 52, Table 9

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>
Total	17	---	---
Blocks	2	10.28515	1.4
Rate	1	2.3184	---
Spacing	2	1.11525	---
R x S	2	.80275	---
Error	10	2.44526	

Page 54, Table 11

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>
Total	47		
Block	2	2.258367	---
Seeding Method	2	7.6155	1.52
Seeding Rate	3	18.276533	3.65
SR x SM	6	2.7959	---
Error	33	4.99816	

Page 55, Table 12

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	N.S.
Replications	3	---	---	C.V.%	6.99
Method	2	2.697175	---		
Error	6	2.830652			
Total	11				

Page 55, Table 13

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	N.S.
Replications	3	.786089		C.V.%	6.24
Method	2	4.733775	3.17		
Error	6	1.491447			
Total	11				

Page 65, Table 4

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	3.07 T/A ¹ / ₁
Replications	3	779.8333	xxx	C.V.%	10.09
Varieties	5	345.5	3.49*		
Error	14	98.821428			
Total	22				

¹/₁ figure based on green weights

Page 65, Table 5

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	3.44 T/A
Replications	3	335.443333		L.S.D. (.01)...	4.76 T/A
Varieties	5	2662.10	21.34**	C.V.%	5.29
Error	15	124.74466			
Total	23				

¹/₁ figures based on green weights

Page 84, Table 14

Analysis of Varce

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	
Replications	2	2,034.025	---	30.1 bu.	
Varieties	35	5,316.1214	3.61**	40.1 bu.	
Error	70	9,775.29457		C.V. %	12.59
Total	107				

Page 85, Table 15

Analysis of Varce

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	
Replications	2	6,101.775	---	22.0 bu.	
Varieties	35	18,327.8286	3.50**	29.4 bu.	
Error	69	5,241.28188		C.V. %	13.60
Total	106				

Page 86, Table 16

Analysis of Varance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	
Replication	3	1,051.2100	---	15.6	
Varieties	7	16,302.6971	5.09**	21.2	
Error	21	3,199.541428		C.V. %	5.21
Total	31				

Page 87, Table 17

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	
Replication	3	.928467	---	26.3	
Varieties	9	24,570.1777	2.62*	C.V. %	9.44
Error	27	9,364.39259			
Total	39				

Page 88, Table 18

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	
Replication	3	2333.49166	5.30**	5.69	
Varieties	9	1046.891666	2.37**	C.V. %	9.75
Error	27	440.195370			
Total	39				

Page 95, Table 24

Analysis of Variance

<u>Source</u>	<u>D.F.</u>	<u>Mean Square</u>	<u>F</u>	L.S.D. (.05)...	N.S.
				C.V. %	26.08
Replications	3	13,960.841	--		
Varieties	8	35,237.4653	1.80		
Error	24	19,619.70945			
Total	35				