ANNUAL REPORT

1953

NORTHWESTERN MONTANA BRANCH STATION

Creston, Montana

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This report is in 6 parts:

1. Development of the Station.
2. Agronomy.
3. Horticulture.
4. Activities.
5. Livestock.
6. Weather.

Together, the 6 parts of this report present a fairly comprehensive resume of the activities and accomplishments of the Station in 1953.

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Development of the Northwestern
Montana Branch Station

An addition to Residence #2 improves the appearance of the structure, provides badly needed room, including one additional bed room, a back entrance and closet space, and incloses the entrance to the basement. This addition was contracted at $1996.00.

Improvement of equipment has been given considerable attention. With the help of one of the Station Advisory committee members who operates a machine shop, an attachment was designed and constructed for a Cub 474 four row vegetable planter which provides us with a portable, tractor operated, hydraulically controled, four row belt seeder. Another attachment enables us to side-dress previously seeded crops with exact amounts of fertilizers. At reletively little expense we have an efficient seed and fertilizer drill, which with simple adjustments, will accurately seed amounts of seeds of any size in amounts varying from 1 to 200 pounds per acre, at any depth, and in any row spacing; and that will accurately apply fertilizers in any amounts up to 200 pounds per acre to either annual or perennial crops. The cost for additional labor and materials was approximately $250.00.

A few equipment items were purchased which add to the accuracy of our work with grains and seed crops. Among these are an office Clipper seed cleaner, a portable electric motor, and a clover huller. The combined cost of these items was $142.00. Other much needed equipment items purchased were a weed sprayer, and a hay hoist and slings. The cost of these items were $199.00 and$120.00 respectively. Twelve dollars and fifty cents spent for a vacuum cleaner makes it possible to apply soluble weed chemicals accurately to small plots, using a portable generator, loaned to us by the Horticulture Department, for power.

Ten Pasture Mixtures - Irrigated

Ten pasture mixtures were seeded in the spring of 1949, in 5 x 24 feet plots, four replication, rows spaced six inches. Yields are determined by frequent clipping of 3 x 20 feet plot centers.

Yields in 1953 were considerably below the long term averages for some mixtures. One mixture improved its relative yield position by producing more than in any previous season.

Table I presents the 1953 yield data, showing significantly greater yield the fourth year after seeding for two mixtures when compared to Huntley as a check.

Table II shows four year averages for the ten mixtures, and show eight of the ten mixtures haveing similar yields, with one somewhat lower and one somewhat higher than the others.

New pasture studies seeded this spring pair five grasses with Ladino Clover and with Birdsfoot Trefoil.

Table I. Frequent clipping 1953. Plot weights in ounces. Four cuttings- 6-1, 6-22, 7-27, 9-5. Irrigated- 7-7, 7-20, 8-3, 8-20. Twenty feet of three feet center cut for yield.

Mixture	Ounces per plot I	II	III	IV	Total	Av.lbs Per Acre
Huntley	38.50	51.75	44.25	41.50	176.00	1996.5
%	15.00	15.00	12.50	13.75		14%
Huntley A	33.25	34.25	32.00	50.25	149.75	1698.7
%	13.75	13.75	10.00	15.00		13%
Huntley B	16.25	32.50	34.50	39.25	122.50	1389.6
%	7.50	8.75	10.00	12.50		10%
Huntley C	41.25	33.00	29.00	33.50	136.75	1551.26
%	13.75	13.75	10.00	8.75		11.50%
Orchard and Ladino	22.50	41.50	39.50	28.25	131.75	1494.5
%	12.50	13.75	13.75	11.25		13%
Brome and Ladino	37.25	28.00	29.50	47.75	142.50	1616.5
%	22.50	25.00	25.00	22.50		24%
Alta and Ladino	62.00	60.50	61.25	54.25	238.00	2699.8**
%	7.50	10.00	13.75	8.75		10%
Tall Blue and Ladino	42.50	17.00	34.50	27.50	121.50	1378.26
%	22.50	32.50	32.50	32.50		30%
Brome and Alfalfa	41.75	31.50	59.25	59.75	192.25	2180.8
%	36.25	32.50	40.00	42.50		38%
Tall Blue Trefoil	48.50	57.50	67.50	81.25	254.75	2889.8**
%	72.50	80.00	77.50	80.00		77.50%

*Varities yielding significantly more than Huntley (5%).
**Varities yielding significantly more than Huntley (1%).

Mean Yield.....1889.42
S. E. X.....209.72
L.S.D. (5%).....608.03
L.S.D. (1%).....821.74
C. V.....11.10%

Table II. Four year average yields of ten pasture mixtures.

Mixture	1950	1951	1952	1953	Total	Average lbs/A	Av. % Legume
Huntley	3145	2235	2019	1996	9395	2349	9.50
Huntley A	3097	2291	2210	1699	9297	2324	10.75
Huntley B	2960	2087	1960	1390	8397	2099	7.50
Huntley C	3545	2303	1942	1551	9341	2335	7.50
Orchard-Ladino	3624	2428	2456	1494	10002	2500	7.75
Brome-Ladino	3460	2144	2051	1616	9271	2118	12.00
Alta-Ladino	3025	2700	2777	2700	11202	2800	7.75
Tall blue-Ladino	1948	1577	1824	1378	6727	1682	30.00
Brome-Alfalfa	3582	2427	2182	2181	10372	2593	27.50
Tall blue-Trefoil	1982	2155	1878	2890	8905	2226	73.50

Thirteen Hay Mixtures - Irrigated

Six grasses were seeded alone and each with alfalfa in 5 x 24 feet plots, four replications, in 1949, rows spaced six inches.

Yields are determined by cutting 3 x 20 feet plot centers, and weighing the samples when dry. Two cuttings are usually secured, although regrowth of grasses is sometimes insufficient to justify a second harvest.

In 1953 alfalfa produced more than in any previous season, grasses were all lower than for any previous season. (Standard applications of 200 pounds of 10-20-0 per acre to all plots in this study for the last two years may have favored alfalfa more than grass). Table III presents the 1953 data. The plots were irrigated on 7/7, 7/20, and 8/3. Harvest dates were 6/23 and 8/21. Two mixtures, brome and alfalfa and orchard and alfalfa produced significantly more than alfalfa alone at 1 per cent level.

Table IV shows four year average yields of the 13 hays. Even though alfalfa alone was much nearer the mixtures in total yield this year than heretofore, mixtures have produced from .46 to .95 tons per acre more than alfalfa alone for the four year average.

New hay studies seeded this spring compare six alfalfa-grass mixtures with six red clover-grass mixtures.

Table III. 13 Hay crops or mixtures - Irrigated 1953. Two cuttings in Pounds and ounces from 60 sq. ft.

Crop or Mixture		I	II	III	IV	Total lbs.	lbs/A
Alfalfa	1st	4-1	4-1	4-5.50	2-9		
	2nd	3-7.50	2-14.75	4-5.50	2-14.25		
	Total	7.53	6.95	8.69	5.45	28.62	5195.4
Brome	1st	3-15.75	3-15.75	3-3	3-11.50		
	Total	3.98	3.98	3.19	3.72	14.87	2745.2
Brome & Alfalfa	1st	5-9.50	4-15	4-15.25	5-0.75		
	2nd	4-1	3-7.50	3-7.50	5-3.50		
	Total	9.66	8.40	8.42	10.27	36.75	6670.1**
Orchard	1st	2-8.75	2-7.75	1-12	2-5		
		2.55	2.48	1.75	2.31	9.09	1644.8
Orchard & Alfalfa	1st	4-10	5-7.75	4-9.50	5-8		
	2nd	3-7.50	4-10.25	4-10.25	4-5.50		
	Total	8.09	10.13	9.23	9.84	37.29	6760.9**
Alta Fescue	1st	3-11	4-2.25	3-2.25	3-0.50		
		3.69	4.14	3.14	3.03	14.00	2541
Alta & Alfalfa	1st	4-7.50	3-15.75	5-6.75	3-2.75		
	2nd	2-14.25	3-7.50	3-7.50	2-14.25		
		7.34	7.45	8.90	6.06	29.75	5399.6
Crested	1st	3-0.50	2-4.25	2-0.75	1-9		
		3.01	2.26	2.04	1.56	8.87	1610.8
Crested & Alfalfa	1st	3-12.50	4-11.25	3-8.50	4-2.75		
	2nd	3-12.25	4-10.25	4-1	4-10.25		
		7.56	9.34	7.59	8.81	33.30	6046.2
Reed Canary	1st	3-14.50	2-5.25	2-0.50	2-7.75		
		3.91	2.33	2.02	2.49	10.75	1951.1
Canary & Alfalfa	1st	5-12	6-7.75	4-1	4-10.25		
	2nd	4-10.25	4-1	3-7.50	5-3.50		
		10.39	10.55	7.53	9.86	38.33	6953.7
Timothy	1st	3-6.50	4-1.25	2-0.75	1-14		
		3.40	4.08	2.04	1.88	11.40	2064.6

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Table III Continued. 13 Hay crops or mixtures.

Crop or Mixture		I	II	III	IV	Total Lbs.	Lbs/Acre
Timothy & Alfalfa	1st	6-0	4-12.75	3-14	4-1.25		
	2nd	4-1	3-7.50	2-14.24	2-8.50		
		10.06	8.27	6.76	6.61	31.70	5751.3

Cut 6/23 & 8/21.

Irrigated 7/7, 7/20, and 8/3.

**Crops or Mixture yielding significantly more than alfalfa (1%).

Mean Yield.....4254.36
S. E. $\bar{X}$..... 344.56
I.S.D. (5%)..... 987.36
I.S.D. (1%).....1321.32
C. V. 8.09%

Table IV. Four year average yields of 13 irrigated hays.

Variety or Mixture	1950		1951		1952		1953		Total	Average lbs/A	Tons Per A.
Alfalfa	3604	1.8	2720	1.36	3294	1.647	5195	2.597	14813	3703	1.85
Brome	6506	3.25	3979	1.989	2573	1.286	2745	1.37	15803	3951	1.97
Bome and Alfalfa	5936	2.968	4510	2.255	5250	2.625	6625	3.31	22321	5580	2.79
Orchard	5984	2.992	3596	1.798	2777	1.388	1645	.82	14002	3500	1.75
Orchard and Alfalfa	5975	2.987	4294	2.147	5295	2.647	6761	3.38	22325	5581	2.79
Alta	6562	3.28	5173	2.586	3471	1.735	2541	1.27	17747	4437	2.21
Alta and Alfalfa	6032	3.01	4674	2.337	4537	2.268	5400	2.7	20643	5161	2.58
Crested	4336	2.168	2870	1.435	1760	.88	1611	.805	10577	2644	1.32
Crested and Alfalfa	4557	2.278	3913	1.956	3984	1.992	6046	3.023	18500	4625	2.31
Reed Canary	4849	2.124	3456	1.728	2269	1.134	1951	.975	12525	3131	1.56
Reed Canary and Alfalfa	5031	2.515	4430	2.215	6003	3.001	6954	3.477	22418	5604	2.80
Hopkins Timothy	6395	3.197	3449	1.724	2536	1.268	2065	1.03	14445	3611	1.80
Hopkins Timothy and Alfalfa	5536	2.768	4041	2.02	4420	2.21	5751	2.875	19748	4937	2.47
	5485		3931		3705		4253				

Fifteen Grasses for Seed - Irrigated

Of the fifteen grass species planted in 1949 eight were present in comparable stands for harvest the fourth year after seeding, after rogueing to remove bluegrass.

Table V presents 1953 yield data. Four grasses produced 350 pounds per acre or more the fourth year after seeding. Fertilizer applications of 50 pounds of nitrogen per acre in 1952 and 32 pounds of nitrogen per acre in 1953 may have contributed to these yields. All plots were irrigated July 7. Plots are harvested as ripe beginning July 21, except that an unknown percentage of the Reed Canary seed was lost by shattering.

Table VI shows four year average for grasses that remained in good stands for the entire period.

Lawn Grass Seeds

Two lawn grasses, B 27 (Merion) Blue Grass and F 74 Red Fescue were seeded in four row plots 20 feet long, 1 foot between rows four replications, in 1951. Good stands were obtained, although the fescue was noticeably the quicker to fill the rows.

Seed was not obtained in 1952 because the plots were mowed by mistake. 1953 yields were not especially high, and varied considerably between replications. Table VII shows 1953 yield data.

Seven Legumes for Seed - Irrigated

Of seven legumes planted in small plots for seed production in 1949 three remained in good stands and produced seed in 1953. None of the yields were high, and Birdsfoot yields were down as compared to previous years. Obviously something in the way of cultural practices: spacing, fertilizer, cultivation, irrigation, colonization, needs be applied to these crops to improve yields if they are to be commercially profitable. Table VIII and VIIIa present yield data for 1953 and for 1951-1953.

Table V. Irrigated grass seed yields in Ounces per plot, and four plot average yields in Lbs. per acre, 1953. (16 ft. of center row harvested, or 48 sq. ft.)

Species	Grass Seed in Ounces from 16 ft. of 3 ft. row I	II	III	IV	Total	Pounds Per Acre
Russian Wild Rye	.75	1.00	1.00	.75	3.50	49.63
Intermediate Wheat Grass	2.75	1.00	2.00	1.50	7.25	102.8
Alta Fescue	6.25	7.75	13.75	8.25	36.00	510.48
Manchar Sm. Brome	1.50	2.25	2.25	1.25	7.25	102.8
Tualatin Tall Oat	5.25	5.50	7.00	7.00	24.75	350.96
Erect Brome	13.00	8.50	5.25	8.75	35.50	503.39
Beltsville Orchard	6.00	8.50	5.00	5.75	25.25	358.04
Reed Canary*	.25	.25	.25	.25	1.00	14.18

Conversion factor 192 sq. ft. x 14.18

*Lost by shattering.

Mean Yield.....249.00
S. E. $\bar{x}$ 52.46
L.S.D. (5%).....154.28
L.S.D. (1%).....209.86
C. V. 21.07

Table VI. Four year average grass seed yields-irrigated.

Species or Variety	1950	1951	1952	1953	Total	Average Pounds Per Acre
Alta Fescue	910	524	474	510	2418	604.5
Manchar Smooth Brome	617	216	453	103	1389	347.0
Tualatin Tall Oatgrass	628	392	348	351	1719	429.5
Beltsville Orchard Grass	500	167	88	358	1113	278.0
Intermediate Wheat	668	188.6	-	102.8	959.4[1]	319.8[1]
Erect Brome	1160	374.3	252.3	503.4	2290.0	575.0
Russian Wildrye	79	49.6	-	49.6	178.2[1]	59.4[1]
Reed Canary	224.6	218.3	132.5	14.2	589.5	147.4

[1]Three years only.

Table VII. lawn grass seeds 1953. Two species, four replications. Ounces from two rows 16 feet One ft. space or 32 square feet.

Species	I	II	III	IV	Total	Pounds Per Acre
B 27 Blue	2.25	2.50	1.50	1.50	7.75	164.84
F 74 Red Fescue	3.50	3.75	1.25	4.25	12.75	271.19

Table VIII. Legume Seeds 1953. Three one foot rows twenty feet.

Species	Ounces per plot I	II	III	IV	Total	Pounds Per Acre
Kenland	.75	1.75	1.00	1.75	5.25	59.56
Alfalfa	3.25	2.50	3.00	2.75	11.50	130.45
Birdsfoot	2.25	2.50	1.50	2.75	9.00	102.09

Mean Yield.....97.56
S. E. M.....13.045
L.S.D. (5%).....45.21
C. V.....13.37%

Table VIIIa. Three year average yield of Legume Seeds.

	1951	1952	1953	Total	Average Pounds/A
Alfalfa	102.1	107.5	130.4	340.0	113.3
Kenland	48.2	76.7	59.6	184.5	61.5
Birdsfoot	317.6	239.1	102.1	658.8	219.6
Ladino (Breeders)	42.5	35.8	-	78.3	39.1
Ladino (Fdm.)	34.0	32.2	-	66.2	33.1

Fourteen Brome grass Strains - Irrigated

Fourteen strains of Bromegrass were seeded in 1950 in three row plots, rows spaced three feet, plots 20 feet long, three replications. Center rows are harvested for seed. One border row is cut prior to ripening for forage yield indication.

Results for the first three harvest years have been erratic and the data obtained far from conclusive, so far as seed yields are concerned. Individual plot yields indicate that all strains are capable of high seed yields. The first years yields were obtained from stands that varied considerably. The second years yields were from quite comparable stands, and little statistically significant difference in yield obtained. The third year, 1953, plot yields were erratic in the extreme, probably due to too drastic cultivation.

1953 yield data and three year average data is shown in Tables IX and X.

Forage yield indications secured by harvesting border rows have been quite uniform so far as three plot averages are concerned, but with considerable plot variation. 1953 forage yields and two year averages are shown in Tables XI and XII.

Unless some strains (or varieties) emerge as superior during the next two years it may be necessary to conclude that any one of ten or twelve of the strains is about equal to the other.

Table IX. Seed yields of 14 Bromegrass Strains 1953. Ounces Per Plot and Pounds per Acre.

Strain	I	II	III	Total	Pounds Per Acre
Elsberry	3.50	1.50	1.75	6.75	127.57
Achenbach	2.25	1.75	2.25	6.25	118.12
Lincoln	2.50	2.25	1.50	6.25	118.12
Fischer	2.50	1.25	4.00	7.75	146.47
Nebraska 36	2.25	3.25	3.25	8.75	165.37
Nebraska 44	2.75	2.25	4.50	9.50	179.55
B in 12	3.00	2.25	5.00	10.25	193.72
Martin	2.50	4.75	3.25	10.50	198.45
Manchar	4.75	6.50	5.00	16.25	307.12
Mandan 404	3.75	4.75	7.75	16.25	307.12
Canadian Common	3.00	6.00	2.25	11.25	207.9
South Dakota	3.00	3.75	3.25	10.00	189.0
Parkland	4.75	3.25	2.25	10.25	193.72
Meadow	10.00	8.75	16.75	35.50	670.95

Mean Yield.....223.47
S. E. $\bar{x}$ 30.21
L.S.D. (5%)..... 87.91
L.S.D. (1%).....118.54
C.V..... 13.52%

Table X. Three year average seed yields of 14 Bromegrass Strains in Pounds Per Acre.

Strain	1951	1952	1953	Total	3 year Average
Elsberry	480	376.6	127.6	9842	328.
Achenbach	521	449.2	118.1	1088.3	362.8
Lincoln	553	435.6	118.1	1106.7	368.9
Fischer	838	422.0	146.5	1406.5	468.8
Nebraska 36	553	512.7	165.4	1231.1	410.4
Nebraska 44	728	503.7	179.5	1411.2	470.4
B in 12 (Utah)	512	481.0	193.7	1186.7	395.6
Martin	617	476.4	198.4	1291.8	430.6
Manchar	614	458.3	307.1	1379.4	459.8
Mandan 404	357	521.8	307.1	1185.9	395.3
Canadian Common	468	476.4	207.9	1152.3	384.1
S. Dakota	438	317.6	189.	944.6	314.9
Parkland	659	417.4	193.7	1270.1	423.4
Meadow	651	481.0	670.9	1802.9	601.0

Table XI. Forage from 14 Brome Strains 1953. Cut July 27, 1953. One row 20 feet or 60 sq. feet.

Grass	Field Dry Cuts I	II	III	Average Total	Average Pounds/A
Elsberry	4	4	6	14	3388
Achenbach	8	5	7	20	4840
Lincoln	7	6	6	19	4598
Fischer	7	4	7	18	4356
Neb 36	8	4	6	18	4356
Neb 44	5	8	4	17	4114
Bin 12 Utah	6	6	5	17	4114
Martin	7	4	7	18	4356
Manchar	6	6	6	18	4356
Man 404	8	5	7	20	4840
Can Com	6	8	4	18	4356
S. Dakota	6	5	7	18	4356
Parkland	5	6	8	19	4598
Meadow	5	5	5	15	3630

Mean Yield.....4305.18
S. E. $\bar{X}$..... 587.62
L.S.D..... N. S.
C. V. 13.64%

TABLE XII. Two year average forage yields of 14 brome strains.

Strain or Variety	1952	1953	Total	Average lbs/A
Elsberry	5270.8	3388	8658.8	4329.4
Achenbach	5111.0	4840	9951.0	4975.5
Lincoln	5270.8	4598	9868.8	4934.4
Fischer	5975.0	4356	10331.0	5165.5
Nebr. 36	4406.8	4356	8762.8	4381.4
Nebr 44	5503.1	4114	9617.1	4804.3
Bin 12	5822.5	4114	9936.5	4968.2
Martin	5190.9	4356	9546.9	4773.4
Manchar	6214.6	4356	10570.6	5285.3
Man 404	5031.2	4840	9871.2	4935.6
Canadian Common	4087.4	4356	8443.4	4221.7
S. Dakota	6054.8	4356	10410.8	5205.4
Parkland	4798.9	4598	9396.9	4698.4
Meadow	5270.8	3630	8900.8	4450.4

Nine Orchardgrass Strains for Forage-Irrigated

This is the second harvest year for Orchardgrasses seeded for hay in 1951. Yields for all strains are lower than should be necessary this season, but analysis shows this to be a good trial under the conditions existing in these plots.

Table XIII shows 1953 yield data. Wisconsin 51 leads in yield for the second consecutive season, with Beltsville and Trogdon very close for second and third positions. Three produced significantly less than Beltsville at 1%.

Table XIV presents two year yield comparisons placing Wisconsin 51, Trogdon, and Beltsville in the three top yield positions.

Table XIII. Nine orchard grass strains for forage 1953. Two cuttings 6/23 and 9/5. Irrigated 7/7, 7/20, 8/3. Plot weights in Pounds and Ounces. Season in Pounds.

Strain		I	II	III	IV	Total /Cut	Total Season	Average Per Acre
Wisconsin 51	1st	2-15.50	2-11.25	2-8.25	2-9.25	10-12.25	15-14.75	2892.7
	2nd	1-1	1-2	1-8.50	1-7	5-2.50	15.92	
	Total	4.03	3.82	4.045	4.015			
Beltsville	1st	1-11	2-10	2-3	2-9	9-1	14-10.75	2665.8
	2nd	1-2.50	1-9.75	1-2.50	1-11	5-9.75	14.67	
	Total	2.84	4.23	3.34	4.25			
Virginia	1st	2-0	2-1.50	2-6	3-2	9-9.50	14-7.75	2631.7
	2nd	1-5.25	1-7	1-4.50	0-13.50	4-14.25	14.48	
	Total	3.33	3.53	3.65	3.97			
New Zealand	1st	1-3.50	1-13.25	1-9.25	1-10	5-14	10-7.50	1905.7**
	2nd	1-0.25	1-4.50	1-3	1-1.75	4-9.50	10.47	
	Total	2.23	3.11	2.39	2.73			
Trogdon	1st	2-4.50	2-4.50	2-10.50	2-5.50	9-9	14-6.75	2614.5
	2nd	1-4.50	1-5	1-1.75	1-2.50	4-13.75	14.42	
	Total	3.56	3.59	3.77	3.50			
Akaroa	1st	1-12.75	1-13.50	1-9	1-11.50	6-14.75	11-6.25	2064.6**
	2nd	0-15	1-4	1-4.50	1-0	4-7.50	11.39	
	Total	2.73	3.09	2.84	2.72			
Abev S-37	1st	1-13.75	2-3.25	1-15.75	1-14	7-14.75	13-4	2404.9
	2nd	1-6.25	1-2	1-6	1-7	5-5.25	13.25	
	Total	3.25	3.33	3.36	3.31			
Abev S-143	1st	1-3	1-9.25	1-5.75	1-13.25	5-15.25	9-14.75	1803.7**
	2nd	0-11.50	1-4.50	0-14.25	1-1.25	3-15.50	9.92	
	Total	1.91	2.86	2.25	2.90			
S-143	1st	2-1.25	2-3.75	1-14	2-6.25	8-9.25	13-9.75	2472.9
	2nd	1-4	1-5.75	1-1.75	1-5	5-0.50	13.61	
	Total	3.33	3.59	2.98	3.70			

**Varieties yielding significantly less than Beltsville (1%).

Mean Yield..... 2381.28
S. E. M..... 106.25
L.S.D. (5%).....309.27
L.S.D. (1%).....421.08
C. V. 4.46%

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Table XIV. Two year average yields of nine orchard grass strains. Dry forage in pounds per acre.

Strain or Variety	1952	1953	Total	Average
Wisconsin 51	4566.8	2892.7	7461.5	3730.7
Beltsville	3856.9	2665.8	6522.7	3261.3
Virginia	3780.2	2631.7	6411.9	3205.9
New Zealand	3971.9	1905.7	5877.6	2938.8
Tregdon	4222.6	2620.04	6843.0	3421.5
Akaroa	2830.3	2064.6	4894.9	2447.4
Aber S-37	3267.0	2404.9	5671.9	2835.9
Aber S-143	2915.3	1803.7	4719.0	2359.5
S-143 (Mont)	3650.0	2472.9	6122.9	3061.4

Adaptation Studies - Irrigated

Two 43 species grass nurseries seeded in 1951 remain, one in Flathead County and one in Lincoln County. The survival, apparent vigor, and perhaps comparative yield data will be taken in 1954.

Two legume adaptation nurseries, one on the Station and one in Lake County, contain fair to good stands of a majority of the 20 species seeded. These will be harvested in 1954 if considered necessary to fairly appraise their usefullness, otherwise notes on survival and growth will be taken.

Grasses for Mountain Meadows

In the spring of 1952 six grass species were seeded in the meadow of of the Keeble ranch in McGinnis Meadows, Lincoln County, in 5 x 25 ft plots, four replications. A fair seedbed had been prepared and most of the previous plants eliminated. Moisture was favorable and good stands of all species were secured. These plots were harvested July 25, 1953. The rancher reported that frequent frosts had occured during the summer but Orchardgrass was the only species obviously affected.

Table XV presents data for the first harvest year showing that Lincoln Bromegrass and Reed Canary Grass produced significantly more than Alta Fescue at the 1% level. The yield of dry forage from one cutting was in excess of three tons per acre for these two grasses. Both drainage and irrigation had been made possible on this meadow by deepening the creek channel and enstalling diversion boxes.

Off-Station Hay Studies

Off-Station replicated yield studies with hay containing ten crops or mixtures, including pure stands of four legumes and six grass-alfalfa mixtures were seeded in 1953, in four locations. Three of the plantings came through with good stands and will be harvested in 1954. These are in Ravalli, Missoula, and Sanders Counties. (One of these is in high rainfall area but probably should be considered a dryland trial.)

Table XV. Hay yields, Koebel place, 1953. Harvested July 25, 1953. Three x 25 ft. plot samples.

	Pounds Dry Weight For 75 square feet.					Pounds Per Acre
	I	II	III	IV	Total	
Lincoln Brome	13.68	10.03	12.72	10.94	47.37	6878.12**
Orchard	5.05	5.05	3.10	5.51	18.71	2716.69
Alta Fescue	6.73	7.57	7.02	7.75	29.07	4220.96
Reed Canary	13.14	10.77	12.93	14.00	50.84	7381.97**
Intermediate Wheat	7.56	7.31	12.88	5.37	33.12	4809.02
Tall Oatgrass	2.55	5.55	6.84	4.88	19.82	2877.86

**Varieties yielding significantly more than alta fescue (1%).

Mean Yield.....4814.83
S. E. $\bar{x}$ 517.51
L.S.D.(5%).....1724.98
L.S.D.(1%).....2387.09
C. V. 11.87%

Hybrid Corns for Silage

Twenty varieties and crosses of hybrid corn were planted May 22, 1953 in three row plots, 18 feet long, and three and one-half feet wide.

Forage yields were taken September 14, 1953. The two outside rows of the plot were used for yield data. The remaining row was used for grain yields. Forage weights are given on the green matter only. Grain yields are calculated on the basis of 80 pounds of ear corn per bushel. Grain was harvested October 9, 1953. Compared to yields in 1952, 1953 yields are low in both forage and grain. The season of 1953 was very cold during the months of May and June. The corn emerged June 2, and made little growth from that date until July 1, 1953. Falconer was the leading variety in forage production, with 18.54 tons per acre (green weight). The grain on this variety was very immature and no yields were calculated.

(2254 x 2249) x (J x H) was high in grain yield with 27.05 bushels per acre. This variety was fairly well matured but the corn was quite soft. Table XVI.

Two acres of Wisconsin 275 were grown under field conditions and harvested for silage. The estimated yield on this corn was 12 tons per acre.

Table XVI. Agronomic data from Hybrid Corn Trials at Creston, Montana in 1953. Grown under irrigated conditions four replications, three row plots, 18 feet long, three and one half feet wide.

Dates- Planted: May 22, 1953 Harvested: Forage Sept. 14, 1953, Grain Oct. 9, 1953.

Variety or Cross	Bu./A Air dry Grain	Maturity 9/14/53	Maturity 10/9/53	% Stand	Forage yields in Plot I	II	III	Lbs.	Total Pounds	Average Tons/A Green weight
Nodakhybrid 304		M	VIM	72	62	58	77	53	250	10.80
Falconer	B	B	IM	91	92	107	141	89	429	18.54
Pioneer K		M	IM	76	108	89	95	68	360	15.56
Min. Hybrid 802		D	IM	54	78	63	65	63	269	11.63
(2069 x 2054) x (2059x 2061)	25.52[1]	M	M*	90	64	63	84	50	261	11.28
(2254 x 2249) x (J xH)	27.05[3]	M	M*	96	87	65	44	66	262	11.32
Dekalb 46		B	VIM	64	49	67	68	53	237	10.24
(2059 x 2061) x (D x 49)		M	IM	90	71	77	85	76	309	13.35
Pride B-2		M	IM	85	59	72	64	52	247	10.67
Wisconsin 255		M	IM	70	90	72	81	63	306	13.22
Kingscroft KF	22.01[1]	M	M*	87	84	100	100	97	381	16.47
Dekalb 58		B	VIM	85	114	123	88	86	411	17.76
Wisconsin 270		B	IM	95	82	61	83	103	329	14.22
Wisconsin 279		D	IM	80	60	62	75	56	253	10.93
(2254 x 2249) x (2251 x 2257)	24.31[4]	G	M*	99	64	60	59	74	257	11.11
(2251 x 2257) x (J x H)	27.01[2]	D	IM	69	71	76	86	83	216	13.66
(2069 x 2054) x (D x 49)		M	M	87	72	73	65	66	276	11.93
Nodakhybrid 208		M	VIM	91	83	61	71	51	266	11.50
(2248 x 2294(x(2251 x 2257)	24.44[4]	G	M	96	54	49	64	37	204	8.81
Golden Jewel (Sweet Corn)		M	VIM	52	63	61	88	20	232	10.02

Note: First Frost Sept 16, 1953
*Soft corn
[1]One replication only
[2]Two replications only
[3]Three replications only
[4]Four replications only

Code: 9/14/53
M- Milk
B- Blister
G- Glaze
D- Dough

Code: 10/9/53
VIM- Very immature
IM- Immature
M- Mature

Mean Yield....12.65
S.E. x..... 1.111
L.S.D.(5%).... 3.14
L.S.D.(1%).... 4.18
C.V..... 8.79%

Registered Seed Production

Hopkins Timothy

This was the second harvest year for about ½ acre of Hopkins Timothy. Growth and seed set were good. Field conditions were such that the field passes inspection for Registration.

No attempt was made to leave the seed for combine harvest. Rather the field was mowed when a large percentage of the seed was well filled but before any appreciable amount of shattering occured. No rake was used. After the forage was dry the crop was run through the combine equiped with a pick-up attachment. The combine was set as for wheat except that air was considerably reduced. One-hundred sixty-eight pounds of seed was obtained. The laboratory test showed this to be 99.49% pure, and to germinate 49%.

This is the second year this seed has been inelligible for registration because of low germination.

Thirteen Hay Mixtures - Dryland

1953 was the fourth harvest year for alfalfa, six grasses, and the six grasses in mixtures with alfalfa, seeded in 5 x 24 ft. plots, four replications, on dryland. The soil is a deep sandy loam and free water can be found from eleven feet below the surface to progressively greater depth throughout the season.

Under these conditions alfalfa alone produces very well, practically as well as a grass-alfalfa mixture, and much better than any of the grasses used. Alta Fescue and Crested Wheat are similar in yield and higher than Brome grass, Orchardgrass, Timothy and Reed Canary.

Table XVII shows 1953 yields, Table XVIII shows four year average yields. Yields of alfalfa and alfalfa-grass mixtures have been improving each year, while grass hay yields have never equaled the first seasons production during any of the last three years.

Table XVII. 13 Hay Mixtures, Dryland, 1953. Two cuttings with Alfalfa. One for grass alone. Dates 6/23 and 8/19.

Hay Mixture	Rep. I	II	III	IV	Total Cut	Season Pounds	Average Per Acre
Alfalfa	5-9.75 8-8.25 14.12	5-6.25 7-10.75 13.06	4-6 6-13 11.19	5-9.25 6-6.25 11.97	20-15.25 29-6.25	50-5.50 50.34	9131.7
Smooth Brome	2-15 2.94	2-11.75 2.73	2-15.25 2.95	2-2.75 2.16	10-12.75	10.78	1962.5**
Brome-Alfalfa	7-0.75 6-13 13.86	5-10 6-13 12.44	6-2.25 7-3.50 13.36	6-6.50 6-13 13.22	25-3.50 27-10.50	52-14 52.88	9596.8
Orchard	1-7.25 1.45	1-5 1.31	1-10.75 1.67	1-10.50 1.66	6-1.50	6.09	1111.7**
Orchard A	5-0.25 6-13 11.83	5-1.50 5-15.50 11.06	4-13 6-13 11.63	5-6.75 5-8.50 10.95	20-5.50 25-2	45-7.50 45.47	8439.7*
Alta	4-4 4.25	3-8.75 3.55	3-5.50 3.34	5-2.25 5.14	16-4.50	16.28	2949.4**
Alta-Alfalfa	6-2 6-13 12.94	6-4 6-13 13.06	5-13 6-13 12.63	5-13 6-13 12.62	24-0 27-4	51-4 51.25	9301.9
Crested	5-6.50 5.40	4-4.25 4.26	4-8.50 4.53	3-2.25 3.15	17-5.50	17.34	3147.9**
Crested Alfalfa	5-10.75 7-10.75 13.34	6-4 6-13 13.06	5-4 6-6.25 11.64	5-9.75 6-13 12.42	22-12.50 27-11	50-7.50 50-47	9160.1
Canary	2-6.25 2.39	2-4.75 2.30	2-3.50 2.22	3-1.25 3.07	9-15.75	9.98	1815**
Canary A	5-12.50 5-15.50 11.75	5-0.50 6-13 11.84	5-10.50 6-13 12.47	5-10.25 5-15.50 11.61	22-1.75 25-9	47-10.75 47.67	8555.3

(Continued next page)

Table XVII (Continued) 13 Hay Mixtures, Dryland, 1953.

Hay Mixture	Rep. I	II	III	IV	Total Cut	Total Season lb.	Average Per Acre
Timothy	2-0.75 2.04	1-15.25 1.95	2-12.25 2.77	1-12.25 1.77	8-8.50	8.53	1554.1**
Timothy-Alfalfa	6-10.75 7-10.75 14.35	5-15 6-13 12.75	6-3 6-13 13.0	5-7.50 6-13 12.28	24-4.25 28-1.75	52-6 52.38	9506

*Species yielding significantly less than alfalfa (5%).

**Species yielding significantly less than alfalfa (1%).

Mean Yield.....5858.82
S. E. $\bar{x}$ 222.01
L.S.D. (5%).....637.43
L.S.D. (1%).....853.78
C. V. 3.79%

Table XVIII. Four year average yields of 13 dryland hays.

Species or mixture	1950	1951	1952	1953	Total	Average lbs/A	Tons Per A.
Alfalfa	7354	7467	8412	9132	32365	8091	4.04
Brome	2592	1679	1633	1962	7866	1966	.98
Brome and Alfalfa	6974	7180	8440	9597	32191	8048	4.02
Orchard	3346	1373	1543	1112	7374	1843	.92
Orchard and Alfalfa	6367	6853	8281	8440	29941	7485	3.74
Alta	3100	2654	3054	2949	11757	2939	1.47
Alta and Alfalfa	6432	7492	8685	9302	31911	7978	3.99
Crested	3457	2365	2568	3131	11521	2880	1.44
Crested and Alfalfa	6962	7929	8644	9166	32701	8175	4.08
Reed Canary	2538	1645	1470	1815	7468	1867	.93
Reed Canary and Alfalfa	7189	7430	8399	8555	31573	7893	3.94
Hopkins Timothy	3015	1202	1584	1554	7355	1839	.92
Hopkins Timothy and Alfalfa	7115	7153	9043	9506	32817	8204	4.10

Fifteen Grasses for Seed - Dryland

Ten of the original fifteen grasses seeded for seed production in 1949 remain in good stands and were harvested in 1953. Five produced 300 pounds clean seed per acre or more.

It is interesting to note that actually more grasses remain in good stands in this dryland planting than in the irrigated trials seeded at the same time, and that seed yields have averaged higher in the dryland trials for most species, Orchardgrass and Reed Canary being notable exceptions. In the irrigated trials it has been difficult if not impossible to keep bluegrass from taking over in place of less vigorous species.

Table XIX shows 1953 yield data. Table XX shows four year average yields. From these data it would appear that profitable dryland grass seed production in the area would be dependent more directly on price than upon yield, if the higher producing species are selected.

Table XIX. Dryland grass seed yields in Ounces per plot, and four plot average yield in Pounds per Acre. 1953. (16 ft. of center row harvested, or 48 sq. ft.)

Species	Grass seed in ounces for 16 ft of 3 ft row. I	II	III	IV	Total	Pounds Per Acre
Crested	8.50	15.50	9.00	11.25	44.25	627.46**
R. W. Rye	.75	1.00	1.25	.60[1]	3.60	51.05
Intermediate	5.25	6.50	5.00	4.75	21.50	304.87
Bromar Mt. Brome	9.00	14.00	10.00	8.50	41.50	588.47**
Alta Fescue	7.00	10.50	7.75	8.50	33.75	478.57**
Manchar Smooth Brome	3.50	2.00	7.25	4.25	17.00	241.06
Tualatin Tall Oat	4.50	6.00	7.50	5.25	23.25	329.69
Erect Brome	.75	1.75	.50	1.75	4.75	67.36
Beltsville Orchard	2.00	.75	1.75	.75	5.25	74.44
Reed Canary[2]	.25	.75	.50	.25	1.75	24.81

[1]Missing Plot.

[2]Shattered.

**Species yielding significantly more than Mountian Brome (1%).

Mean Yield.....279.06
S. E. $\bar{Y}$ 43.70
L.S.D. (5%).....127.05
L.S.D. (1%).....170.73
C. V. 15.66%

Table XX. Four year average for grass seed yields-dryland.

Species or Variety	1950	1951	1952	1953	Total	Average Pounds Per Acre
Crested Wheat	1135	486	735	627.5	2983.5	745.9
Russian Wildrye	138	131	20	37.8*	326.8	81.7
Intermediate Wheat	469	399	200	304.9	1372.9	343.2
Bromar Mountain Brome	418	256	699	588.5	1961.5	490.4
Alta Fescue	498	643	1098	478.6	2717.6	679.4
Manchar Smooth Brome	765	407	590	241.1	2003.1	500.8
Tualatin Tall Oatgrass	408	370	299	329.7	1406.7	351.7
Erect Brome	712	383	308	67.4	1470.4	367.6
Bluebranch Wheat	203	113	141	14.2*	471.2	117.8
Beltsville Orchardgrass	236	121	247	74.4	678.4	169.6
Creeping Red Fescue	200	229	172	234*	835.0	209.0
Reed Canary	36	93	91	25.0	245.0	61.0

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Annual Hays

Studies with Oats, Oats and Canadian Field Peas, oats and Hairy Vetch have been conducted for the past four years to determine their use as an annual forage under dryland conditions. Plots were laid out in a 15 x 200 feet area and seeded with a 7 feet I. H. C. drill. They were replicated three times. Yields were obtained by harvesting a 3 x 100 feet area, weighed, and a sample taken for drying to determine dry matter weights.

Yields for 1953 were not significantly different, however oats and peas did give .4 of a ton more than oats alone and only .06 of a ton more than oats and vetch. Table XXI.

Only one year of the four was there significant difference between any of the combinations. However on the four year average there is little or no difference between combinations. Table XXII. Tests for T.D.N. were not run on any of these tests to determine the feeding values of the combinations.

With the foreging information it does not seem necessary to continue this study.

Table XXI. Yield data from annual forage grown under dryland conditions Creston, Montana 1953. Three replications, plots harvested 5 x 100 feet.

Crop or Mixture	Plot yield in Pounds Per Acre I	II	III	Total Pounds	Average Tons/A
Oats (Mission)	35.72	33.80	27.03	96.55	1.40
Oats and Canadian Field Peas	46.55	39.52	38.64	124.71	1.81
Oats and Hairy Vetch	41.23	36.70	42.59	120.52	1.75

Mean Yield.....71.65
S. E. $\bar{x}$..... .091
L.S.D. ..... N. S.
C. V. 5.51%

Table XXII Annual and Four year average yields of dryland annual hays in tons per acre.

Crop or Mixture	1950	1951	1952	1953	Total Tons	Average Tons/A
Oats	1.97	2.24	.93	1.41	6.54	1.63
Oats and Vetch	1.74	1.78	1.32	1.75	6.59	1.65
Oats and Peas	1.79	1.70	1.06	1.81	6.36	1.59

Creeping Alfalfas

While this is considered to be a study of yields of Creeping alfalfas, these are compared with three of the upright types so in effect is an alfalfa variety study.

Nine varieties were seeded in 1952 under dryland conditions, two replications in pure stands, two in mixtures with crested wheatgrass. As is the case in the other dryland hay study, having grass with the alfalfa has made little yield difference.

Table XXIII presents yield data for the first harvest year, and shows no significant yield difference. Farmers seem to like the fine stemed, leafy appearance of Creeping types, no tendency to creep has as yet been noted.

Table XXIII. Creeping alfalfa, 1953, dryland. Two cuttings, June 22, and August 18, First two rows 16 feet, Second four rows 20 feet.

	Ounces Per Square Foot				Cut Total	Season	Pounds Per Acre
	I	II	III	IV			
Nomad	1.30	1.46	2.49	2.50	7.75	10.80	7351.75
	.87	.87	.64	.67	3.05		
	2.17	2.33	3.13	3.17			
Rhizoma	1.69	2.15	2.77	2.43	9.04	14.16	9637.65
	1.57	1.32	1.14	1.09	5.12		
	3.26	3.47	3.91	3.52			
Ladak	1.16	1.73	2.38	2.16	7.43	12.64	8603.1
	1.27	1.48	1.06	1.40	5.21		
	2.43	3.21	3.44	3.56			
Sevelra	1.55	1.56	2.45	1.91	7.47	13.16	8957.02
	1.54	1.88	1.19	1.08	5.69		
	3.09	3.44	3.64	2.99			
A-224	2.04	1.69	2.38	2.74	8.85	12.89	8773.25
	1.19	1.28	.69	.88	4.04		
	3.23	2.97	3.07	3.62			
Ranger	1.28	1.96	2.41	2.48	8.13	13.49	9181.63
	1.38	1.37	1.11	1.50	5.36		
	2.66	3.33	3.52	3.98			
637-037	1.72	1.37	1.67	2.61	7.37	11.58	7881.64
	1.31	1.32	.58	1.00	4.21		
	3.03	2.69	2.25	3.61			
Buffalo	1.48	1.29	2.12	2.23	7.12	13.27	9031.89
	1.60	2.17	.88	1.50	6.15		
	3.08	3.46	3.00	3.73			
A-169	1.75	1.78	2.48	2.43	8.44	12.91	8786.87
	1.28	1.45	.84	.90	4.47		
	3.03	3.23	3.32	3.33			

Mean Yield.....8684.78
S. E. $\bar{x}$ 469.63
L.S.D. (5%)..... N. S.
C. V. 5.40%

Grasses for Arid Areas

Several thousand acres of land in Sanders County lies in a low rainfall belt with annual precipitation below ten inches. Much of this land is clay or clay loam and quite alkaline. In its native state it produces little except brouse on dwarf sage. Upon the invitation of the County Agent and the Conservation District Work Unit Leader we agreed to attempt some grass seedings in an attempt to determine the feasibility of reseeding the area to increase the carrying capacity. The seedings were made on a fair seedbed prepared for spring barley. We were told that yields of Compana barley might be from ten to 15 bushels, on fallow.

Two plantings were made, using two or three pounds of seed per acre. In one eight grass species and one alfalfa were seeded in rows spaced three feet. In the other the grasses were seeded in alternate rows with alfalfa. Twenty pounds of Sulfate of Ammonia per acre was put on with the seed in three of the four replications and appeared to help the grasses get started.

May rains helped get the grasses up and fall inspections revealed fair stands of most species. Whether or not they will survive, or produce enough to justify reseeding if they do, remains to be seen. At least we were fortunate enough to get the grasses started the first season.

Registered Seed Production - Dryland

Alta Fescue

One-fourth of the field seeded to Alta Fescue for seed production was fall plowed in 1952, leaving about 5.75 acres for seed production this season. Another ¼ was broken during the fall of 1953.

Seed yields were less than expected but near average, being 275 pounds per acre. Total amount of clean seed was 1585 pounds.

Hay from the field was sold in the field, weighed 6.52 tons and sold for $8.00, mowed and raked.

The breaking was done in order to get started on the rotation planned for this area which will keep one-half the area in grass seed production while raising grain alternated with fallow on the other half.

Clean seed produced by years:

1950	2057 lbs.	7.5 acres
1951	2290 lbs.	7.5 acres
1952	2126 lbs.	7.5 acres
1953	1585 lbs.	5.75 acres.

SPRING GRAIN IMPROVEMENT

Spring wheat (Irrigated)

A total of seven irrigated spring wheat nurseries were seeded in the spring of 1953. Two of which were located on the station. The off-station nurseries were located in Lake County (Polson and Charlo), Sanders (Hot Springs), Lincoln County (Eureka), Missoula County (Potomac). The nursery at Polson in Lake County was not harvested due to bird damage and the nursery at Hotsprings was not harvested because of improper care.

The advanced yield and western regional nurseries were grown on the station. The mean yield for the advance yield was 59.23 bushels per acre. Lee contained loose smut in all plots. Table XXIV. The mean yield for the western regional was 51.31 bushels per acre using Onas as a check, White Federation 38 and Marfed x Merit 10 were significantly greater in yield than the check. Many of the varieties had 100% leaf rust infection and some up to 78% stem rust. Percent of lodging was also very high in this nursery. High infection of mildew was noted during the growing season, but no notes were made at the time. Table XXV.

The off-station nurseries contained eleven varieties. Three white wheats and nine hard red spring varieties. The nursery at Charlo in Lake County was very good, and a good test of the varieties. Rescue and Chinook were significantly lower in yield than Pilot which was used as the check. Table XXVI.

No significant difference was found in the nursery at the Horticultural Branch station at Corvallis. Table XXVII. Due to uneven soil conditions only two replication of the nursery at Eureka in Lincoln County were harvested. Table XXVIII.

Lemhi (white wheat) was significantly better than the check (Pilot) in the nursery at Potomac in Missoula County. Table XXIX.

Table XXX gives the average of the eleven varieties under irrigation for the past season. The rank of the first three varieties are Lemhi (white), Pilot and Ceres.

Data for the period 1949-1952 of work done on hard red spring wheats at Creston, Montana and in Northwestern Montana are shown in tables XXXI and XXXII respectively. Data onwwhite wheats for the same period and area are shown in tables XXXIII and XXXIV. For 20 trials Pilot is the highest yielding hard red spring and Lemhi the highest white wheat with 36.2 and 37.7 respectively.

Table XXIV. Agronomic data from irrigated advance yield wheat Nursery, Creston, Montana, 1953. Three row plots, five replications.

Date Planted May 4, 1953 Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Heading Date	Plot Yield in Bushels per Acre I	II	III	IV	V	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Rescue x Thatcher	B50-18	7-13	68.04	53.87	69.46	68.75	57.41	317.52	63.50	60
Pilot	11945	7-12	71.58	60.24	46.78	69.46	65.21	301.93	60.38	60
1750 x Rescue	B50-120	7-12	53.16	52.45	58.12	58.12	75.13	296.97	59.39	58
1520 x 1752 (N2389)	13041	7-13	72.29	75.84	53.16	77.25	54.57	333.11	66.62	61
Thatcher	10003	7-12	51.74	63.79	57.41	46.07	57.41	276.41	55.28	59
Pilot[2] x Thatcher (N2170)	12974	7-15	63.79	57.41	45.36	68.04	59.54	294.13	58.82	59
1764 x Rescue	B49-90	7-16	61.66	43.94	51.74	53.87	51.74	262.95	52.59	60
Rescue	12435	7-14	42.53	59.54	44.65	41.82	64.50	253.02	50.61*	59
MoM-Exch x Redman[3] (C. I. 186)	13100	7-15	70.88	57.41	58.12	55.28	46.07	287.75	57.55	59
1764 x Henry	12733	7-9	58.12	58.83	48.90	59.54	53.87	279.25	55.85	60
Chinook	H-4258	7-15	51.74	52.45	47.49	48.90	53.16	253.73	50.75*	60
1750 x Rescue	B49-102	7-14	79.38	68.04	60.24	46.07	53.87	307.60	61.52	59
Ceres	6900	7-13	75.83	87.89	42.53	57.41	57.40	321.77	64.21	60
Lee[1]	12488	7-9	55.28	68.04	65.20	68.04	59.54	316.10	63.22	58
Pilot[2] x Regent (N2183)	13042	7-11	63.79	69.46	64.50	68.75	69.46	335.95	67.19	60
Mida	12008	7-11	58.83	67.33	72.29	82.21	73.00	353.66	70.73	61
Rushmore	12273	7-11	56.70	47.49	51.03	54.57	56.70	266.49	53.30	59
Supreme	8026	7-12	56.70	65.20	36.15	53.16	61.66	272.87	54.57	57

Note: Average of Pilot and Ceres used as a check in this Nursery.

*Varieties yielding significantly less than the checks.

[1]Smut in all plots of this variety.

Mean Yield.....59.23
S. E. $\bar{x}$ 3.90
L.S.D. (5%).....11.00
L.S.D. (1%).....14.66
C. V. 6.59%

Table XXV. Agronomic data from irrigated western regional white wheat nursery, Creston, Montana, in 1953. Three row plots three replications.

Date Planted May 11, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Heading Date	Leaf Rust %	Stem Rust %	Lodging %	Plot Yield in Bushels per Acre I	II	III	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Marfed x Merit-22	13057	7-16	100	27	97	73.00	71.58	38.27	64.50	60.95	59
Baart 46	12386	7-19	100	17	98	42.53	81.51	48.20	60.75	57.40	60
K.F.D.E.B.-121	12944	7-17	97	-	70	36.15	26.22	48.90	39.25	37.09	59
Idaed	11706	7-13	98	42	60	41.11	63.79	43.23	52.25	49.38	59
Henry	12265	7-16	33	-	90	63.79	70.87	57.41	67.75	64.02	60
Onas	6221	7-20	100	37	73	31.89	44.65	46.07	43.25	40.87	57
Marfed x Merit-28	13058	7-18	78	13	88	68.04	75.13	40.40	64.75	61.19	58
Kenya x Lemhi4	13051	7-17	100	75	68	45.36	39.69	51.03	48.00	45.36	60
Kenya x Lemhi2	12947	7-18	98	67	83	48.90	34.02	56.70	49.25	46.54	55
W5-67 (Lemhi x Hope-Fed)	13053	7-18	100	73	75	58.12	63.79	44.65	58.75	55.52	57
Lemhi	11415	7-19	100	78	82	58.12	46.78	66.51	60.50	57.17	55
Marfed x Merit-10	13056	7-18	82	3	82	83.63	58.12	65.92	73.25	69.22*	60
White Fed. 38	11906	7-13	100	27	17	70.88	75.13	60.24	72.75	68.75*	59
Baart	1697	7-19	100	3	95	48.90	23.39	58.83	46.25	43.71	61
Federation	4734	7-24	100	13	72	31.89	47.49	30.48	38.75	36.61	56
Onas 52	12946	7-20	100	-	88	58.12	44.65	34.73	48.50	45.83	57
Marfed	11919	7-19	100	43	80	34.02	34.02	41.11	38.50	36.38	58
Awned Onas	12235	7-19	100	38	97	58.12	29.77	37.56	44.25	41.82	57
Thatcher	10003	7-15	-	-	-	42.53	56.70	39.69	49.00	46.31	59
Idaed x Merit-5	13055	7-14	63	-	62	28.35	73.71	61.66	57.75	54.57	60
Idaed x Merit-2	13054	7-17	77	-	72	60.24	57.41	58.83	62.25	58.83	59

Note: Onas check in this Nursery.

*Varieties yielding significantly more than the check (5%).

Mean Yield 51.31
S. E. $\bar{x}$ 7.58
L.S.D. (5%).....21.23
C. V. 14.77%

Table XXVI. Yield data from spring wheat nursery grown under irrigated condition in Lake County. Single row plots, four replications. Bill Eldridge farm, Charlo, Montana.

Date Planted May 14, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Plot Yield in Bushel Per Acre I	II	III	IV	Total	Average Bushels Per Acre	Bushel Weight Pounds
Onas	6221	43.25	24.80	24.80	40.40	133.25	33.31	57
Awned Onas	12235	37.56	35.44	36.15	33.31	142.46	35.62	57
Rescue	12435	28.35	31.89	29.06	29.06	118.36	29.59*	59
Lee	12488	32.60	28.35	34.02	28.35	123.32	30.83	59
Ceres	6900	39.69	32.60	35.44	41.11	148.84	37.21	60
Lemhi	11415	39.69	41.11	37.56	37.56	155.92	38.98	58
Thatcher	10003	32.60	28.35	31.19	32.60	124.74	31.19	57
Pilot	11945	36.86	38.27	33.31	33.31	141.75	35.44	57
Rushmore	12273	35.44	35.44	27.64	34.02	132.54	33.14	59
1764 x Henry	12733	31.89	37.56	30.47	29.77	129.69	32.44	59
Chinook	H-4258	24.80	33.31	29.77	28.35	116.23	29.05*	60

Note: Pilot is the check in this nursery.

*Varieties yielding significantly less than the check (5%).

Mean Yield.....33.34
S. E. % 2.02
L.S.D. (5%)..... 5.81
C. V. 6.05%

Table XXVII. Agronomic data from spring wheat nursery grown under irrigated conditions in Ravalli County at the Horticultural Branch Station, Corvallis, Montana. 1953, Single row plots, four replications.

Date Planted, May 5, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Plot Yield In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Onas	6221	26.93	25.52	17.72	24.10	94.24	23.56	51
Awned Onas	12235	17.72	23.39	24.81	20.55	86.47	21.62	53
Rescue	12435	29.77	21.26	30.48	16.30	97.81	24.45	58
Lee	12488	21.26	17.72	26.93	24.81	90.72	22.68	—
Ceres	6900	38.98	19.85	19.85	29.06	107.74	26.93	—
Lemhi	11415	38.98	39.69	26.93	21.97	127.57	31.89	53
Thatcher	10003	23.39	22.68	17.72	16.30	80.09	20.02	55
Pilot	11945	26.93	35.44	28.35	29.06	119.78	29.95	53
Rushmore	12273	26.22	17.72	11.34	24.81	80.09	20.02	56
1764 x Henry	12733	26.22	26.93	25.52	21.26	99.93	24.98	—
Chinook	N-4258	24.10	26.93	29.06	18.43	98.52	24.63	57

Mean Yield.....24.62
S. E. $\bar{x}$.....2.753
L.S.D. (5%).....N. S.
C. V.....11.19%

Table XXVIII. Yield data from spring wheat nursery grown under irrigated conditions in Lincoln, County. Single row plots, four replications, Wilfred Johnson farm, Eureka, Montana.

Date Planted May 13, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot In Bushels Per Acre I	II	Total Bushels	Average Bushels Per Acre
Onas	6221	18.43	30.48	48.91	24.46
Awned Onas	12235	21.26	29.06	50.32	25.16
Rescue	12435	14.18	17.72	31.90	15.95
Lee	12488	12.76	22.68	35.44	17.72
Ceres	6900	12.05	26.22	38.27	19.14
Lemhi	11415	21.26	37.56	58.82	29.42
Thatcher	10003	9.92	20.55	30.47	15.24
Pilot	11945	17.01	26.22	43.23	21.67
Rushmore	12273	14.18	24.81	38.99	19.50
1764 x Henry	12733	11.34	25.52	36.86	18.43
Chinook	H-4258	7.09	28.35	35.44	17.72

Note: Not sufficient replications for analysis. Mean Yield.....20.39
Data given is the average of two replications.

Table XXIX. Yield data from spring wheat nursery grown under irrigated conditions in Missoula, County. Single row plots, four replications, Henry Hays farm, Potomac, Montana.

Date Planted May 7, 1953 Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Plot Yields in bushels per acre I	II	III	IV	Total	Average Bushels Per Acre	Bushel Weight in Lbs.
Onas	6221	26.93	26.93	35.43	29.76	119.05	29.76	57
Awned Onas	12235	34.02	26.93	24.81	43.23	128.99	32.24	58
Rescue	12435	21.97	34.73	21.97	28.35	107.02	26.76	59
Lee	12488	24.10	24.10	25.52	23.39	97.11	24.28*	60
Ceres	6900	25.52	32.60	30.48	19.85	108.45	27.11	60
Lemhi	11415	31.19	38.98	39.69	48.20	158.06	39.52**	59
Thatcher	10003	17.01	23.39	19.14	24.10	83.64	20.91*	—
Pilot	11945	26.22	31.89	29.76	34.72	122.59	30.65	57
Rushmore	12273	24.10	24.10	26.93	26.93	102.06	25.52	60
1764 x Henry	12733	30.48	31.89	26.22	34.02	122.61	30.65	60
Chinook	H-4258	31.19	31.19	25.52	30.48	118.38	29.60	60

Stripe Rust Susp

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Note: Pilot used as a check in this nursery.

**Varieties yielding significantly more than the check (1%).

*Varieties yielding significantly less than the check (5%).

Mean Yield.....28.82
S. E. ℳ 2.053
L.S.D. (5%)..... 5.92
L.S.D. (1%)..... 7.98
C. V. 7.12%

Table XXX. Summary of eleven varieties of spring wheat in Northwestern Montana under irrigated conditions in 1953.

Variety or Cross	Location					Average	
	Creston	Charlo	Potomac	Corvallis	Eureka	Bushels/A	Rank
Onas	40.87	33.31	29.76	23.56	48.91	35.28	7
Awned Onas	41.82	35.62	32.22	21.62	50.32	36.32	4
Rescue	50.61	29.59	26.76	24.45	31.90	32.66	10
Lee	63.22	30.83	24.28	22.68	35.44	35.29	6
Ceres	64.21	37.21	27.11	26.93	38.27	38.75	3
Lemhi	57.17	38.98	39.52	31.89	58.82	45.28	1
Thatcher	55.28	31.19	20.91	20.02	30.47	31.57	11
Pilot	60.38	35.44	30.65	29.95	43.23	39.93	2
Rushmore	53.30	33.14	25.52	20.02	38.99	34.19	8
1764 x Henry	55.85	32.44	30.65	24.98	36.86	36.16	5
Chinook	50.75	29.05	29.60	24.63	35.44	33.89	9

Table XXXI. Annual and five year summary of yield data from hard red spring wheat grown under irrigated conditions at Creston, Montana 1949-1953.

Variety or Cross	C. I. or N. No.	1949	1950	1951	1952	1953	Average Bushels/A	Years Grown
Reward	8182	23.4	38.5	57.4			39.8	3
Supreme	8026	33.8	46.1		48.0	54.6	45.6	4
Thatcher	10003	38.2	45.8	64.3	48.2	55.3	50.4	5
Marquis	3641	34.2	43.2				38.7	2
Pilot	11945	35.4	34.3	72.1	54.5	60.4	51.3	5
Ceres	6900	27.4	46.3	54.8	50.3	64.2	48.6	5
Pilot x Mida (N1756)	12303		57.6	75.1			66.4	2
Pilot x Mida (N1953)	12445		52.5				52.5	1
Mida x Cadet (N1831)	12363		48.4	57.9			53.2	2
Rescue	12435		45.8		51.0	50.6	49.1	3
Mida	12008		43.9		53.9	70.7	56.2	3
Merit x Pilot (N1810)	12355		40.9				40.9	1
Cadet	12053		39.7				39.7	1
Pilot x Merit (N1898)	12442		39.5				39.5	1
Lee	12488		36.9	59.3	54.8	63.2	53.6	4
N 1552 x Mida	12746			74.9			74.9	1
Timstein x Newthatch	12739			73.3			73.3	1
1764 x Henry (N2211)	12733			72.5	47.0	55.9	58.5	3
Pilot x Merit (N1996)	12648			69.2			69.2	1
Canada 4232-20	12695				54.6		54.6	1
1764 x Rescue	B49-90				48.5	52.6	50.6	2
1552 x Mida	12746				46.5		46.5	1
1750 x Rescue	B50-120				46.3	51.4	49.3	1
1750 x 1753 (N2256)	12975				56.9		56.9	1
Chinook	H-4258				43.5	50.8	47.2	2
Rushmore	12273				56.5	53.3	54.9	2
1750 x Rescue	B49-102				49.6	61.5	55.6	2
Pilot^2 x Thatcher (N2170)	12974				53.9	58.8	56.4	2
Henry	12265				63.1	64.0	63.6	2
Rescue x Thatcher	B50-18					63.5	63.5	1
1520 x 1752 (N2389)	13041					66.6	66.6	1
McN-Exch x Redman^3 C.I. 186	13100					57.6	57.6	1
Pilot x Regent^2 (N2183)	13042					67.2	67.2	1

Table XXXII. Five year summary of yield data on hard red spring wheats under irrigated conditions in Northwestern Montana 1949-1953.

Variety or Cross	C. I or N. No.	Creston	Lincoln	Sanders	Ravalli	Lake	Missoula	Average Bu./A	No. Trials
Reward	8182	39.8	16.3	26.8				27.6	5
Supreme	8026	45.6	22.9	27.9				32.1	4
Thatcher	10003	50.4	28.3	26.2	34.5	25.5	16.9	30.3	20
Marquis	3641	38.7	20.1	30.0	38.8	25.7		30.7	6
Pilot	11945	51.3	32.0	34.7	40.9	31.8	26.5	36.2	20
Ceres	6900	48.6	33.6	36.2	42.9	30.4	24.5	36.0	20
Pilot x Mida (N1756)	12303	66.4	34.6			30.2		43.7	5
Pilot x Mida (N1953)	12445	52.5						52.5	1
Mida x Cadet (N1831)	12363	52.2	34.0			24.6		37.3	5
Rescue	12435	49.1	30.7		38.0	26.8	20.1	32.9	10
Mida	12008	56.2						56.2	3
Merit x Pilot	12355	40.9						40.9	1
Cadet	12053	39.7						39.7	1
Pilot x Merit (N1898)	12442	39.5						39.5	1
Lee	12438	53.6	32.1		22.7	25.7	22.4	31.3	11
N1552 x Mida	12746	74.9						74.9	1
Timstein x Newthatch	12739	73.3						73.3	1
1764 x Henry (N2211)	12733	58.5	39.3		25.0	28.5	24.5	35.2	10
Pilot x Merit (N1996)	12648	69.2						69.2	1
Canada 4232-20	12695	54.6						54.6	1
1764 x Rescue	B49-90	50.6						50.6	2
1552 x Mida	12746	46.5						46.5	1
1750 x Rescue	B50-120	48.8						48.8	2
1750 x 1753 (N2256)	12975	56.9						56.9	1
Chinook	H-4258	47.2	17.7		24.6	29.1	29.6	29.6	6
Rushmore	12273	54.9	19.5		20.2	33.1	25.5	30.6	6
1750 x Rescue	B49-102	55.6						55.6	2
Pilot^2 x Thatcher (N2170)	12974	56.4						56.4	2
Henry	12265	63.6						63.6	2
Rescue x Thatcher	B50-18	63.5						63.5	1
1750 x 1752 (N2389)	13041	66.6						66.6	1
Mcm-Exch x Redman^3	13100	57.6						57.6	1
Pilot x Regent^2 (N2183)	13042	67.2						67.2	1

Table XXXIII. Annual and five year summary of white spring wheats Creston, Montana 1949-1953(Irrigated)

Variety or Cross	C. I. or N No.	1949	1950	1951	1952	1953	Average Bushels/A	Years Grown
Idaed	11706	35.0	41.8	61.2	61.4	49.4	49.8	5
Lemhi	11415	35.9	51.3	61.7	68.7	57.2	55.0	5
Onas	6221	40.6	51.3	58.1	67.1	40.9	51.6	5
Federation 41 M	12391		59.1				59.1	1
Awned Onas	12235		56.9	70.4	61.9	41.8	57.8	4
Federation	4734		56.5	45.1	59.8	36.6	49.5	4
Baart	1697		55.8	55.0	62.9	43.7	54.4	4
White Federation 38	11906		55.1	83.1	53.1	68.8	65.0	4
Baart 46	12386		52.7	55.3	53.6	57.4	54.8	4
Hope x Lemhi^4	12685		51.5	65.2	66.6		61.1	3
Marfed	11919		47.7	57.4	62.1	36.4	50.9	4
Baart 38	11907		47.7				47.7	1
Marfed x Merit-22	13057					61.0	61.0	1
K.F.D.E.B.-121	12944					37.1	37.1	1
Marfed x Merit-28	13058					61.2	61.2	1
Kenya x Lemhi^4	13051					45.4	45.4	1
Kenya x Lemhi^2	12947					46.5	46.5	1
W-5-67(lemhi x hope-Fed)	13053					55.5	55.5	1
Marfed x Merit-10	13056					69.2	69.2	1
Onas 52	12946					45.8	45.8	1
Idaed x Merit-5	13055					54.8	54.8	1
Idaed x Merit-2	13054					58.8	58.8	1

Table XXXIV. Five year summary of white spring wheats under irrigated conditions in Northwestern Montana 1949-1953.

Variety or Cross	C. I. or N No.	Creston	Lincoln	Sanders	Ravalli	Lake	Missoula	Average Bu./A	No. Trials
Idaed	11706	49.8	13.9	33.5	51.2	35.0		36.7	10
Lemhi	11415	55.0	35.2	37.3	49.8	26.4	22.2	37.7	20
Onas	6221	51.6	36.3	34.4	42.7	28.8	18.8	35.4	20
Federation 41 M	12391	59.1						59.1	1
Awned Onas	12235	57.8	40.6		39.7	28.0	26.0	38.4	17
Federation	4734	49.5						49.5	4
Baart	1697	54.4						54.4	4
White Federation 38	11906	65.0						65.0	4
Baart 46	12386	54.8						54.8	4
Hope x Lemhi^4	12685	61.1			45.3			53.2	4
Marfed	11919	50.9						50.9	4
Baart 38	11907	47.7						47.7	1
Marfed x Merit-22	13057	61.0						61.0	1
K.F.D.E.B.-121	12944	37.1						37.1	1
Marfed x Merit-28	13058	61.2						61.2	1
Kenya x Lemhi^4	13051	45.4						45.4	1
Kenya x Lemhi^2	12947	46.5						46.5	1
W-5-67 (Lemhi x Hope-Fed)	13053	55.5						55.5	1
Marfed x Merit-10	13056	69.2						69.2	1
Onas 52	12946	45.8						45.8.	1
Idaed x Merit-5	13055	54.8						54.8	1
Idaed x Merit-2	13054	58.8						58.8	1

SPRING GRAIN IMPROVEMENT

Oats (Irrigated)

Seven irrigated oat nurseries were seeded in the spring of 1952. One was seeded in April, the rest during the month of May. A twenty variety nursery was grown on the station at Creston. The off-station nurseries containing ten varieties were seeded in the following counties; Lake(Charlo and Polson), Missoula(Potomac), Ravalli(Horticultural Station), Sanders(Hotsprings), and Lincoln(Eureka).

The mean yield of the station nursery was 145.89 bushles per acre. Using the recommended varieties as a check(Bridger, Park, Mission, Gopher) Clinton x Overland^2 AB5989 was the only variety significantly higher in yield. All varieties stood up very well and no particular disease problem was noted during the growing season. Table XXXV.

No significant results were obtained from the test conducted on the Horticultural Station at Corvallis, Montana. The mean yield of this nursery was 123.45 bushels per acre. Table XXXVI.

In the nursery located in Lake county with a mean yield of 120.87 bushels per acre, significant differences were found between varieties when analysed statistically. Using Park as a check Gopher was found to be significantly lower in yield. Table XXXVII. One-half pound of 2,4-D was used in controling weeds in this nursery.

The mean yield of the nursery at Charlo, Montana was 82.35 bushels per acre. There were no significant differences in this test. Table XXXVIII.

Table XXXIX shows yield data from the nusery at Potomac with a mean yield of 71.76 bushels per acre. Yields were not significantly different when analysed statistically.

The nurseries in Lincoln and Sanders counties were not harvested. In Lincoln county deer distroyed the nursery. In Sanders county the nursery was lost due to improper care.

Exeter ranked number one in a summary of work done in Northwestern Montana this past season, with a yield of 113.98 bushels per acre. Table XL.

Table XII and XIII shows the summary of work done at Creston, and in Northwestern Montana 1949-1953, respectively. In five years on the station Bannock leads followed by Park on the basis of production only. In 19 trials conducted Bridger leads in yield followed by Park.

Table XXXV. Agronomic data from irrigated oat nursery. Creston, Montana in 1953. Three row plots, five replications.

Date Planted, May 8, 1953. Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Heading Date	Test Weight	Plot Yield in Ounces I	II	III	IV	V	Total Ounces	Average Bushels Per Acre
Cody	3916	7-19	36	26.00	27.00	29.50	22.50	29.25	134.25	142.84
V-R x Bannock	4283	7-17	36	25.00	27.00	19.00	25.75	28.00	124.75	132.73
Markton-Rainbow x Mission	43-2-25	7-18	39	27.50	30.25	21.00	32.25	37.75	148.75	158.27
Mission	2588	7-16	38	35.75	22.25	29.00	19.25	33.50	139.75	148.69
Maganskii o44	4515	7-20	38	24.75	17.25	20.25	22.75	28.00	113.00	120.23
Bannock	2592	7-19	39	26.00	31.25	31.25	20.25	43.00	151.75	161.46
Canada Hybrid	2795-11-5	7-16	39	27.75	30.50	37.00	35.25	32.00	162.50	172.90
Aberystwyth s84	3549	7-25	40	22.75	21.50	23.00	30.00	24.50	121.75	129.54
Gopher x Bridger	44-5-3-13	7-14	39	28.50	27.25	23.25	30.50	20.50	130.00	138.32
Exeter	4158	7-19	38	30.00	25.50	29.75	27.00	30.75	143.00	152.15
Bridger	2611	7-20	39	22.00	28.50	22.50	26.50	19.75	119.25	126.88
Park	6611	7-18	38	38.75	38.00	30.25	26.00	19.00	152.00	161.72
Clinton x Overland[2]	AB5989	7-18	39	37.50	39.75	31.75	29.25	30.25	168.50	179.28*
Clinton x Overland[2]	AB6014	7-18	39	34.00	29.25	31.50	24.75	27.50	147.00	156.41
Clinton x Overland[2]	AB6016	7-18	38	29.50	43.25	29.75	25.00	31.25	158.75	168.91
C. I. 4189 x Overland	5347	7-19	38	27.25	24.50	21.50	25.25	35.50	134.00	142.57
Gopher	2027	7-13	39	31.00	24.25	21.25	29.25	24.75	130.50	138.85
Golden Rain	4512	7-20	38	22.75	23.00	15.50	20.00	14.00	95.25	101.35
Beaver	4521	7-16	36	23.75	29.00	18.25	37.25	25.00	133.25	141.78
Shelby	4372	7-17	38	27.75	17.75	37.00	25.75	26.50	134.25	142.84

Note: Average of four recommended varieties are used as a check in this nursery. They are Bridger, Park, Mission, and Gopher.

* Varieties Yielding significantly more than four recommended varieties (5%).

Mean Yield.....145.89
S. E. $\bar{x}$..... 10.19
L.S.D. (5%)..... 28.69
L.S.D. (1%)..... 38.04
C. V. 6.98%

Table XXXVI. Yield data from oat nursery grown under irrigated conditions in Ravalli, County. Single row plots four replications, Horticultural Branch Station, Corvallis, Montana.

Date Planted May 5, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushel Per Acre	Bushel Weight Pounds
Cody	3916	123.69	134.33	142.31	102.41	502.74	125.69	37
V-R x Bannock	4283	122.36	126.35	115.71	134.33	498.75	124.69	38
Park	6611	111.72	127.68	106.40	107.73	453.53	113.38	37
Bridger	2611	119.70	105.07	119.70	103.74	448.21	112.06	35
Gopher	2027	156.94	144.97	167.58	106.40	575.89	144.00	38
Mission	2588	106.40	154.28	148.96	133.00	542.64	135.66	38
Canada Hybrid	2795-11-5	75.81	103.74	98.42	118.37	396.34	99.06	35
Clinton x Overland	AB 6014	151.62	101.08	122.36	122.36	497.42	124.36	38
Exeter	4158	126.75	130.34	82.46	111.72	451.36	112.84	34
Overland	4181	133.00	117.04	98.42	136.99	485.45	121.36	36

Note: Park used as check in this nursery.

Mean Yield.....121.45
S. E. $\bar{x}$ 9.193
L.S.D. (5%).....N. S.
L.S.D. (1%).....N. S.
C. V. 7.57%

Table XXXVII. Yield data from oat nursery grown under irrigated conditions in Lake, County. Single row plots four replications, Mrs. Smurr farm, Polson, Montana.

Date Planted April 27, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Cody	3916	140.98	147.63	110.39	101.08	500.08	125.02	37
V - R x Bannock	4283	133.00	152.95	98.42	121.03	505.40	126.35	38
Park	6611	122.36	77.14	126.35	136.99	462.84	115.71	36
Bridger	2611	175.76	166.25	152.95	122.36	494.96	123.74	39
Gopher	2027	66.50	71.82	85.12	65.17	288.61	72.15**	30
Mission	2588	98.42	110.39	89.11	115.71	413.63	103.40	37
Canada Hybrid	2795-11-5	111.72	155.61	107.73	103.74	478.80	119.70	39
Clinton x Overland	AB6014	155.61	125.02	110.39	126.35	517.37	129.34	38
Exeter	4158	135.66	154.28	118.37	160.93	569.24	142.31	39
Overland	4181	115.71	122.36	103.74	139.65	481.46	120.36	34

Note: Park used as check in this nursery.

*Varieties yielding significantly less than the check (5%).

**Varieties yielding significantly less than the check (1%).

Mean Yield.....120.87
S. E. $\bar{x}$ 9.794
L.S.D. (5%)..... 28.40
L.S.D. (1%)..... 38.35
C. V. 8.10%

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Table XXXVIII. Yield data from oat nursery grown under irrigated conditions in Lake County. Single row plots four replications, William Eldridge farm, Charlo, Montana.

Date Planted May 14, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushel Per Acre	Bushel Weight Pounds
Cody	3916	99.75	73.15	78.47	82.46	333.83	83.45	32
V-R x Bannock	4283	66.50	83.79	70.49	82.46	303.24	75.81	31
Park	6611	65.17	74.48	77.14	70.49	287.29	71.82	32
Bridger	2611	95.76	107.73	70.49	77.14	351.12	83.28	34
Gopher	2027	85.12	89.11	79.11	79.80	333.14	83.29	32
Mission	2588	93.10	107.73	94.43	77.14	372.40	93.10	37
Canada Hybrid	2795-11-5	94.43	75.81	85.12	62.51	317.87	79.47	32
Clinton x Overland	AB 6014	75.81	75.81	73.15	85.12	309.89	77.47	33
Exeter	4158	86.45	90.44	66.50	99.75	343.14	85.79	32
Overland	4181	74.48	85.12	89.11	90.44	339.15	84.79	31

Note: Park used as check in this nursery.

Mean Yield.....82.35
S. E. $\bar{x}$ 5.22
L.S.D. (5%)..... N.S.
C. V. 6.34%

Table XXXIX. Yield data from oat nursery grown under irrigated conditions in Missoula County. Single row plots four replications, Henry Hays farm, Potomac, Montana.

Date Planted May 7, 1953 Size of Plot 16 feet

Varieties or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushel Per Acre	Bushel Weight Pounds
Cody	3916	86.25	97.09	51.87	49.21	284.42	71.12	32
V-R x Bannock	4283	78.47	79.80	82.46	58.82	299.55	74.88	35
Park	6611	94.43	78.47	65.17	74.48	312.55	78.14	36
Bridger	2611	106.40	51.87	81.13	85.12	324.52	81.13	36
Gopher	2027	78.47	69.16	69.16	77.14	293.93	73.48	35
Mission	2588	38.75	66.50	75.81	66.50	247.56	61.89	36
Canada Hybrid	2795-11-5	63.84	79.80	85.12	55.86	284.62	71.16	35
Clinton x Overland	AB6014	82.46	51.87	69.16	66.50	269.99	67.50	34
Exeter	4158	70.49	74.48	88.79	78,47	307.23	76.80	34
Overland	4181	59.85	67.83	73.15	43.89	244.72	61.18	33

Note: Park used as check in this nursery.

Mean Yield.....71.76
S. E. $\bar{x}$ 7.464
L.S.D. (5%).....N. S.
L.S.D. (1%).....N. S.
C. V. 10.40%

Table XL. Summary of ten varieties of oats grown under irrigated conditions in Northwestern Montana in 1953

Variety or Cross	Location					Bushels/A	Rank
	Creston	Polson	Charlo	Potomac	Corvallis		
Cody	142.84	125.02	83.45	71.12	125.69	84.49	10
V-R x Bannock	132.73	126.35	75.81	74.88	124.69	106.89	5
Park	161.72	115.71	71.82	78.14	113.38	108.15	4
Bridger	126.88	123.74	85.28	81.13	112.06	105.82	7
Gopher	138.85	72.15	83.29	73.48	144.00	102.55	8
Mission	148.69	103.40	93.10	61.89	135.66	108.55	3
Candida Hybrid	162.50	119.70	79.47	71.16	99.06	106.38	6
Clinton x Overland (AB6014)	156.41	129.34	77.47	67.50	124.36	111.02	2
Exeter	152.15	142.31	85.79	76.80	112.84	113.98	1
Overland		120.36	84.79	61.18	121.36	96.92	9

Table XLI. Annual and five year summary of yield data on oats at Creston, Montana 1949-1953 (Irrigated)

Variety or Cross	C.I. or N No.	1949	1950	1951	1952	1953	Average Bushels/A	Years Grown
Gopher	2027	77.1	101.5	114.4	133.0	138.9	113.0	5
Bannock	2592	88.7	121.9	125.9	150.3	161.5	129.7	5
Marida		60.7		113.2			86.9	2
Mission	2568	64.7	96.2	110.4	129.0	148.7	109.8	5
Park	6611	80.7	116.5	136.1	129.0	161.7	124.8	5
Zephyr	4800	69.2	87.4	113.1			89.9	3
Bridger	2611	100.2	101.1	133.4	128.1	126.9	117.9	5
Overland	4181	66.9	110.4	133.4			103.6	3
V-R x Bannock	4283	74.0	111.7	123.3	141.4	132.7	116.6	5
Bond x Rainbow	4186		94.0				94.0	1
C. I. 4189 x Overland	5347			119.3	130.3	142.6	130.7	3
Aberystwyth S84	3549			117.5	134.3	129.5	127.1	3
Canada Hybrid	2795-11-5			128.1	133.4	162.5	141.3	3
Clinton x Overland^2	AB5989			128.1	146.3	179.3	151.2	3
Clinton x Overland^2	AB6013			125.5			125.5	1
Clinton x Overland^2	AB6014			150.7	144.5	156.4	150.5	3
Clinton x Overland^2	AB6016			137.0	114.4	168.9	140.1	3
Cody	3916			139.9	155.2	142.8	146.0	3
Golden Rain	4512			133.0	142.8	101.4	125.7	3
Receleet Clinton	4969			122.8			122.8	1
Manganskii 044	4515			130.8	140.1	120.2	130.4	3
Markton-Rainbow x Mission	43-2-25				112.6	158.3	135.5	2
Gopher x Bridger	44-5-3-13				101.5	138.3	119.9	2
Exeter	4158				131.2	152.2	141.7	2
Beaver	4521				123.2	141.8	132.5	2
Shelby	4372				135.7	142.8	139.3	2

Table XLII. Five year summary of yield data on irrigated oats in Northwestern Montana 1949-1953.

Variety or Cross	C.I.or N No.	Creston	Lake	Lincoln	Sanders	Ravalli	Missoula	Average	Number Trials
Gopher	2027	113.0	73.4	62.5	45.7	106.3	46.8	74.6	19
Bannock	2592	129.7	79.9	72.5	49.2	96.9	38.1	77.7	15
Marida		86.9	117.1	28.3	25.7			64.5	5
Mission	2588	109.8	75.4	54.9	40.8	103.8	44.1	71.5	19
Park	6611	124.8	81.4	71.6	39.5	103.3	50.7	78.6	19
Zephyr	4800	89.9	72.0	30.6	37.2	84.9		62.9	11
Bridger	2611	117.9	89.1	70.7	45.2	102.0	57.5	80.4	19
Overland	4181	103.6	92.6	69.4	25.7	112.4	44.9	74.4	13
V-R x Bannock	4283	116.6	85.0	71.6	29.7	109.7	49.9	77.1	19
Bond x Rainbow	4186	94.0	43.9			84.7		74.2	3
C.I. 4189 x Overland	5347	130.7						130.7	3
Aberystwyth S84	3549	127.1						127.1	3
Canada Hybrid	2795-11-5	141.3	85.4	118.1		95.0	71.2	100.6	12
Clinton x Overland^2	AB5989	151.2						151.2	3
Clinton x Overland^2	AB6013	125.5						125.5	1
Clinton x Overland^2	AB6014	150.5	103.4			124.4	67.5	111.5	7
Clinton x Overland^2	AB6016	140.1	60.2			79.5		93.3	6
Cody	3916	146.0	104.3	103.1		125.7	51.7	106.2	9
Golden Rain	4512	125.7						125.7	3
Reselect Clinton	4969	122.8						122.8	1
Maganskii c44	4515	130.4						130.4	3
Markton-Rainbowx Mission	43-2-25	135.5						135.5	2
Gopher x Bridger	44-5-3-13	119.9						119.9	2
Exeter	4158	141.7	114.1			112.8	76.8	111.35	6
Beaver	4521	132.5						132.5	2
Shelby	4372	139.3		89.4			21.0	83.2	4

SPRING GRAIN IMPROVEMENT

Barley (Irrigated)

Eight irrigated barley nurseries were seeded in April and May of 1953. Two 25 variety nurseries were seeded on the station. The off-station nurseries contained ten varieties and were located in Lake (Charlo and Polson), Ravalli (Horticultural Station), Lincoln (Eureka), Missoula (Potomac) and Sanders (Hotsprings) counties.

The two nurseries seeded on the station were to be used in comparisons of weed control methods. Only one of these nurseries was harvested due to the severe lodging in the one treated with 2, 4-D. High rates of infection of Bacterial blight were noted on all varieties of barley. No notes on degree of infection were taken. Glacier x Titan, F-7, C. I.'s 50-5610-7 and 50-5644-2 were significantly higher in yield than the check (average of Titan, Vantage and Compana). The mean yield of the nursery was 64.23 bushels per acre. Lodging was also very severe in this nursery. Table XLIII.

With Vantage and Titan as a check Harlan, Danish, Compana, B. C. 120-78-10, Bonneville and Cem were significantly lower in yield in the nursery in Ravalli county. Table XLIV.

The mean yield of the nursery in Lake county (Polson) was 81.57 bushels per acre. B. C. 120-78-10 was the only variety that was significantly higher in yield than the average of Titan and Vantage. Table XLV.

Harlan was significantly lower in yield than the average of Titan and Vantage in the nursery grown at Charlo. The mean yield of this nursery was 56.82 bushels per acre. Table XLVI.

Three replications were harvested in the Lincoln county nursery. The fourth was uneven due to soil conditions. There were no significant differences in this nursery. Table XLVII.

Table XLVIII shows data from the nursery grown at Potomac. There were no significant differences between varieties in this test.

The nursery in Sanders county was not harvested due to improper care during the growing season.

The summary of the 1953 seasons work in Table XLIX ranks Vantage as number one in production.

Tables L and LI gives the five year summary at Creston and in Northwestern Montana respectively. In five years at Creston, Vantage has lead in production with 82 bushels per acre. In 20 trials in Northwestern Montana Vantage leads with 66.1 bushels per acre.

Table XLIII. Agronomic data from irrigated barley nursery, Creston, Montana, 1953. Three row plots, Three replications.

Date Planted, May 11, 1953 Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Heading Date	Nursery Entry	Smut L.M.H.S	Lodging %	Plot Yield In Bushels Per Acre I	II	III	Total Bushels	Average Bushel Per Acre	Bushel Weight Pounds
Gem	7243	7-7	II	M	100	33.68	70.01	71.78	175.47	58.49	46
Titan	7055	7-10	II	-	67	62.04	28.36	71.78	162.18	54.06	50
Vantage	7324	7-11	II	-	47	113.44	70.90	106.35	290.69	96.90*	53
Compana	5438	7-12	II	-	97	30.13	38.11	65.58	133.82	44.61	48
Harlan	7008	7-10	II	-	82	39.88	45.20	77.10	162.18	54.06	46
B. C. 4-15	7558	7-17	II	-	90	39.00	54.06	69.13	162.19	54.06	47
Bonneville	7248	7-17	II	-	88	66.47	66.47	101.92	234.86	78.29	46
W. S. 471	8055	7-8	II	-	85	65.58	39.88	60.27	165.73	55.24	45
Custer	8053	7-10	II	-	97	77.10	59.38	59.38	195.86	65.29	49
W. S. 480	8104	7-14	II	L	90	77.10	58.49	92.17	227.76	75.92	47
B.C. 120-78-10	8059	7-15	II	-	92	64.70	72.67	72.67	210.04	70.01	44
Freja	7130	7-14	II	-	100	83.31	56.72	67.36	207.39	69.13	51
Danish	B. Mont	7-17	II	-	98	85.08	35.45	65.58	186.11	62.04	49
Ymer	7275	7-16	II	-	95	84.19	74.45	65.58	224.22	74.74	51
Glacier x Titan, F-7	50-5610-7	7-11	II	-	95	89.51	78.88	105.46	273.85	91.28*	45
Glacier x Compana	47-7405-IV	7-12	II	M	90	63.81	59.38	56.72	179.91	59.97	46
Glacier x Compana	47-7405-V	7-11	II	-	98	82.42	52.29	55.83	190.54	63.51	47
2-Row	6398	7-15	II	-	97	77.10	33.68	61.15	171.93	57.31	52
Compana x Morgenrot	49-527-24	7-12	II	-	97	54.06	46.09	74.45	174.60	58.20	52
Glacier x Titan F-7	50-5644-2	7-8	II	-	92	101.03	74.45	100.15	275.63	91.88*	49
Lico x C. I. 7152 F-6	49-5579-19	7-8	II	-	98	81.84	46.09	48.74	176.37	58.79	47
Hannchen	4841	7-17	S	-	100	27.47	33.68	74.45	135.60	45.20	51
Moravian	7559	7-16	S	-	93	62.92	19.50	31.01	113.43	37.81	52
W.S. 462	9164	7-14	S	-	88	81.54	39.00	74.45	194.99	65.00	48
Frontier	7155	7-17	S	-	92	79.76	62.92	46.09	188.77	62.92	47

Note: The average of Titan, Vantage and Compana is used as a check(65.19)

*Varieties yielding significantly more than the check (5%).

Mean Yield.....64.23
S. E. $\bar{x}$..... 8.816
L.S.D.(5%).....25.06
L.S.D. (1%).....33.43
C. V.....13.73%

Table XLIV. Yield Data from spring barley nursery grown under irrigated conditions in Ravalli County. Single row plots four replications. Horticultural Branch Station, Corvallis, Montana.

Date Planted May 5, 1953 Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Frontier	7155	73.55	63.81	61.15	53.18	251.69	62.92	45
Vantage	7324	92.17	69.13	74.45	50.52	286.27	71.57	46
Harlan	7008	54.06	45.20	58.49	54.95	212.70	53.18*	44
Titan	7055	55.83	57.60	70.90	82.42	266.75	66.68	45
Danish	E. Mont.	38.11	56.72	35.45	35.45	165.73	41.43**	45
Freja	7130	62.04	62.04	49.63	60.27	233.98	58.50	45
Compana	5438	45.20	58.49	32.79	48.74	185.22	46.31**	44
B. C. 120-78-10	8059	65.58	62.92	36.44	47.86	212.80	53.20*	41
Bonneville	7248	42.54	52.29	49.63	41.65	186.07	46.52**	41
Gem	7243	55.83	52.29	42.54	54.95	205.61	51.40*	44

Note: Average of Titan and Vantage used as check in this nursery.

* Varieties yielding significantly less than the check (5%).

**Varieties yielding signigicantly less than the check (1%).

Mean Yield.....55.16
S. E. $\bar{x}$ 5.06
L.S.D. (5%).....14.75
L.S.D. (1%).....19.89
C. V. 9.17%

Table XLV. Yield data from spring barley nursery grown under irrigated conditions in Lake County. Single row plots, four replications, Mrs. Smurr farm, Polson, Montana.

Date Planted April 27, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels per Acre I	II	III	IV	Total Bushel	Average Bushels Per Acre	Bushel Weight Pounds
Frontier	7155	90.39	95.77	88.63	110.78	385.57	96.39	49
Vantage	7324	95.77	79.76	66.47	83.31	325.31	81.33	50
Harlan	7008	58.49	70.01	54.06	65.58	248.14	62.03	45
Titan	7055	77.99	64.69	87.74	77.99	308.41	77.10	48
Danish	E. Mont.	64.69	82.42	75.33	73.56	296.00	74.00	50
Freja	7130	53.18	74.45	88.63	114.33	330.59	82.65	52
Compana	5438	53.18	77.10	69.13	63.81	263.22	65.81	48
B. C. 120-78-10	8059	100.15	91.28	106.35	96.60	394.38	98.60*	46
Bonneville	7248	96.60	86.85	91.28[1]	82.42	357.15	89.29	45
Gem	7243	76.22	97.49	108.12	72.67	354.50	88.63	47

Note: Average of Titan and Vantage used as check in this nursery.

*Varieties yielding significantly more than the check (5%).

[1]Calculated, Missing plot.

Mean Yield.....81.57
S. E. $\bar{x}$ 6.346
L.S.D. (5%).....18.46
L.S.D. (1%).....24.96
C. V. 7.78%

Table XLVI. Yield data from spring barley mursery grown under irrigated conditions in Lake County. Single row plots four replications. Bill Eldridge farm, Charlo, Montana.

Date Planted May 14, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight pounds
Frontier	7155	72.67	72.67	47.86	51.40	244.60	61.15	45
Vantage	7324	74.45	67.36	74.45	70.01	286.27	71.57	49
Harlan	7008	26.59	42.54	45.20	35.45	149.78	37.45*	45
Titan	7055	70.90	49.63	40.77	47.86	209.09	52.27	51
Danish	E. Mont.	55.83	73.56	59.38	49.63	238.44	59.61	50
Freja	7130	37.22	42.54	56.72	62.92	199.40	49.85	50
Comyana	5438	53.18	50.25	42.54	51.40	197.33	49.33	49
B. C. 120-78-10	8059	67.36	47.86	70.01	57.61	242.84	60.71	41
Bonneville	7248	55.83	79.76	52.29	54.94	242.84	60.71	42
Gem	7243	70.90	54.06	80.64	64.70	270.30	67.58	46

Note: Average of Titan and Vantage used as check in this Nursery.

*Varieties yielding significantly less than the check (5%).

Mean Yield.....56.82
S. E. % 5.48
L.S.D. (5%).....15.84
L.S.D. (1%).....21.44
C. V. 9.64%

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Table XLVII. Yield data from spring barley nursery grown under irrigated condition in Lincoln County. Single row plots three replications, Wilfred Johnson farm, Eureka, Montana 1953.

Date Planted May 18, 1953 Size of Plot 16 feet

Variety or Cross	C. I. N No.	Yield Per Plot In Bushels per acre I	II	III	Total Bushels	Average Bushels Per Acre
Frontier	7155	17.73	44.31	51.40	113.44	37.88
Vantage	7324	32.79	32.79	35.45	101.03	33.68
Harlan	7008	11.52	12.41	26.59	50.52	16.84
Titan	7055	34.56	45.20	20.38	100.14	33.37
Danish	E. Mont	25.70	56.72	21.27	103.69	34.56
Freja	7130	19.50	33.68	35.45	88.63	29.54
Compana	5438	34.56	10.64	15.95	61.15	20.38
B. C. 120-78-10	8059	33.68	56.72	41.65	132.05	44.02
Bonneville	7248	3.55	32.79	39.88	76.22	25.41
Gem	7243	18.61	34.56	29.25	82.42	27.47

Note: Average of Titan and Vantage used as check in this nursery.

Mean Yield.....30.31
S. E. %..... 6.946
L.S.D.(5%)..... N. S.
L.S.D. (1%)..... N.S.
C.V.....22.91%

Table XLVIII. Yield Data from spring barley nursery grown under irrigated conditions in Missoula County. Single row plots four replication, Henry Hays farm, Potomac, Montana.

Date Planted May 7, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Frontier	7155	54.95	43.43	57.61	54.91	210.94	52.74	42
Vantage	7324	68.24	84.19	59.38	59.38	271.19	67.80	43
Harlan	7008	37.22	49.63	61.15	60.27	208.27	52.07	43
Titan	7055	49.63	62.04	50.52	54.06	216.25	54.06	44
Danish	E. Mont.	49.63	51.40	58.49	44.31	203.83	50.96	45
B. C. 4-15	7558	66.47	75.33	52.29	60.27	254.36	63.59	42
Compana	5438	47.86	46.09	50.29	67.36	211.60	52.90	44
B. C. 120-78-10	8059	34.56	48.74	53.18	49.63	186.11	46.52	41
Bonneville	7248	65.58	35.45	42.54	56.72	200.29	50.07	40
Gem	7243	67.36	47.86	47.86	54.95	218.03	54.51	45

Note: Average of Titan and Vantage used as check in this nursery.

Mean Yield.....54.52
S. E. $\bar{x}$ 4.94
L.S.D. (5%) .....Not Signif.
L.S.D. (1%) ..... " "
C. V. 9.06%

Table XLIX. Summary of ten varieties of spring barley in Northwestern Montana under irrigated conditions in 1953.

Variety or Cross	Creston	Polson	Charlo	Potomac	Corvallis	Eureka	Average Bu./A	Rank
Frontier	62.92	96.39	61.15	52.74	62.92	37.88	65.67	2
Vantage	96.90	81.33	71.57	67.80	71.57	33.68	70.48	1
Harlan	54.06	62.03	37.45	52.07	53.18	16.84	45.94	10
Titan	54.06	77.10	52.27	54.06	66.68	33.37	56.25	7
Danish	62.04	74.00	59.61	50.96	41.43	34.56	53.77	8
Freya	69.13	82.65	49.85	63.59	58.50	29.54	58.88	4
Compana	44.61	65.81	49.33	52.90	46.31	20.38	46.56	9
B.C. 120-78-10	70.01	98.60	60.71	46.20	53.20	44.02	62.18	3
Bonneville	78.29	89.29	60.71	50.07	46.52	25.41	58.39	5
Gem	58.49	88.63	67.58	54.51	51.40	27.47	58.01	6

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Table L. Annual and five year summary of irrigated barley yield data grown at Creston, Montana 1949-1953.

Variety or Cross	C. I. or H No.	1949	1950	1951	1952	1953	Average Bu./A	Number of Trials
Compana	5438	45.2	59.9	74.6	75.6	44.6	60.0	5
Glacier	6976	40.2	58.7	83.8			60.9	3
Velvon 11	7088	50.2	72.6	94.1	105.8		80.7	4
Gem	7243	44.9	56.7	94.4	87.7	58.5	68.4	5
Titan	7055	47.3	54.6	85.6	81.5	54.1	64.2	5
Frontier	7155	53.8	60.2	98.8	94.8	62.9	74.1	5
Montcalm	7149	51.1	54.9				53.0	2
Flush	6093	44.6	61.6	90.3	73.3		67.4	4
Vantage	7324	41.6	77.0	95.3	99.3	96.9	82.0	5
B.C. 4-15	7558		82.3	98.8	99.9	54.1	83.8	4
Lico I	7544		74.9	71.4			83.2	2
Hannchen	4841		69.3			45.2	57.3	2
Velvon 1-17	8058		68.7	96.8	85.4		83.6	3
Harlan	7008		66.6	93.8	121.4	54.1	84.0	4
Trebi	936		66.4	96.2	103.1		88.6	3
Bonneville	7248		61.9	81.1	115.8	78.3	84.3	4
36 ab 2031	7152		58.7				58.7	1
Moore	7251		54.0	77.9	82.4		71.4	3
W.S. 471	8055			78.2	91.9	55.2	75.1	3
Glacier x Compana	47-7405-I			67.6			67.6	1
Glacier x Compana	47-7405-V			70.2	74.5	63.5	69.4	3
Glacier x Compana	47-7405-X			59.7			59.7	1
Glacier x Compana	47-7415-V			57.8			57.8	1
Custer	8053				95.1	65.3	80.2	2
B.C. 120-78-10	8059				116.7	70.0	93.4	2
Danish	E. Mont				87.2	62.0	74.6	2
Freja	7130				103.1	69.1	86.1	2
Ymer	7275				97.5	74.7	86.1	2
Otis	7557				91.9		91.9	1
W.S. 480	8104				99.3	75.9	87.6	2
Glacier x Compana	47-7405-IV				81.5	60.0	70.8	2
Glacier x Titan, F-7	50-5610-7					91.3	91.3	1
2 row	6398					57.3	57.3	1
Compana x Morgenrot	49-527-24					58.2	58.2	1
Glacier x Titan F-7	50-5644-2					91.9	91.9	1

Table L .(Con't) Annual and five year summary of irrigated barley yield data grown at Creston, Montana 1949-1953.

Variety or Cross	C. I. or N No.	1949	1950	1951	1952	1953	Average Bu/A	Number of Trials
Lico x C. I. 7152 F-6	49-5579-19					58.8	58.8	1
Moravian	7559					37.8	37.8	1
W.S. 462	9184					65.0	65.0	1

Table LI. Five year summary of irrigated barley yield data. Northwestern Montana 1949-1953.

Variety or Cross	C. I. or N No.	Creston	Lake	Lincoln	Sanders	Ravalli	Missoula	Bu/Acre Average	No. of Trials
Compana	5438	60.0	49.7	33.7	51.1	58.9	41.8	49.2	20
Glacier	6976	60.9	74.5	26.6	48.5	73.6	-	56.8	8
Velvon 11	7088	80.7	64.3	52.9	54.9	68.2	-	64.2	14
Gem	7243	68.4	63.8	42.2	51.1	85.4	49.6	60.1	19
Titan	7055	64.2	61.1	41.8	46.4	73.5	45.7	55.5	20
Frontier	7155	74.1	69.1	46.8	51.1	76.8	46.2	60.7	20
Montcalm	7149	53.0	88.3	25.1	43.2	-	-	51.7	5
Plush	6093	67.4	65.9	51.0	47.9	84.2	49.0	60.9	14
Vantage	7324	82.0	70.5	50.2	50.8	85.0	57.9	66.1	20
B. C. 4-15	7558	83.8	44.6	69.0	-	-	59.0	64.1	10
Lico I	7544	83.2	-	-	-	-	-	83.2	2
Hannchen	4841	57.3	-	-	-	-	-	57.3	2
Velvon 1-17	8058	83.6	-	-	-	-	-	83.6	3
Harlan	7008	84.0	49.3	49.0	-	53.2	51.6	57.4	14
Trebi	936	88.6	-	-	-	-	-	88.6	3
Bonneville	7248	84.3	75.0	25.4	-	46.5	50.1	56.3	9
36ab2031	7152	58.7	-	-	-	-	-	58.7	1
Moore	7251	71.4	59.1	-	-	75.6	-	68.7	6
W.S.471	8055	75.1	-	-	-	-	-	75.1	3
Glacier x Compana	47-7405-1	67.6	-	-	-	-	-	67.6	1
Glacier x Compana	47-7405-V	69.4	-	-	-	-	-	69.4	3
Glacier x Compana	47-7405-X	59.7	-	-	-	-	-	59.7	1
Glacier x Compana	47-7415-V	57.8	-	-	-	-	-	57.8	1
Custer	8053	80.2	-	-	-	-	-	80.2	2
B.C. 120-78-10	8059	93.4	79.7	44.0	-	53.2	46.5	63.4	6
Danish	E. Mont.	74.6	66.8	34.6	-	41.4	51.0	53.7	7
Freja	7130	86.1	66.3	29.5	-	58.5	-	60.1	6
Ymer	7275	86.1	-	-	-	-	-	86.1	2
Otis	7557	91.9	-	-	-	-	-	91.9	1
W.S. 480	8104	87.6	-	-	-	-	-	87.6	2
Glacier x Compana	47-7405-IV	70.8	-	-	-	-	-	70.8	2
Glacier x Titan F-7	50-5610-7	91.3	-	-	-	-	-	91.3	1

Continued

Table LI. Continued. Five year summary of irrigated barley yield data. Northwestern Montana 1949-1953.

Variety or Cross	C. I. or N No.	Creston	Lake	Lincoln	Sanders	Ravalli	Missoula	Average Bu/Acre	No. of Trials
2-row	6398	57.3	-	-	-	-	-	57.3	1
Compana x Morgenrot	49-527-24	58.2	-	-	-	-	-	58.2	1
Glacier x Titan F-7	50-5644-2	91.9	-	-	-	-	-	91.9	1
Lico x C. I. 7152 F-6	49-5579-19	58.8	-	-	-	-	-	58.8	1
Maravian	7559	37.8	-	-	-	-	-	37.8	1
W. S. 462	9184	65.0	-	-	-	-	-	65.0	1

Date of Planting Study

Wheat, Oats, Barley
(Irrigated)

In 1952 a study was started to determine the best date of planting for small grain in Northwestern Montana.

In 1953 Pilot (wheat), Park (oats), and Vantage (barley) were planted at five different dates beginning April 15 and every ten days there after until May 25. Each crop was seeded in an individual test.

There was no significant difference in either wheat or barley, however the April 15th date in oats was significantly better than any of the May dates of planting. Tables LIa, LII, LIII.

Table LIIIa gives the average of two years data. The highest yields obtained for wheat was the planting made May 25, for oats, April 15, and for barley, April 15.

Table LIa. Agronomic data from date of planting study at five different dates on Pilot spring wheat 1953.

Date Planted	Heading Date	Height in Inches	Harvest Date	Plot Yield In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
April 15	7-5	51	8-23	52.28	38.10[1]	35.44	26.93	152.75	38.18
April 25	7-10	49	8-26	36.86	38.27	24.81	74.42	174.36	43.59
May 5	7-11	43	8-26	51.03	31.89	62.37	31.19	176.48	44.12
May 15	7-15	46	9-16	46.78	62.37	41.82	46.07	150.97	37.74
May 25	7-21	45	9-16	54.57	53.16	47.49	53.16	208.38	52.10

[1] Calculated missing plot.

Mean Yield.....45.59
S.E. %.....7.44
L.S.D.(5%).....N. S.
C. V.....16.31%

Table LII. Agronomic data from date of planting study at five different dates on Park oats in 1953.

Date Planted	Heading Date	Height in Inches	Harvest Date	Plot Yield In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
April 15	7-11	45	8-26	148.96	281.96	194.18	247.38	872.48	218.12*
April 25	7-15	45	8-26	140.98	211.47	171.57	199.50	723.52	180.88
May 5	7-15	42	9-15	135.66	183.54	99.75	161.68	580.63	145.16
May 15	7-14	44	9-16	167.58	178.22	122.36	133.00	601.16	150.40
May 25	7-21	45	9-16	117.41	171.57	103.74	178.22	570.94	142.74

* Yield is significantly higher than the May dates of Planting (5%).

Mean Yield.....167.42
S. E. $\bar{x}$.....12.54
L.S.D.(5%).....38.64
L.S.D.(1%).....54.26
C. V.....7.49%

Table LIII. Agronomic data from date of planting study at five different dates on Vantage barley in 1953.

Date Planted	Heading Date	Height in Inches	Harvest Date	Plot Yield In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
April 15	6-26	49	8-20	126.73	114.33	130.28	148.00	519.34	129.84
April 25	6-30	43	8-26	130.28	91.28	114.33	107.24	443.13	110.78
May 5	7-4	49	8-26	97.49	135.60	94.83	107.24	435.16	108.79
May 15	7-12	42	9-15	124.08	130.28	66.47	107.24	428.07	107.02
May 25	7-15	42	9-16	111.67	115.21	90.41	90.40	407.68	101.92

Mean Yield.....111.67
S. E. $\bar{x}$.....9.45
L.S.D.(5%).....N. S.
C. V.....8.46%

Table IIIIa . Two year average of Date of Planting Study.

Date of Planting	1952	1953	Total	Average	Rank
Wheat					
April 15	37.56	38.18	75.74	37.87	5
April 25	41.76	43.59	85.35	42.68	3
May 5	44.33	44.12	88.45	44.23	2
May 15	38.49	37.74	76.23	38.11	4
May 25	38.49	52.10	90.59	45.30	1
Oats					
April 15	121.45	218.12	339.57	169.79	1
April 25	122.80	180.88	303.68	151.84	2
May 5	117.04	145.16	262.20	131.10	3
May 15	108.62	150.40	259.02	129.51	4
May 25	107.73	142.74	250.47	125.24	5
Barley					
April 15	82.71	129.84	212.55	106.28	1
April 25	81.24	110.78	192.02	96.01	3
May 5	93.35	108.79	202.14	101.07	2
May 15	76.52	107.02	183.54	91.77	4
May 25	68.54	101.92	170.46	85.23	5

SPRING GRAIN IMPROVEMENT

Wheat (Dryland)

Six dryland nurseries were seeded during May 1953 in four Northwestern Counties. Two nurseries were on the station at Creston, with each nursery having 18 varieties. The remaining four were in Flathead (Stillwater), Lincoln (Eureka), Mineral (Superior), and Sanders (Trout Creek) counties. Eleven entries were included in each nursery.

The advance yield hard red spring wheat nursery on the station had a mean yield of 39.48 bushels per acre. There was no significant difference when analysed statistically. Lee, was heavily infected with loose smut. Supreme, had 75% lodging, breaking over about two inches above the soil surface. A number of "white heads" were noted, the greatest number being in Pilot. Table LIV.

The western regional white wheat nursery had a mean yield of 69.46 bushels per acre. Rates of infection of both stem and leaf rust were very high in this nursery. Leaf rust was present on all varieties. Stem rust was recorded on all but three varieties. These varieties are: Marfed x Merit-10, C. I. 13056; Idaed x Merit-5, C. I. 13055; and Idaed x Merit-5, C. I. 13054. Some lodging of all varieties was noted except white Federation 38, C. I. 11906 and Idaed x Merit-5, C. I. 13055. Yields were not significantly different.

No significant differences were found in the nursery at Trout Creek, which had a mean yield of 9.48 bushels per acre. The high C. V. is due in part to uneveness of stand because of new forest soil on which the nursery was grown. Table LVI.

Very dry conditions prevailed in the nursery at Superior. Yields were very low because of these conditions. The mean yield was 14.63 bushels per acre. Table LVII.

Drouth conditions in the Eureka nursery account for the low mean yield of 5.65 bushels per acre in this nursery. Table LVIII.

Significant results were obtained in the nursery at Stillwater in Flathead county. Two white wheats Lemhi and Onas were significantly higher in yield, when compared to Pilot which was used as a check in this nursery. Table LIX.

Table LX showsthe results of the seasons work on eleven varieties and includes all locations in which they were grown. For the white wheats Lemhi is first, also first of all varieties and Chinook is high for the hard red wheats.

Table LXI and LXIII give the five year yields for Creston and all work done in the Northwest 1949-1953 respectively for hard red spring wheats. In years on the station Pilot leads with 45.7 bushels per acre, for twenty trials in the Northwest Pilot leads with 16.9 bushels per acre.

White wheat averages are found in Tables LXIII and LXIV for Creston and Northwestern Montana respectively. In four years grown Lemhi leads on the station with 60.3 bushels per acre. On the basis of 19 trials Lemhi also leads with 20.7 bushels per acre.

Six varieties were grown in 1/80 acre plots to obtain samples for milling and baking test. These plots were harvested with a 6 feet combine. Yield data is shown in Table LXV.

Table LIV. Agronomic data from dryland advance yield nursery, Creston, Montana in 1953. Three row plots, three replications.

Date Planted, May 4, 1953 Size of Plot, 16 feet.

Variety or Cross	C. I. or M No.	Heading Date	Height in Inches	Lodging %	Harvest Date	Plot Yield in Bushels per Acre I	II	III	Total Ounces	Average Bushels Per Acre	Bushel Weight
Rescue x Thatcher	B50-18	7-11	45	-	8-22	38.27	39.69	53.16	131.12	43.71	61
Pilot	11945	7-11	43	-	8-22	38.27	38.98	41.11	118.36	39.45	56
1750 x Rescue	B50-120	7-11	46	-	8-19	38.27	41.82	40.40	120.49	40.16	None
1520 x 1752 (N2389)	13041	7-12	41	-	8-22	38.98	42.53	32.60	114.11	38.04	60
Thatcher	10003	7-10	41	-	8-19	36.15	37.56	35.44	109.15	36.38	57
Pilot[2] x Thatcher (N2170)	12974	7-12	42	-	8-22	36.15	43.23	45.36	124.74	41.58	58
1764 x Rescue	B49-90	7-14	44	-	8-22	36.15	34.02	43.23	113.40	37.80	59
Rescue	12435	7-12	42	-	8-22	37.56	32.60	46.78	116.94	38.98	58
McM-Exch x Redman[3] (C.I.186)	13100	7-11	42	-	8-19	34.02	36.15	46.78	116.90	38.98	56
1764 x Henry	12733	7-7	42	-	8-19	38.98	43.23	32.60	114.82	38.27	57
Chinook	H-4258	7-10	45	-	8-19	37.56	13.56	49.61	124.74	41.58	60
1750 x Rescue	B49-102	7-12	46	-	8-22	35.44	35.44	38.98	109.86	36.62	None
Ceres	6900	7-11	47	-	8-22	38.27	38.27	31.89	108.44	36.15	60
Lee[1]	12488	7-7	45	-	8-19	36.86	42.53	36.86	116.24	38.75	57
Pilot[2] x Regent (N2183)	13042	7-8	42	-	8-22	39.69	41.11	45.36	126.16	42.05	58
Mida	12008	7-9	44	-	8-22	42.53	43.23	43.94	129.70	43.23	60
Rushmore	12273	7-10	42	-	8-22	38.27	40.40	46.78	125.45	41.82	59
Supreme	8026	7-10	43	75	8-22	42.53	36.86	31.89	111.27	37.09	57

Note: Average of Pilot and Ceres used as check in this Nursery.

[1]Twenty-four smut heads per 16 feet of row average of three plots (Loose smut)

Mean Yield.....39.48
S. E. $\bar{x}$..... 2.65
L.S.D. (5%).....Not Signif.
L.S.D. (1%)..... " "
C. V. 6.70%

Table LV. Agronomic data from dryland western regional white wheat nursery. Creston, Montana in 1953. Three row plot, three replications.

Date Planted, May 11, 1953 Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Heading Date	Height in Inches	Leaf Rust %	Stem Rust %	Lodging %	Plot Yield in Bushels per Acre I	II	III	Total Ounces	Average Bushels Per Acre	Bushel Weight Pounds
Marfed x Merit-22	13057	7-17	44	60	T	53	70.88	76.54	75.12	78.50	74.18	60
Baart 46	12386	7-16	43	67	13	70	55.90	56.70	57.41	60.00	56.70	61
K.F.D.E.B.-121	12944	7-23	44	60	T	37	63.79	68.74	76.55	73.75	69.69	58
Idaed	11706	7-13	44	73	13	13	60.95	66.62	69.46	69.50	65.68	61
Henry	12265	7-15	46	23	-	27	65.91	82.92	75.85	79.25	74.89	62
Onas	6221	7-17	42	88	23	46	70.88	63.79	70.86	72.50	68.51	59
Marfed x Merit-28	13058	7-16	42	50	14	33	65.20	67.33	84.34	76.50	72.29	60
Kenya x Lemhi^4	13051	7-16	44	83	33	13	64.50	73.71	74.41	75.00	70.88	60
Kenya x Lemhi^2	12947	7-17	44	65	13	10	71.58	49.61	65.21	66.25	62.60	59
W5-67 (Lemhi x Hope-Fed)	13053	7-17	44	88	7	18	69.46	66.62	77.96	75.50	71.34	59
Lemhi	11415	7-16	43	97	50	13	72.29	78.67	67.33	77.00	72.77	62
Marfed x Merit-10	13056	7-16	44	33	-	16	72.29	90.01	81.50	83.00	78.44	61
White Fed. 38	11906	7-12	41	93	3	-	73.00	75.12	85.05	82.25	77.73	61
Baart	1697	7-16	43	93	40	68	70.88	48.90	60.95	63.75	60.24	64
Federation	4734	7-24	43	93	30	23	72.29	69.46	65.91	73.25	69.22	63
Onas 52	12946	7-19	42	85	-	38	79.38	65.21	92.13	83.50	78.90	60
Marfed	11919	7-17	44	92	43	15	58.12	77.25	76.55	74.75	70.63	59
Awned Onas	12235	7-17	41	88	30	38	79.38	80.80	70.86	74.00	69.93	59
Thatcher	10003	7-14	44	-	-	-	58.82	59.53	64.50	71.75	67.80	59
Idaed x Merit-5	13055	7-14	43	43	-	-	74.41	75.13	61.66	69.00	65.21	60
Idaed x Merit-2	13054	7-15	43	40	-	17	71.58	34.02	77.25	64.50	60.95	60

Note: Onas, check in this Nursery.

Mean Yield.....69.46
S. E. $\bar{x}$ 5.46
L.S.D. (5%).....Not Signif.
L.S.D. (1%)..... " "
C. V. 7.86%

Table LVI. Yield data from spring wheat nursery grown under dryland conditions in Sanders, County. Single row plots, four replications, Henry Kraus farm, Trout Creek, Montana.

Date Planted May 12, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Onas	6221	3.54	5.67	14.18	7.80	31.19	7.80
Awned Onas	12235	4.96	7.80	15.59	8.51	36.86	9.22
Rescue	12435	3.54	17.01	12.05	14.18	46.78	11.70
Lee	12488	4.96	9.21	7.80	9.92	31.89	7.97
Ceres	6900	2.84	7.09	14.18	13.47	37.58	9.40
Lemhi	11415	4.96	15.59	10.63	14.18	45.36	11.34
Thatcher	10003	4.96	7.80	9.21	9.92	31.89	7.97
Pilot	11945	8.51	5.67	4.25	21.97	40.40	10.10
Rushmore	12273	5.67	7.09	11.34	12.05	36.15	9.04
1764 x Henry	12733	12.76	4.96	13.47	9.92	41.11	10.28
Chinook	H-4258	7.09	12.05	12.76	9.21	41.11	10.28
Premier		4.92[1]	34.25	15.59	9.92	34.68	8.67

[1]Calculated Missing Plot.

Mean Yield.....9.48
S. E. $\bar{x}$ 1.945
L.S.D. (5%).....N.S.
C. V. 20.52%

Table LVII. Yield data from spring wheat nursery grown under irrigated conditions in Mineral County. Single row plots, three replications, Mr. Jostad farm, Superior, Montana.

Date Planted May 6, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Plot Yield in Bushels Per Acre I	II	III	Total Bushels	Average Bushels Per Acre
Onas	6221	4.96	12.75	21.26	38.97	12.99
Awned Onas	12235	7.09	14.88	17.01	38.98	12.99
Rescue	12435	13.47	17.01	14.88	45.36	15.11
Lee	12488	17.01	19.14	18.43	54.58	18.19
Ceres	6900	6.39	18.43	18.43	43.25	14.42
Lemhi	11415	6.39	17.01	20.55	43.95	14.65
Thatcher	10003	8.51	12.76	12.05	33132	11.11
Pilot	11945	5.67	14.96	18.43	39.06	13.01
Rushmore	12273	14.88	14.88	25.52	55.28	18.43
1764x Henry	12733	9.21	15.59	7.80	32.60	10.87
Chinook	H-4258	14.88	24.88	17.72	57.48	19.16

Note: Pilot is the check in this nursery.

Mean Yield.....14.63
S. E. $\bar{x}$..... 2.225
L.S.D.(5%).....N. S.
C V 15.21%

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Table LVIII. Yield data from spring wheat nursery grown under dryland conditions in Lincoln County. Single row plots, four replications, Horace Hudson farm Eureka, Montana.

Date Planted, May 13, 1953 Size of plot 16 feet

Variety or Cross	C. I. or N No.	Yield per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Onas	6221	9.21	3.54	7.09	3.54	23.38	5.85
Awned Onas	12235	6.38	4.96	7.79	3.54	22.67	5.67
Rescue	12435	7.09	4.96	5.67	4.96	22.68	5.67
Lee	12488	7.80	5.67	7.09	5.67	26.23	6.56
Ceres	6900	4.96	4.25	7.09	4.96	21.26	5.32
Lemhi	11415	7.09	4.25	9.21	6.38	26.93	6.73
Thatcher	10003	4.96	3.54	7.09	4.96	20.55	5.14
Pilot	11945	3.54	3.54	7.78	4.96	19.82	4.96
Rushmore	12273	5.67	5.67	5.67	4.96	21.97	5.49
1764 x Henry	12733	4.96	4.25	6.38	2.84	18.43	4.61
Chinook	H-4258	5.67	5.67	7.80	5.67	24.81	6.20

Note: Pilot is the check in this nursery.

Mean Yield.....5.65
S. E. ₹ ..... .956
L.S.D. (5%).....N.S.
C. V. 16.92%

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Table LIX. Yield data from spring wheat nursery grown under irrigated conditions in Flathead County. Single row plots, four replications. Conrad Gilbertson farm, Kalispell, Montana.

Date Planted May 9, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Plot Yield in Bushels Per Acre I	II	III	IV	Total	Average Bushels Per Acre
Onas	6221	14.88	14.88	17.01	14.18	60.95	15.23**
Awned Onas	12235	12.05	11.34	14.18	12.75	50.32	12.58
Rescue	12435	13.47	11.34	13.47	11.34	49.62	12.40
Lee	12486	11.34	11.34	7.09	9.92	39.69	9.92
Ceres	6900	13.47	11.34	11.34	10.63	46.78	11.70
Lemhi	11415	18.43	14.88	18.43	13.47	65.21	16.30**
Thatcher	10003	9.21	9.92	9.92	8.51	37.56	9.39
Pilot	11945	12.76	10.63	12.76	12.76	48.91	12.23
Rushmore	12273	11.34	8.51	9.92	8.51	38.28	9.57
1764 x Henry	12733	9.21	10.63	9.92	6.39	36.15	9.04
Chinook	H-4258	11.34	11.34	14.17	12.05	48.90	12.23

Note: Pilot is the check in this nursery.

* Varieties yielding significantly more than the check (5%).

**Varieties yielding significantly more than the check (1%).

Mean Yield.....11.87
S. E. $\bar{x}$ 6.76
L.S.D. (5%)..... 1.95
L.S.D. (1%)..... 2.63
C. V. 5.70%

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Table LX. Summary of eleven varieties of spring wheat in Northwestern Montana under dryland conditions in 1953.

Variety or Cross	Creston	Stillwater	Superior	Trout Creek	Eureka	Average Bushel/A	Rank
Onas	68.51	15.23	12.99	7.80	5.85	22.08	3
Awned Onas	69.93	12.58	12.99	9.22	5.67	22.09	2
Rescue	38.98	12.40	15.11	11.70	5.67	16.72	6
Lee	38.75	9.92	18.19	7.97	6.56	16.28	7
Ceres	36.15	11.70	14.42	9.40	5.32	15.40	9
Lemhi	72.77	16.30	14.65	11.34	6.73	24.36	1
Thatcher	36.38	9.39	11.11	7.97	5.14	14.00	11
Pilot	39.45	12.23	13.01	10.10	4.96	15.95	8
Rushmore	41.82	9.57	18.43	9.04	5.49	16.87	5
1764 x Henry	38.27	9.04	10.87	10.28	4.61	14.61	10
Chinook	41.58	12.23	19.16	10.28	6.20	17.89	4

Table LXI. Annual and five year summary of hard red spring wheat at Creston, Montana 1949-1953. (Dryland)

Variety or Cross	C. I. or N No.	1949	1950	1951	1952	1953	Average Bushels/A	Years Grown
Reward	8182	33.3	43.9	41.8			39.7	3
Supreme	8026	37.3	58.3	49.1	41.6	37.1	46.7	5
Thatcher	10003	41.1	51.5	43.7	31.9	36.4	40.9	5
Marquis	3641	37.6	58.4	40.2			45.4	3
Ceres	6900	45.4	57.9	48.5	40.4	36.2	45.7	5
Pilot	11945	44.7	63.1	42.3	35.7	39.5	45.0	5
Pilot x Mida (N1756)	12303		61.2	40.9			51.1	2
Mida x Cadet (N1831)	12363		61.2	50.3			55.8	2
Lee	12488		60.5	41.1	36.9	38.8	44.3	4
Pilot x Mida (N1953)	12445		59.8				59.8	1
Merit x Pilot (N1860)	12355		59.3				59.3	1
Cadet	12053		59.1				59.1	1
Mida	12008		53.4	47.2	39.9	43.2	45.9	4
Rescue	12435		48.2	38.5	38.7	38.9	41.1	4
Pilot x Merit (N1898)	12442		58.1				58.1	1
Rushmore	12273			48.4	40.6	41.8	43.6	3
N1764 x Henry (N2211)	12733			47.5	37.6	38.3	41.1	3
1764 x Rescue	B49-90			46.5	39.0	37.8	41.1	3
Timstein x Newthatch	12739			46.3			46.3	1
N 1552 x Mida	12746			45.4	44.9		45.1	2
Red Thatcher				45.1			45.1	1
Pilot x Merit (N1996)	12648			42.5			42.5	1
Saunders	3516			39.0			39.0	1
1750 x Rescue	B50-120				39.2	40.2	39.7	2
1750 x 1753 (N2256)	12975				42.8		42.8	1
1750 x Rescue	B49-102				41.1	36.6	38.9	2
Pilot^2 x Thatcher (N2170)	12974				42.5	41.6	42.1	2
Chinook	B-4258				36.6	41.6	39.1	2
Rescue x Thatcher	B50-18					43.7	43.7	1
1520 x 1752 (N2389)	13041					38.0	38.0	1
MoM-Exch x Redman^3 C.I. 186	13100					38.9	38.9	1
Pilot x Regent (N2153)	13042					42.1	42.1	1
Henry	12265				62.2	74.9	68.6	2

Table LXIII. Five year summary of white spring wheats under dryland conditions Creston, Montana 1949-1953.

Variety or Cross	C. I. N. No.	1949	1951	1952	1953	Average Bushels/A	Years Grown
Idaed	11706	41.1		61.9	65.7	56.2	3
Lemhi	11415	43.4	51.5	73.4	72.8	60.3	4
Onas	6221	44.2	55.8	63.5	68.5	58.0	4
Hope x Lemhi^4	12685		48.5	72.8		60.7	2
Awned Onas	12235			72.3	69.9	71.1	2
Marfed	11919			62.4	70.6	66.5	2
Federation	4734			60.2	69.2	64.7	2
White Federation 38	11906			65.0	77.7	71.4	2
Baart	1697			72.8	60.2	66.5	2
Baart 46	12386			56.0	56.7	56.4	2
Marfed x Merit-22	13057				74.2	74.2	1
K.F.D.E.B.- 121	12944				69.7	69.7	1
Marfed x Merit-28	13058				72.3	72.3	1
Kenya x Lemhi^4	13051				70.9	70.9	1
Kenya x Lemhi^2	12947				62.6	62.6	1
W-5-67(Lemhi x Hope-Fed)	13053				71.3	71.3	1
Marfed x Merit-10	13056				78.4	78.4	1
Onas 52	12946				78.9	78.9	1
Idaed x Merit-5	13055				65.2	65.2	1
Idaed x Merit-2	13054				61.0	61.0	1

Table LXIV. Five year summary on white spring wheats under dryland conditions in Northwestern Montana 1949-1953.

Variety or Cross	C.I. or N No.	Creston	Lincoln	Sanders	Lake	Flathead	Mineral	Average Bu./A	No. Trials
Idaed	11706	56.2	9.1	15.0	8.5	16.5		21.1	8
Lemhi	11415	60.3	10.7	16.5	9.9	15.7	11.1	20.7	19
Onas	6221	58.0	10.1	15.0	9.2	14.6	9.7	19.4	19
Hope x Lemhi^4	12685	60.7						60.7	2
Awned Onas	12235	71.1	9.7	13.9		12.7	9.3	24.3	14
Marfed	11919	66.5						66.5	2
Federation	4734	64.7						64.7	2
White Federation 38	11906	71.4						71.4	2
Baart	1697	66.5						66.5	2
Baart 46	12386	56.4						56.4	2
Marfed x Merit-22	13057	74.2						74.2	1
K.F.D.E.B.-121	12944	69.7						69.7	1
Marfed x Merit-28	13058	72.3						72.3	1
Kenya x Lemhi^4	13051	70.9						70.9	1
Kenya x Lemhi^2	12947	62.6						62.6	1
W-5-67(Lemhi x Hope-Fed)	13053	71.3						71.3	1
Marfed x Merit-10	13056	78.4						78.4	1
Onas52	12946	78.9						78.9	1
Idaed x Merit-5	13055	65.2						65.2	1
Idaed x Merit-2	13054	61.0						61.0	1

Table LXV. Yield Data from 1/80 acre plots under dryland conditions Creston, Montana 1949-1953.

Variety	C. I. or N No.	Yield Per. A.
Chinook	N-4258	41.33
Rescue	12435	49.33
1764 x Rescue	B49-90	48.00
Marquis	3641	41.33
1764 x Henry	12733	51.33
Thatcher	10003	51.33

SPRING GRAIN IMPROVEMENT

Oats (Dryland)

Six dryland oat nurseries were seeded in May 1953. Two nurseries were seeded on the station and four off station. The off-station nurseries were located in Flathead(Stillwater), Sanders(Trout Creek), Mineral(Superior), and Lincoln(Eureka) counties.

One station nursery contained twenty varieties, the other 31 varieties and was grown as a Uniform Nursery in cooperation with Mr. Stevens at the Aberdeen Station in Idaho. The off-station nurseries each contatined ten Varieties.

The station nursery(20 entries) had a mean yield of 74.61 bushels per acre and was not significant when analysed statistically. Table LXVI.

In the Uniform nursery with 31 entries there was no significant differences between varieties. The mean yield was 137.42 bushels per acre. Table LXVII.

Low yields and a hight C. V. in the nursery at Trout Creek were due in part to dry conditions and uneven soil conditions. Only three replications were harvested because of these conditions. The mean yield was 5.65 bushels per acre. Bridger and Canada hybrid were significantly higher in yield than the check(Mission and Gopher). Table LXIX.

With Gopher as a check Bridger, Park, and Mission were significantly lower in yield. The mean yield of the nursery at Eureka was 7.98 bushels per acre. Very dry conditions prevailed in this area in which this nursery was grown. Table LXX.

Using the Average of Gopher and Mission as a check Cody, Park, Bridger, Clinton x Overland^{2} AB6014 and Exeter were significantly higher in yield in the nursery at Stillwater. The mean yield was 23.38 bushels per acre Table LXXI.

Table LXXIa gives the results of the past seasons work on oats. Bridger ranks number one for the 1953 season with 30.2 bushels per acre.

For five years average on the station Park leads with 96.1 bushels per acre. Table LXXII. In all the Northwestern Montana counties in 18 trials Bridger leads with 46.2 bushels per acre. Table LXXIII.

Table LXVII. Agronomic data from dryland oat nursery. Creston, Montana in 1953. Three row plots, three replications.

Date Planted, May 4, 1953 Size of plot 16 feet.

Variety or Cross	C. I. or N No.	Heading Date	Heading Height	Lodging %	Harvest Date	Test Wt.	Yield per plot in oz. I	II	III	Total ounces	Average Bushels Per acre
Clinton x Marion	5440	7-11	36	-	8-14	31	12.50	11.75	12.25	36.50	64.73
Clinton x Marion	5647	7-11	37	-	8-16	31	15.25	13.75	14.00	43.00	76.25
Clinton x Marion	5649	7-12	37	-	8-15	34	13.25	13.75	14.50	41.50	73.59
Columbia x Clinton	5630	7-9	36	-	8-13	31	13.00	15.75	14.50	43.25	76.70
Copher	2027	7-12	36	-	8-13	31	14.75	15.00	14.50	44.25	78.47
Fulton x Clinton	4991	7-14	33	-	8-16	32	15.75	16.00	15.75	47.50	84.23
Neoelect Clinton	4969	7-11	34	-	8-12	32	11.25	16.00	15.75	43.00	76.25
Cody	3916	7-18	31	-	8-19	31	14.00	14.50	10.75	39.25	69.60
V- R x Bannock	4283	7-12	32	3	8-14	32	13.75	13.25	13.75	40.75	72.26
Mission	2588	7-12	38	-	8-16	33	13.50	13.75	18.00	45.25	80.24
Markton-Rainbow x Mission	43-2-25	7-14	36	-	8-17	36	15.50	15.75	14.00	45.25	80.24
Park	6611	7-16	34	-	8-19	33	15.50	13.00	12.75	41.25	73.15
Clinton x Overland[2]	AB6014	7-15	32	-	8-16	33	15.50	14.00	11.25	40.75	72.26
Clinton x Overland	AB6016	7-16	33	-	8-17	32	13.25	9.00	16.00	38.25	67.82
Proctor	4158	7-18	36	-	8-16	32	13.50	15.00	14.00	42.50	75.37
Bridger	2611	7-20	41	-	8-19	31	15.75	13.50	14.25	43.50	77.14
Andrew x Clinton	5636	7-11	38	7	8-14	31	14.75	13.25	15.50	43.50	77.14
Clinton "59"	4259	7-10	33	2	8-13	33	13.00	16.00	13.00	42.00	74.48
Golden Rain	4512	7-20	41	-	8-19	34	13.50	16.00	12.75	42.25	74.92
Overland	4181	7-13	31	8	8-16	32	14.00	14.75	9.25	38.00	67.39

Note. Not significant when analyzed statistically.

Mean Yield..... 74.61
C. D. 5%..... 5.45
C. V. 7.31

84.

Table LXVIII. Agronomic data from uniform oat nursery, Creston, Montana in 1953. Three row plots three replications. Dryland.

Date Planted May 15, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Heading Date	Heading Height	Lodging %	Harvest Date	Plot Yield In Bushels Per Acre I	II	III	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Shasta	3976	7-24	48	-	9-3	160.93	158.27	147.63	466.83	155.61	35
(V - R) x Bannock	3865	7-21	38	-	9-3	151.62	154.28	107.73	413.63	137.88	32
Bannock	2592	7-22	45	-	9-3	131.67	133.00	130.34	395.01	131.67	37
Overland	4181	7-18	39	-	9-3	111.72	111.72	134.33	357.77	119.26	35
Andrew x Clinton	5657	7-16	41	-	8-28	140.98	135.66	113.05	389.69	129.90	32
Branch	5013	7-22	47	-	9-3	154.28	219.45	135.66	509.39	169.80	37
Clintafe	5869	7-16	45	-	8-28	160.93	122.36	99.75	383.04	127.68	34
Clinton x Overland^2	5345	7-21	43	-	9-3	160.93	160.93	148.96	470.82	156.94	37
Exeter	4158	7-25	43	-	9-3	117.04	138.32	171.57	426.93	142.31	35
Carleton	2378	7-20	43	-	8-28	71.82	156.94	118.37	347.13	115.71	34
Clarion	5647	7-17	43	-	8-28	147.63	131.67	114.38	393.68	131.23	33
Sauk	5946	7-23	44	-	9-3	144.97	125.02	151.62	421.61	140.54	36
Clinton x Overland^2 (Park)	6611	7-22	41	-	9-3	172.90	156.94	142.31	472.15	157.38	37
Clintland	6701	7-14	36	-	8-28	101.08	109.06	101.08	311.22	103.74	34
(Victoria x Najira-Banner) x Roxton	6661	7-22	46	-	9-3	136.99	130.34	167.58	434.91	144.97	38
Fortune	5226	7-20	47	-	9-3	144.97	212.80	115.71	473.48	157.83	35
Clinton x Overland^2	5346	7-22	43	-	9-3	151.62	126.35	98.42	376.39	125.46	37
Cody	3916	7-21	42	-	9-3	131.67	135.66	147.63	414.96	138.32	37
Victory	1145	7-25	49	-	9-3	119.70	110.39	130.34	360.43	120.14	37
Roxton	4134	7-24	51	-	9-3	139.65	66.50	138.32	344.47	114.82	35
Andrew x Clinton	5658	7-17	46	3	9-3	144.97	162.26	146.30	453.53	151.18	34
Clinton x Clinton	5441	7-17	44	-	8-28	118.37	121.03	123.69	363.09	121.03	39
Shelby	4372	7-21	45	-	9-3	142.31	114.38	164.92	421.61	140.50	35
Craig	4332	7-22	39	-	8-28	171.57	129.01	127.68	428.26	142.75	35
C. I. 4189 x Overland	6613	7-22	43	-	9-3	118.37	144.97	147.63	410.97	136.99	35
Markton	2053	7-18	44	-	9-3	115.71	122.36	164.92	402.99	134.33	33

Table LXVIII. Agronomic data from uniform oat nursery, Creston, Montana in 1953. Three row plots three replications. Dryland. (Con't)

Date Planted May 15, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Heading Date	Heading Height	Lodging %	Harvest Date	Plot Yield In Bushels Per Acre I	II	III	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
C. I. 4189 x Overland	5347	7-21	41	-	9-3	133.00	146.30	144.97	424.27	141.42	35
(V-R)x Columbia Mo-0-205	4988	7-17	43		8-28	136.99	139.65	127.68	404.32	134.77	35
Ajax	4157	7-20	47	-	8-28	158.27	171.57	163.59	493.43	164.48	35
Andrew	4170	7-14	41	-	8-28	131.67	131.67	111.72	375.06	125.02	34
(B x A) x Iogold x (V-R)	6612	7-21	39	-	9-3	138.32	167.58	133.00	438.90	146.30	36

Mean Yield.....137.42
S. E. $\bar{x}$..... 13.07
L.S.D.(5%).....N. S.
C. V. 9.51%

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Table LXIX. Yield data from oat nursery grown under dryland conditions in Sanders County. Single row plots three replications, Henry Kraus farm, Trout Creek, Montana.

Date Planted May 12, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Plot Yield In Bushels Per Acre I	II	III	Total Bushels	Average Bushels Per Acre
Cody	3916	5.32	6.65	2.66	14.63	4.88
V-R x Bannock	4283	7.98	3.99	5.32	17.29	5.76
Park	6611	5.32	2.66	3.99	11.97	3.99
Bridger	2611	10.64	6.65	7.02[1]	24.31	8.10*
Gopher	2027	6.65	3.36[1]	3.99	14.00	4.67
Mission	2588	7.98	3.36[1]	2.66	14.00	4.67
Canada Hybrid	2795-11-5	13.30	5.32	7.98	26.60	8.87*
Clinton x Overland	AB6014	6.65	5.32	2.66	14.63	4.88
Exeter	4158	10.64	5.32	5.32	21.28	7.09
Overland	4181	3.99	2.66	3.99	10.64	3.55

Note: Average of Gopher and Mission used as a check in this nursery.

*Varieties yielding significantly more than the check (5%).

[1]Calculated missing plot

Mean Yield.....5.65
S. E. $\bar{x}$ ..... .956
L.S.D. (5%).....2.88
C. V. 16.92%

Table LXX. Yield data from oat nursery grown under dryland conditions in Lincoln, County. Single row plots, four replications. Horace Hudson farm, Eureka, Montana.

Date Planted May 31, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Cody	3916	9.31	7.98	5.32	10.64	33.25	8.31
V-R x Bannock	4283	7.98	13.30	7.98	6.65	35.91	8.98
Park	6611	6.65	9.31	3.99	10.64	30.59	7.65*
Bridger	2611	2.66	5.32	5.32	6.65	19.95	4.99**
Gopher	2027	6.65	15.96	9.31	13.30	45.22	11.31
Mission	2588	6.65	10.64	5.32	5.32	27.93	6.98*
Canada Hybrid	2795-11-5	7.98	10.64	5.32	15.96	39.90	9.98
Clinton x Overland	AB6014	5.32	7.98	1.33	7.98	22.61	5.65
Exeter	4158	3.99	6.65	2.66	11.97	25.27	6.32
Overland	4181	9.31	11.97	6.65	10.64	38.57	9.64

Note: Gopher is used as the check in this nursery.

*Varieties yielding significantly less than the check (5%).

**Varieties yielding significantly less than the check (1%).

Mean Yield.....7.98
S. E. % 1.123
L.S.D. (5%).....3.25
L.S.D. (1%).....4.40
C. V. 14.07%

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Table LXXI. Yield data from oat nursery grown under dryland conditions in Flathead County. Single row plots four replications, Conrad Gilbertson farm, Kalispell, Montana 1953.

Date Planted May 9, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushels Weight Pounds
Cody	3916	19.95	27.93	31.92	37.24	117.04	29.26**	27
V-R x Bannock	4283	10.64	18.62	14.36	21.28	65.17	16.29	
Park	6611	18.62	22.61	26.60	31.92	99.75	24.94*	29
Bridger	2611	19.95	26.60	31.92	43.89	122.36	30.59**	29
Gopher	2027	7.98	13.30	10.64	17.29	49.21	12.30	
Mission	2588	15.96	26.60	31.92	26.60	101.08	25.27	
Canada Hybrid	2795-11-5	17.29	25.27	22.61	29.26	94.43	23.61	30
Clinton x Overland	AB6014	18.62	23.94	31.92	29.26	103.74	25.94*	29
Exeter	4158	26.60	23.94	22.61	37.24	110.39	27.60**	30
Overland	4181	18.62	13.30	13.30	26.60	71.82	17.96	26

Note: The average of Gopher and Mission is the check in this nursery.
* Varieties yielding significantly more than the check (5%)
** Varieties yielding significantly more than the check (1%)

Mean yield.....23.38
S.E. $\bar{x}$..... 1.984
L.S.D.(5%)..... 5.75
L.S.D. (1%)..... 7.77
C.V..... 8.49%

-001-

Table LXXI a. . Summary of ten varieties of oats grown under dryland conditions in Northwestern Montana 1953.

Variety or Cross	C. I. or N No.	Creston	Trout Creek	Eureka	Still-water	Average Bushel/A	Rank
Cody	3916	69.6	4.9	8.3	29.3	28.0	4
V-R x Bannock	4283	72.3	5.8	9.0	16.3	25.6	8
Park	6611	73.2	4.0	7.7	24.9	27.5	5
Bridger	2611	77.1	8.1	5.0	30.6	30.2	1
Gopher	2027	78.5	4.7	11.3	12.3	26.7	7
Mission	2588	80.2	4.7	7.0	25.3	29.3	2
Canada Hybrid	2795-11-5	-	8.9	10.0	23.6	14.2	10
Clinton x Overland	46AB6014	72.3	4.9	5.7	25.9	27.2	6
Exeter	4158	75.4	7.1	6.3	27.6	29.1	3
Overland	4181	67.4	3.6	9.6	18.0	24.7	9

Table LXXII. Annual and five year summary of yield data on dryland oats at Creston, Montana. 1949-1953

Variety or Cross	C. I. or N. No.	1949	1950	1951	1952	1953	1953	Average	No. of Trials
Gopher	2027	68.7	139.7	86.0	85.6	78.5		91.7	5
Bannock	2592	50.1					131.7	90.9	2
Marida		59.4						59.4	1
Mission	2588	56.8	117.0	94.5	95.1	80.2		88.7	5
Park	6611	57.2	149.0	104.2	97.1	73.2	157.4	96.1	5
Zephyr	4800	64.7	138.3	106.4				103.1	3
Bridger	2611	59.4	133.0	102.0	97.1	77.14		93.7	5
Overland	4181	60.8	141.9	104.6	101.5	67.4	119.3	99.3	6
(V-R) x Bannock	4283	56.7	148.5	90.4	93.1	72.3		92.2	5
Clinton x Overland^2	46AB6014		153.4	95.3	103.7	72.3	84.9	101.9	4
Clinton x Overland^2	46AB6016		151.2	95.0	97.5	67.8		102.9	4
(Bond - Anth) x Overland	46AB5834		150.3					150.3	1
Overland x Mission	44-1-1-1		150.3					150.3	1
Clinton x Overland	5933		148.1					148.1	1
Fulton x Clinton	4991		147.2	85.1	99.3	84.2		138.6	4
Clinton x Overland	46AB6015		143.2					143.2	1
(Bond -Anth) x Overland	5347		142.8					142.8	1
Canada Hybrid	2795-11-5		141.9					141.9	1
Reselect Clinton	4969		141.0	87.9	86.0	76.3		97.8	4
Bond x Rainbow	4186		138.8					138.8	1
Vieland	3611		138.8	94.1				116.5	2
(Bond x Anth) x Overland	AB5835		138.8					138.8	1
Clinton	3971		131.7					131.7	1
Overland x Mission	44-1-1-76		130.3					130.3	1
Clinton x Overland	46AB6013		128.5	101.5				115.0	2
Andrew	4170		128.1					128.1	1
Markton - Rainbow x Mission	43-2-25		124.1	91.5	82.9	80.2		94.7	4
Exeter	4158			101.1	101.5	75.4	142.3	105.1	4
Columbia x Clinton	5630			88.7	90.0	76.7		85.1	3
Cody	3916			100.0	72.7	69.6	138.3	95.2	4

Continued

Table LXXII. Continued

Variety or Cross	C. I. or N No.	1949	1950	1951	1952	1953	1953	Average	No. of Trials
C. I. 4189 x Overland	AB5347			96.7				96.7	1
C. I. 4189 x Overland	46AB5834			92.3				92.3	1
C. I. 4189 x Overland	AB5835			92.2				92.2	1
Clinton x Marion	5440				45.7	64.7		55.2	2
Clinton x Marion	5647				67.4	76.3		71.5	2
Clinton x Marion	5649				87.3	73.6		80.5	2
Andrew x Clinton	5636				99.5	77.1		88.3	2
Clinton 59	4259				88.7	74.5		81.6	2
Golden Rain	4152				89.6	74.9		82.3	2
Shasta						155.6		155.6	1
V - R x Bannock	3865					137.9		137.9	1
Andrew x Clinton	5657					129.9		129.9	1
Branch	5013					169.8		169.8	1
Clintafe	5869					127.7		127.7	1
Clinton x Overland	5345					156.9		156.9	1
Carleton	2378					115.7		115.7	1
Clarion	5647					131.2		131.2	1
Sauk	5946					140.5		140.5	1
Clintland	6701					103.7		103.7	1
(Victoria x Hajira - Vanner) x Roxton	6661					145.0		145.0	1
Fortune	5226					157.8		157.8	1
Clinton x Overland	5346					125.5		125.5	1
Victory	1145					120.1		120.1	1
Roxton	4134					114.8		114.8	1
Andrew x Clinton	5658					151.2		151.2	1
Clinton x Clinton	5441					121.0		121.0	1
Shelby	4372					140.5		140.5	1
Craig	4332					142.8		142.8	1
C. I. 4189 x Overland	6613					137.0		137.0	1
Markton	2053					134.3		134.3	1

Table LXXIII. Five year summary of yield data on dryland oats in Northwestern Montana 1949-1953.

Variety or Cross	C. I. or N No.	Creston	Lincoln	Sanders	Flat-head	Mineral	Average Bu./A	No. of Trials
Gopher	2027	91.7	20.4	31.6	21.9	19.3	37.0	16
Bannock	2592	90.9	25.3	36.1	38.1	25.6	43.2	12
Marida		59.4	12.9	33.9			35.4	4
Mission	2588	88.7	17.8	31.2	28.2	18.1	36.8	18
Park	6611	96.1	19.1	34.0	29.8	16.3	39.1	18
Zephyr	4800	103.1	23.7	36.3	31.4	16.3	42.3	13
Bridger	2611	93.7	36.0	40.4	34.2	26.9	46.2	18
Overland	4181	99.3	15.2	27.4	26.1		42.0	16
(V-r) x Bannock	4283	92.2	16.2	32.3	29.5	23.9	38.8	18
Clinton x Overland^2	46AB6014	101.9	5.7	4.9	25.9		34.6	7
Clinton x Overland^2	46AB6016	102.9	28.3	47.5		17.6	49.1	7
(Bond-Anth) x Overland	46AB5834	150.3					150.3	1
Overland x Mission	44-1-1-1	150.3					150.3	1
Clinton x Overland	5933	148.1					148.1	1
Fulton x Clinton	4991	138.6					138.6	4
Clinton x Overland	46AB6015	143.2					134.2	1
(Bond-Anth) x Overland	5347	142.8					142.8	1
Canada Hybrid	2795-11-5	141.9	21.5	21.7	23.6	22.0	46.1	7
Reselect Clinton	4969	97.8					97.8	4
Bond x Rainbow	4186	138.8	26.6	36.4	29.2		57.8	5
Vicland	3611	116.5					116.5	2
(Bond x Anth) x Overland	46AB5835	138.8					138.8	1
Clinton	3971	131.7					131.7	1
Overland x Mission	44-1-1-76	130.3					130.3	1
Clinton x Overland	46AB6013	115.0					115.0	2
Andrew	4170	128.1					128.1	1
Markton-Rainbow x Mission	43-2-25	94.7					94.7	4
Exeter	4158	105.1	6.3	7.1	27.6		36.5	7
Columbia x Clinton	5630	85.1					85.1	3
Cody	3916	95.2	8.3	4.9	29.3		24.9	7
C. I. 4189 x Overland	AB5347	96.7					96.7	1
C. I. 4189 x Overland	46AB5834	92.3					92.3	1
C. I. 4189 x Overland	46AB5835	92.2					92.2	1

Continued

Table LXXIII. Continued. Five year summary of yield data on dryland oats in Northwestern Montana 1949-1953.

Variety or Cross	C. I. or N No.	Creston	Lincoln	Sanders	Flat-head	Mineral	Average Bu./A	No. of Trials
Clinton x Marion	5440	55.2					55.2	2
Clinton x Marion	5647	71.5					71.5	2
Clinton x Marion	5649	80.5					80.5	2
Andrew x Clinton	5636	88.3					88.3	2
Clinton 59	4259	81.6					81.6	2
Golden Rain	4152	82.3					82.3	2
Shasta		155.6					155.6	1
V-R Bannock	3865	137.9					137.9	1
Andrew x Clinton	5657	129.9					129.9	1
Branch	5013	169.8					169.8	1
Clintaf	5869	127.7					127.7	1
Clinton x Overland	5345	156.9					156.9	1
Carleton	2378	115.7					115.7	1
Clarion	5647	131.2					131.2	1
Sauk	5946	140.5					140.5	1
Clintland	6701	103.7					103.7	1
(Victoria x Hajira-Banner) x Roxton	6661	145.0					145.0	1
Fortune	5226	157.8					157.8	1
Clinton x Overland	5346	125.5					125.5	1
Victory	1145	120.1					120.1	1
Roxton	4134	114.8					114.8	1
Andrew x Clinton	5658	151.2					151.2	1
Clinton x Clinton	5441	121.0					121.0	1
Shelby	4372	140.5					140.5	1
Craig	4332	142.8					142.8	1
C. I. 4189 x Overland	6613	137.0					137.0	1
Markton	2053	134.3					134.3	1

SPRING GRAIN IMPROVEMENT

Barley (Dryland)

Five dryland nurseries were seeded in May 1952. One nursery containing 20 varieties was seeded at Creston. The other four off-station nurseries contained ten entries and were seeded in Sanders (Trout Creek), Mineral (Superior), Lincoln (Eureka), and Flathead (Stillwater) counties.

The station nursery had a mean yield of 50.44 bushels per acre. Smut notes were taken, and Glacier x Compana, C. I. 47-7405-IV had 36 "smutty" heads per 16 feet of row. This variety had the most smut. Smut was also noted on several two-row varieties. Table LXXIV. There was no significant difference in yields when analysed statistically.

Low yields and a high C. V. in the nursery at Trout Creek was due to low moisture conditions and uneven soil conditions. This was the first crop planted in newly cleared forest land. Table LXXV.

Significant results were obtained from the nursery at Superior with a very high C. V. due to uneven soil conditions. Gem was significantly higher at the 1% level than the average of Titan and Vantage, used as checks. Table LXXIV.

Low moisture conditions in the Eureka nursery are due in part to the high C. V. and low yields. There were no significant differences in the nursery. Table LXXVII.

Table LXXVIII shows the yield data from the nursery at Stillwater. Lico was added to this nursery as a check because of its use in the Stillwater area. It was high in yield, however these differences were not significant.

In all work done on the ten varieties during the 1953 growing season Gem ranks number one in yield with Titan number 2. Table LXXIX.

Table LXXX and LXXXI gives the five year average yields at Creston and the yields of all trials in Northwestern Montana respectively. In five years at Creston Vantage leads with 69.1 bushels per acre. In 20 trials in the northwest Titan leads with 30.1 bushels per acre followed by Vantage with 28.0 bushels per acre.

Table LXXIV. Agronomic data from dryland barley nursery, Creston, Montana 1953. Three row plots. Three replications.

Date Planted, May 11, 1953 Size of Plot, 16 feet.

Variety or Cross	C. I. or N No.	Heading Date	Height (ing)	Average No. Smut heads /16 ft. row	Lodging %	Nursery Intry	Plot Yield in Bushels Per Acre I	II	III	Total Bushel	Average Bushels Per Acre	Bushel Weight Pounds
Gem	7243	7-2	37	6	7	D I	50.52	64.69	40.77	155.98	51.86	45
Titan	7055	7-6	43	-	-	D I	52.29	53.18	70.01	175.48	58.49	52
Vantage	7324	7-7	38	-	3	D I	46.97	56.72	57.61	161.31	53.77	44
Glacier x Titan F7	Boz.50-5610-7	7-6	35	-	7	D I	46.97	62.92	69.13	179.02	59.67	43
B C 4-15	7558	7-12	37	-	-	D I	36.34	53.18	36.34	125.86	41.95	43
Harlan	7008	7-4	38	-	7	D I	56.72	47.86	74.45	179.03	59.68	44
Custer	8053	7-4	40	-	8	D I	21.27	43.42	54.95	119.64	39.88	48
W. S. 471	8055	7-5	38	-	-	D I	45.20	48.74	50.52	144.46	48.16	43
Compana	5438	7-7	34	3	20	D I	37.22	54.06	45.20	136.48	45.49	48
Glacier x Compana	47-7405-IV	7-6	36	36	-	D I	42.54	40.77	51.40	134.71	44.90	46
Glacier x Compana	47-7405-V	7-6	39	1	-	D I	39.88	61.15	29.25	130.28	43.43	47
Freja	7130	7-10	32	-	-	D I	49.63	54.06	54.95	158.64	52.88	47
Ymer	7275	7-11	32	-	-	D I	53.18	48.74	61.15	163.07	54.36	46
Otis	7557	7-3	34	3	-	D I	49.63	47.86	61.15	158.64	54.88	50
2-row	3351	7-7	33	2	37	D I	53.18	37.22	53.18	143.58	47.86	48
2-row	6398	7-9	33	2	-	D I	51.40	57.60	45.20	154.20	51.40	49
Compana x Morgenrot	49-527-24	7-2	32	4	22	D I	46.97	52.29	46.97	146.23	48.74	50
Danish	E. Mont.	7-10	33	-	-	D I	39.88	55.83	51.40	147.11	49.04	48
Frontier	7155	7-11	35	-	-	S	62.04	45.20	43.43	150.67	50.22	44
W. S. 480	8104	7-9	34	-	-	S	59.38	52.29	54.95	166.62	55.54	48

Note: Average of Titan, Vantage and Compana used as a check.

MeanYield.....50.44
S. E. $\bar{x}$..... 5.34
L.S.D. (5%).....N. S.
C. V. 10.60%

Table LXXV. Yield data from spring barley nursery grown under dryland conditions in Sanders, County. Single row plots three replications, Henry Kraus, Farm, Trout Creek, Montana.

Date Planted May 12, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N NO.	Yield Per Plot In Bushels Per Acre I	II	III	Total Bushels	Average Bushels Per Acre
Frontier	7155	20.38	7.98	5.32	33.68	11.27
Vantage	7324	16.83	15.07	15.07	46.97	15.65
Harlan	7008	26.59	6.20	7.98	40.77	13.59
Titan	7055	15.07	15.07	7.98	38.12	12.71
Danish	E. Mont	17.73	15.95	12.41	46.09	15.36
Freja	7130	15.95	7.09	15.07	38.11	12.70
Compana	5438	19.50	7.09	4.43	31.02	10.40
B.C. 120-78-10	8059	15.95	10.64	12.41	39.00	13.00
Bonneville	7248	10.64	13.29	7.98	31.91	10.64
Gem	7243	15.07	7.98	7.98	31.03	10.34

Note: Average of Titan and Vantage used as check in this Nursery.

Mean Yield.....12.57
S. E. ₹..... 2.439
L.S.D. (5%).....NS
L.S.D. (1%).....N.S.
C. V.....19.40%

Table LXXVI. Yield data from spring barley nursery grown under dryland conditions in Mineral County. Single row plots four replications. Mr. Jostad farm, Superior, Montana.

Date Planted May 6, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Frontier	7155	.89	3.55	3.55	5.32	13.31	3.32
Vantage	7324	11.52	7.98	15.07	10.63	45.20	11.33
Harlan	7008	4.43	20.38	17.73	15.95	58.49	14.62
Titan	7055	17.73	15.95	12.41	15.95	62.04	15.51
Danish	E. Mont.	-	-	-	3.55	3.55	.88
Freja	7130	3.55	4.43	7.09	6.20	21.27	5.32
Compana	5438	13.29	12.41	13.29	15.95	54.94	13.74
B. C. 120-78-10	8059	2.66	7.98	9.75	9.75	30.14	7.54
Bonneville	7248	1.77	.89	1.77	7.98	12.41	3.10
Gem	7243	18.61	24.82	39.00	27.47	109.90	27.47**

Note: Average of Titan and Vantage used as check in this nursery.

*Varieties yielding significantly more than the check (5%).

**Varieties yielding significantly more than the check (1%).

Mean Yield.....10.28
S. E. $\bar{x}$ 1.856
L.S.D. (5%)..... 5.38
L.S.D. (1%)..... 7.27
C. V. 18.05%

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Table LXXVII. Yield data from spring barley nursery grown under dryland conditions in Lincoln, County. Single row plots, four replications, Horace Hudson farm, Eureka, Montana.

Date Planted May 13, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Frontier	7155	7.98	7.09	19.50	20.38	54.95	13.74
Vantage	7324	12.41	4.43	12.41	13.29	42.54	10.64
Harlan	7008	10.64	1.77	15.95	15.07	43.43	10.86
Titan	7055	18.61	4.43	6.20	9.75	38.99	9.74
Danish	E. Mont.	.89	3.55	.89	7.98	13.31	3.33
Freja	7130	13.29	4.43	15.07	17.73	50.52	12.63
Compana	5438	8.86	6.20	15.07	19.50	49.63	12.41
B. C. 120-78-10	8059	7.09	9.75	15.95	19.50	52.29	13.07
Bonneville	7248	8.86	7.98	8.86	15.95	41.65	10.41
Gem	7243	.89	3.55	15.07	20.38	39.89	9.97

Note: Average of Titan and Vantage used as check in this nursery.

Mean Yield.....10.68
S. E. $\bar{x}$ 2.067
L.S.D.(5%).....Not Signif.
L.S.D. (1%)..... " "
C. V. 19.35%

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Table LXXVIII. Yield data from spring barley nursery grown under dryland conditions in Flathead County. Single row plots four replications. Conrad Gilbertson, farm, Kalispell, Montana.

Date Planted May 9, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Frontier	7155	9.75	6.20	17.73	9.75	43.43	10.86
Vantage	7324	14.18	14.18	15.07	7.98	51.41	12.85
Harlan	7008	8.86	11.52	4.43	11.52	36.33	9.08
Titan	7055	11.52	14.18	17.72	9.75	53.17	13.29
Danish	E. Mont.	9.75	12.41	14.18	11.52	47.86	11.97
Freja	7130	14.18	15.07	15.07	15.07	59.39	14.85
Compana	5438	10.64	15.95	11.52	8.86	46.97	11.74
B. C. 120-78-10	8059	9.75	14.18	8.86	5.32	38.11	9.53
Bonneville	7248	13.29	9.75	12.41	4.43	39.88	9.97
Gem	7243	12.41	15.07	17.73	11.52	56.73	14.18
Lico		15.07	16.84	17.73	9.75	59.39	14.85

Note: Average of Titan and Vantage used as check in this nursery.

Mean Yield.....12.11
S. E. $\bar{x}$ 1.422
L.S.D. (5%).....N. S.
L.S.D. (1%).....N. S.
C. V. 11.74%

Table LXXIX. Summary of ten varieties of barley grown under dryland conditions in Northwestern Montana in 1953.

Variety or Cross	Creston	Superior	Stillwater	Trout Creek	Eureka	Average Bushels/A	Rank
Frontier	50.22	3.32	10.86	11.27	13.74	17.42	7
Vantage	53.77	11.33	12.85	15.65	10.64	20.85	4
Harlan	59.68	14.62	9.08	13.59	10.86	21.56	3
Titan	58.49	15.51	13.29	12.71	9.74	21.96	2
Danish	49.04	.88	11.97	15.36	3.33	16.12	8
Freja	52.88	5.32	14.85	12.70	12.63	19.68	5
Compana	45.49	13.74	11.74	10.40	12.41	18.76	6
B. C. 120-78-10		7.54	9.53	13.00	13.07	10.79	9
Bonneville		3.10	9.97	10.64	10.41	8.53	10
Gem	51.86	27.47	14.18	10.34	9.97	22.76	1

Table LXXX. Annual and five year summary of yield data from dryland barley yields Creston, Montana 1949-1953.

Variety or Cross	C. I. or N No.	1949	1950	1951	1952	1953	Average Bushels/A	Years Grown
Compana	5438	58.8	79.7	50.2	71.8	45.5	61.2	5
Glacier	6976	54.9	95.0	80.2	88.0		79.5	4
Gem	7243	55.5	98.8	72.3	74.2	51.9	70.5	5
Titan	7055	56.7	83.5	62.3	58.5	58.5	63.9	5
Frontier	7155	52.6	89.4			50.2	64.1	3
Montcalm	7149	68.5	69.9				69.2	2
Flush	6093	69.4	74.0	59.0	64.3		66.7	4
Vantage	7324	67.6	99.4	62.6	62.2	53.8	69.1	5
Harlan	7008		116.2	72.6	68.8	59.7	79.3	4
Bonneville	7248		112.4	53.4			82.9	2
Utah B. C. 4-51	8053		103.0				103.0	1
Velvon 1-17	8058		99.1	70.2	69.7		79.7	3
36 ab 2031	7152		94.7				94.7	1
W.S. 471	8055		91.5	63.4	64.4	48.2	66.9	4
Atlas 46	7323		91.1	68.4	66.8		75.4	3
Velvon 11	7088	63.2	77.6	67.3			69.4	3
Otis	7537		71.7	56.7	61.8	54.9	61.3	4
Moore	7251		64.0	58.9			61.5	2
Hannchen	4841		62.0				62.0	1
Glacier x Compana	47-7405-I			54.9			54.9	1
Glacier x Compana	47-7405-X			51.3			51.3	1
Glacier x Compana	47-7415-V			50.2			50.2	1
Glacier x Compana	47-7405-V			57.8	44.3	43.4	46.5	3
Custer	8053				74.7	39.9	57.3	2
Freja	7130				74.5	52.9	63.7	2
Prekoymus	6530				55.5		55.5	1
2-row	6240				58.2		58.2	1
Danish	E. Mont				67.3	49.0	58.2	2
Ledger	5076				62.9		62.9	1
Glacier x Compana	47-7405-IV				73.4	44.9	59.2	2
Glacier x Compana	47-7405-VI				59.1		59.1	1
Glacier x Morgenrot	49-527-24				69.4	48.7	59.1	2
Sanalta	6087				54.7		54.7	1
Glacier x Morgenrot	49-527-5				62.3		62.3	1
Glacier x Titan F-7	50-5610-7					59.7	59.7	1

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Table LXXX .(con't) Annual and five year summary of yield data from dryland barley yields Creston, Montana 1949-1953.

Variety or Cross	C. I. or N. No.	1949	1950	1951	1952	1953	Average Bushels/A	Years Grown
B. C. 4-15	7558			64.3	79.5	42.0	61.9	3
Ymer	7275					54.4	54.4	1
2 row	3351					47.9	47.9	1
2 row	6398					51.4	51.4	1
W. S. 480	8104					55.5	55.5	1

Table. LXXXI. Five year summary of yield data on spring barley grown in Northwestern Montana 1949-1953 under dryland conditions.

Variety or Cross	C. I. or N No.	Creston	Lincoln	Sanders	Mineral	Flat-Head	Average Bu//A	No. Trials
Compana	5438	61.2	15.2	21.4	13.7	17.7	25.8	19
Glacier	6976	79.5	12.1	23.5		22.7	34.5	11
Gem	7243	70.5	16.6	22.7	27.5	17.5	31.8	18
Titan	7055	63.9	29.7	24.4	15.5	16.9	30.1	19
Frontier	7155	64.1	13.9	21.8	3.2	20.8	24.8	17
Montcalm	7149	69.2	14.2	22.8			35.4	5
Plush	6093	66.7	14.5	26.6		17.1	31.2	14
Vantage	7324	69.1	14.5	26.9	11.3	18.4	28.0	19
Harlan	7008	79.3	14.0	23.7	14.6	9.1	28.1	11
Bonneville	7248	82.9	10.4	10.6	3.1	12.0	23.8	6
Utah B. C. 4-51	8053	103.0					103.0	1
Velvon 1-17	8058	79.7					79.7	3
36 ab 2031	7152	94.7					94.7	1
W.S. 471	8055	66.9					66.9	4
Atlas 46	7323	75.4					75.4	3
Velvon 11	7088	69.4	16.2	23.6		21.3	32.6	10
Otis	7537	61.3					61.3	4
Moore	7251	61.5	5.3	26.6		23.0	29.1	8
Hannchen	4841	62.0					62.0	1
Glacier x Compana	47-7405-I	54.9					54.9	1
Glacier x Compana	47-7415-V	50.2					50.2	1
Glacier x Compana	47-7405-X	51.3					51.3	1
Glacier x Compana	47-7405-V	46.5					46.0	3
Custer	8053	57.3					57.3	2
Freya	7130	63.7	12.6	12.7	5.3	14.9	21.8	6
Prekoymus 143	6530	55.5					55.5	1
2 row	6240	58.2					58.2	1
Danish	E. Mont	58.2	3.3	15.4	.9	12.0	18.0	6
Ledger	5076	62.9					62.9	1
Glacier x Compana	47-7405-IV	59.2					59.2	2
Glacier x Compana	47-7405-VI	59.1					59.1	1
Glacier x Morgenrot	49-527-24	59.1					59.1	2
Sanalta	6087	54.7					54.7	1
Glacier x Morgenrot	49-527-5	62.3					62.3	1
Glacier x Titan F-7	50-5610-7	59.7					59.7	1

Table. LXXXI . (Con't) Five year summary of yield data on spring barley grown in Northwestern Montana 1949-1953 under dryland Conditions.

Variety or Cross	C. I. or N. No.	Creston	Lincoln	Sanders	Mineral	Flat-head	Average Bu./A	No Trials
B. C. 4-15	7558	61.9	12.6	27.3			33.9	5
Ymer	7275	54.4					54.4	1
2 row	3351	47.9					47.9	1
2 row	6398	51.4					51.4	1
W. S. 480	8104	55.5					55.5	1
B.C. 120-78-10	8059		13.1	13.0		7.5	9.5	4

Foundation and Certified Grains

Five acres of grain were seeded in the spring for growing as either foundation or certified grains. The following chart gives the crop, generation, number of acres, and amount produced. Also included in the chart is the amount delivered to the cleaning plant, field inspection data, and laboratory data if received.

Crop and Variety	Generation	No. of Acres	Amount Produced (Pounds)	Field inspection	Laboratory Data
Pilot Wheat	Certified	2½	5570	passed	Not Available
Park Oats	Certified	½	2300	passed	Not Available
Park Oats	Foundation	1/3	1107	passed	Not Available
Horsford Barley	Foundation	1	1396	passed	Not Available
Vantage Barley	Foundation	.8	1723	passed	Not Available
Wasatch Winter Wheat	Foundation	1	2681	passed	Blue Tag

WINTER GRAIN IMPROVEMENT

Winter Wheat

Eight nurseries were seeded in the fall of 1952. The Nursery on the station was the advanced yield nursery. The nursery in Flathead county was a hard red winter dwarf smut nursery. The remaining six nurseries contained nine entries and were seeded in Lake (Ronan), Sanders (Plains and Camas Praire), Mineral Tarkio), Missoula (Frenchtown), and Lincoln (Eureka) counties.

The station nursery yields were non-significant and had a mean yield of 38.47 bushels per acre. Considerable leaf spot was noted on the Rio/Rex x Nebred and Rio/Rex x Cheyenne crosses. A sample of this was sent to Dickson University of Wisconsin for identification. He identified it as a bacterial disease but did not give the causitive organism. Table LXXXII.

No Drawf smut was found in the smut nursery in Flathead county at Stillwater. The mean yield was 19.20 bushels per acre with no differences in yield when analysed statistically. Table LXXXIII.

Table LXXXIV shows the yield data of the nursery grown near Ronan. Dry weather in the fall at seeding time apparently prevented good stands.

Good stands were obtained in the nursery at Camas Praire. Orfed (White Wheat) was the only variety significantly higher in yield than Wasatch, which was used as a check. Table LXXXV.

Blackhull/Rex x Cheyenne and Rio/Rex x Nebred were higher in yield at the 1% level than Wasatch which was used as a check in the nursery at Plains. The mean yield of this nursery was 12.9 bushels per acre. Table LXXXVI.

No significant results were obtained from the nursery at Superior. The mean yield was 27.64 bushels per acre. Table LXXXVII.

In the nursery at Frenchtown two varieties were lower in yield than Wasatch. The varieties were Orfed and Rex x Rio. The mean yield of this nursery was 15.32 bushels per acre. Table LXXXVIII.

Results were not significant in the Lincoln county nursery. The fall was very dry at seeding time as was the following growing season. The mean yield was 6.03 bushels per acre. Table LXXXIX.

Table XCI gives data for four years at Creston. Only five varieties have been tested for for four years. The lead in those five is Karmont, but it is very susceptible to drawf bunt.

In table XCII only four varieties have been in all eleven trials and of those four Yogo leads in production, but it is not resistant to drawf smut.

Table LXXXII. Agronomic data from winter wheat nursery dryland, Creston, Montana 1953. Three row plots, three replications.

Date Planted, September 18, 1953 Size of Plot 16 feet

Variety or Cross	C. I OR N No.	Percent Stand Fall	Percent Stand Harvest	Heading Date	Heading Height	Plot Yield In Bushels Per Acre I	II	III	Total Bushel	Average Bushels Per Acre	Bushel Weight Pounds
Comanche		61	75	6-14	42	15.4	39.9	37.8	93.1	31.03	61
Yogo		77	88	6-18	47	37.0	35.7	49.7	122.4	40.83	61
Newturk		88	97	6-18	48	39.2	18.9	50.4	108.5	36.17	63
Karmont		93	93	6-17	48	25.2	50.4	33.6	109.2	36.40	62
Kharkof		92	98	6-17	49	35.0	44.8	41.3	121.1	40.37	61
Wasatch		93	95	6-15	50	25.9	39.2	44.1	109.2	36.40	62
Turkey x Oro -221		95	97	6-19	49	40.6	29.4	44.1	114.1	38.03	61
Yogo x Wasatch -6		97	95	6-16	50	27.3	30.1	56.0	113.4	37.80	61
Yogo x Wasatch -8		97	100	6-16	50	39.2	49.7	22.4	111.3	37.10	62
Yogo x Wasatch -3		98	93	6-16	51	25.2	39.2	44.1	108.5	36.17	60
Yogo x Wasatch -4		80	98	6-17	49	25.2	31.5	34.3	91.0	30.33	61
Blackhull/Rex-Cheyenne	M-482296	80	98	6-19	50	47.6	45.5	51.1	144.2	48.07	61
Rio/Rex x Cheyenne	M-472361	97	98	6-13	45	39.2	34.3	37.1	110.6	36.87	59
Rio/Rex	M-43131	98	100	6-12	43	41.3	32.9	39.9	114.1	38.03	60
Rio/Rex x Nebred	M-482215	98	98	6-15	45	37.1	44.8	41.3	123.2	41.53	63
Rio/Rex x Nebred	M-482235	93	98	6-14	44	44.1	45.5	36.4	126.0	42.00	62
Marguillo x Oro/O x T x F	Ks47B9	95	100	6-13	48	34.3	30.1	39.9	104.3	47.77	60
Comanche/ O x T x F	Ks47B129	97	98	6-12	48	32.9	27.3	30.8	91.0	30.33	60
Orfed		97	100	6-13	47	48.3	51.1	42.0	141.4	47.13	61
Tenmark		92	98	6-13	48	42.0	58.8	42.7	143.5	47.83	62
Yogo Elite Composite		95	100	6-18	50	42.7	38.5	44.1	125.5	41.77	62
Yogo Poor Composite		86	97	6-18	50	28.7	26.6	44.8	100.1	33.37	61
Yogo Good Composite		85	97	6-18	52	26.6	33.6	39.9	100.1	33.37	61
Cheyenne		92	100	6-19	47	54.6	48.3	44.8	147.7	49.23	61
Minter		93	97	6-19	49	35.4	33.6	40.6	110.6	36.87	61

Note: Wasatch is the check in this nursery.

Mean Yield.....38.47
S. E. $\bar{x}$ 4.71
L.S.D.... .....N. S.
C. V. 12.24%

Table LXXXIII. Agronomic data from hard red winter wheat, smut nursery grown under dryland conditions in Flathead County. Single row plots four replications, Conrad Gilbertson farm, Kalispell, Montana.

Date Planted, October 8, 1952 Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Stand %	Yield Per Plot In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Rio x Rex/Cheyenne	M-472361	85	21.26	17.01	24.81	19.85	82.93	20.73
Rio x Rex/Cheyenne	M-482161	95	20.55	21.26	14.88	19.85	76.54	19.14
Rio x Rex/Nebred	M-482215	95	28.35	25.52	9.21	23.39	86.47	21.62
Rio x Rex/Nebred	M-482232	95	26.93	17.72	14.18	26.93	85.76	21.44
Rio x Rex/Nebred	M-482235	95	26.93	21.97	10.63	31.19	90.72	22.68
Blackhull/Rio x Rex	M-482260	100	29.76	24.10	14.88	15.59	84.33	21.08
Blackhull x Rex/Rio x Rex	M-482271	85	21.97	18.43	12.05	11.34	63.79	15.95
Blackhull x Rex/Rio x Cheyenne	M-482296	80	17.72	18.43	18.43	19.14	73.72	18.43
Rex x Rio 3-5		90	18.43	13.47	18.43	19.14	69.47	17.37
Rex x Rio -14		95	25.52	19.85	9.21	21.97	76.55	19.14
Comanche		80	19.85	9.21	12.76	15.59	57.41	14.35
Wasatch		80	24.10	25.52	17.01	19.85	86.48	21.62
Turkey x Oro Sel. 221		90	22.68	18.43	17.72	18.43	77.26	19.32
Kharkof		95	21.97	25.52	20.55	17.01	85.05	21.26
Orfed x Wasatch		90	20.55	18.43	21.26	19.85	80.09	20.02
Rio x Rex	M-43131	95	19.85	18.43	14.18	14.18	66.64	16.66
Rex x Rio	M-43096	85	21.26	17.01	9.92	9.21	57.40	14.35
Rio		70	21.97	18.43	13.47	19.85	73.72	18.43
Comanche/O x T x F	Kn47B129	90	23.39	12.05	17.72	14.18	67.34	16.84
Mich x H 44 x Mint. °/M x T x Kh	Fc 1197	95	20.55	20.55	12.76	17.72	71.58	17.90
M x O x O x T/Med x Hope x Pn	Fc 1199	95	24.10	23.39	15.59	21.97	85.05	21.26
Yogo x Wasatch -6		85	22.68	23.39	13.47	10.63	70.17	17.54
Yogo x Wasatch -8		90	21.26	24.10	18.43	19.85	83.64	20.91
Yogo x Wasatch -3		90	26.22	24.10	17.72	29.06	97.10	24.28
Yogo x Wasatch -4		90	24.10	22.68	9.92	14.18	70.88	17.72

Table LXXXIV. Yield data from winter wheat nursery grown under dryland conditions in Lake County. Single row plots, four replications. Suco farm, Ronan, Montana.

Date Planted September 17, 1952 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Wasatch		15.59	15.59	26.93	21.97	80.08	20.02	54
Orfed		6.39	9.92	21.26	16.30	53.87	13.97	
Karmont		14.18	17.01	32.60	13.47	77.26	19.32	
Yogo		14.88	21.26	18.43	29.77	84.34	21.09	55
Newturk		14.18	24.10	23.39	14.18	75.85	18.96	51
Blackhull/Rex x Cheyenne	M-48225	12.05	21.97	29.77	18.43	82.22	20.56	53
Rex x Rio		17.72	18.43	14.18	14.88	65.21	16.30	
Rio/Rex x Nebred	M-482235	17.01	26.22	24.10	31.89	99.22	24.81	54
Rio/Rex x Cheyenne	M-482296	14.17	22.68	23.39	17.72	77.96	19.49	

Note: Wasatch used as a check in this nursery.

Mean Yield.....19.33
S. E. $\bar{x}$ 2.476
I.S.D.(5%).....N. S.
C. V..... 12.80%

Table LXXXV. Yield data from winter wheat nursery grown under dryland conditions in Sanders County. Single row plots, four replications. Richard Sipes farm, Camas Praire, Montana.

Date Planted September 19, 1952 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Wasatch		7.7	6.3	9.8	9.1	32.9	8.2
Orfed		12.6	15.4	14.7	17.5	60.2	15.1
Karmont		7.7	9.1	14.7	14.0	45.5	11.4
Yogo		6.3	8.4	9.1	10.5	34.3	8.6
Newturk		7.7	8.4	10.5	11.2	37.8	9.5
Blackhull/Rex x Cheyenne		7.7	9.1	17.5	13.3	47.6	11.9
Rex x Rio		4.2	9.1	4.9	7.0	25.2	6.3
Rio/Rex x Nebred	N-482295	7.7	3.5	15.4	20.3	46.9	11.7
Rio/Rex x Cheyenne	N-482296	9.1	15.4	13.3	20.3	58.1	14.5

Note: Wasatch is used as a check in this nursery.

Mean Yield.....10.8
S. E. $\bar{x}$ 1.42
L.S.D. (5%)..... 4.1
L.S.D. (1%)..... 5.6
C. V. 13.2%

Table LXXXVII. Yield data from winter wheat nursery grown under dryland conditions in Mineral, County. Single row plots, four replications, Charles Fry farm, Superior, Montana.

Date of Planting September 24, 1952 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Wasatch		39.69	28.35	21.26	25.52	114.82	28.70	60
Orfed		29.77	19.85	23.39	12.76	85.77	21.44	
Karmont		25.52	17.01	25.52	36.86	104.90	26.23	58
Yogo		38.98	35.44	25.52	19.14	119.08	29.77	60
Newturk		17.01	24.81	19.85	11.20	72.87	18.22	
Blackhull/Rex x Cheyenne	M-48225	43.94	34.02	21.97	27.64	127.57	31.89	60
Rex x Ric		22.68	31.89	21.26	24.10	99.93	24.98	60
Ric/Rex x Nebred	M-482235	29.77	36.86	29.77	49.61	146.04	36.51	59
Ric/Rex x Cheyenne	M-482296	25.52	34.02	26.22	36.86	122.62	30.66	60

Note: Wasatch used as a check in this nursery.

Mean Yield.....27.64
S. E.$\bar{x}$ 3.839
L.S.D.(5%).....N. S.
C. V. 13.89%

Table LXXXVIII. Yield data from winter wheat nursery grown under dryland conditions in Missoula, County. Single row plots, four replications, William Lucier farm, Frenchtown, Montana.

Date Planted, September 24, 1952 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Wasatch		19.14	14.18	14.88	18.43	66.63	16.66
Orfed		11.34	8.51	7.80	9.92	37.57	9.39**
Karmont		22.68	12.05	15.59	19.85	70.17	17.54
Yogo		14.18	13.47	15.59	17.01	60.25	15.06
Newturk		21.26	14.18	17.72	20.55	73.71	18.43
Blackhull/Rex x Cheyenne		14.88	14.88	12.76	14.88	57.40	14.35
Rex x Rio		9.21	11.34	12.76	14.18	47.49	11.87*
Rio/Rex x Nebred	M-482235	15.59	20.55	20.55	17.01	73.70	18.43
Rio/Rex x Cheyenne	M-482296	13.47	17.01	14.88	19.14	64.50	16.13

Note: Wasatch is used as a check in this nursery.

*Varieties yielding significantly less than the check (5%).

**Varieties yielding significantly less than the check (1%).

Mean Yield.....15.32
C. E. ± 1.231
L.S.D. (5%).... 3.59
L.S.D. (1%).... 4.88
C. V. 8.04%

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Table LXXXIX. Yield data from winter wheat nursery grown under dryland conditions in Lincoln County. Single row plots, four replications Horace Hudson farm, Eureka, Montana.

Date Planted, September 25, 1952 Size of Plot 16 feet

Variety or Cross	C. I. or M No.	Yield Per plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Wasatch		8.51	10.63	10.63	9.21	38.98	9.75
Orfed		4.25	7.09	2.84	4.25	18.43	4.61
Karmont		7.09	8.51	4.25	5.67	25.52	6.38
Yogo		5.67	2.84	5.67	15.59	29.77	7.44
Newturk		7.09	6.38	3.54	4.25	21.26	5.32
Blackhull/Rex x Cheyenne		3.54	5.67	1.42	7.09	17.72	4.43
Rex x Rio		3.54	7.09	4.25	5.67	20.55	5.14
Rio/Rex x Nebred	M-482235	3.54	6.38	6.38	6.38	22.68	5.67
Rio/Rex x Cheyenne	M-482296	3.54	6.38	4.28[1]	7.79	21.99	5.50

Note: Wasatch used as a check in this nursery.

[1] Calculated missing plot.

Mean Yield.....6.03
S. E. %.....1.184
L.S.D. (5%).....N. S.
C.V.....19.63%

Table XC. Summary of nine varieties of winter wheat in Northwestern Montana under dryland conditions in 1953.

Variety or Cross	Creston	Stillwater	Ronan	Frenchtown	Tarkio	Eureka	Plains	Camas Praire	Average Bu./A.	Rank
Wasatch	36.40	21.26	20.02	16.66	28.70	9.75	13.00	8.2	19.25	5
Orfed	47.13		13.97	9.39	21.44	4.61	8.60	5.1	17.18	7
Karmont	36.40		19.32	17.54	26.23	6.38	13.30	11.4	18.65	6
Yogo	40.83		21.02	15.06	29.77	7.44	13.80	8.60	19.50	4
Newturk	36.17		18.96	18.43	18.22	5.32	13.00	9.50	17.09	8
Blackhull/Rex x Cheyenne	48.07		20.56	14.35	31.89	4.43	15.40	11.90	20.94	2
Rex x Rio 43096		14.35	16.30	11.87	24.98	5.14	9.80	6.30	12.68	9
Rio/Rex x Nebred 482235	42.00	22.68	24.81	18.43	36.51	5.67	17.70	11.7	22.43	1
Rio/Rex x Cheyenne	48.07	20.73	19.49	16.13	30.66	5.50	11.20	14.5	20.78	3

Table XCI. Annual and four year summary of winter wheat work done in Northwestern Montana under dry-land conditions 1950-1953 (Creston)

Variety or Cross	1950	1951	1952	1953	Average Bu./A	Years Grown
Yogo	60.9	38.5	31.7	40.8	43.0	4
Yogo x Wasatch-6			22.4	37.8	30.1	2
Karmont	59.5	39.9	31.7	36.4	41.9	4
Yogo x Wasatch-8			34.5	37.1	35.8	2
Yogo x Wasatch-3			26.2	36.2	31.2	2
Cache	59.0				59.0	1
Rio/Rex x Cheyenne M-472361			23.6	36.9	30.3	2
Wasatch	63.8	29.0	23.6	36.4	38.2	4
Newturk	60.7	34.5	32.4	36.2	40.9	4
Turkey x Cro 205		32.4			32.4	1
Turkey x Cro 216		40.1			40.1	1
Turkey x Cro 221	58.8	34.0	25.5	38.0	39.0	4
Karakof		44.2	33.5	40.4	39.4	3
Nebred		48.7	32.5		40.6	2
Comanche		40.4	28.6	31.0	33.3	3
Cheyenne		35.0	32.4	49.2	38.9	3
Tenmark		29.5	25.3	47.8	34.2	3
Minter		24.5	30.5	36.9	30.6	3
Huntley 44		44.4			44.4	1
Yogo x Wasatch -9		35.2	27.2		31.2	2
Yogo x Wasatch-11		32.2			32.2	1
Forty Fold		39.0			39.0	1
Yogo x Wasatch-4				30.3	30.3	1
Blackhull/Rex-Cheyenne M 482296				48.1	48.1	1
Rio/Rex M-43131				38.0	38.0	1
Rio/Rex x Nebred M-482215				41.5	41.5	1
Rio/Rex x Nebred M-482235				42.0	42.0	1
Marguillo x Cro/O x T x F Ks47B9				47.8	47.8	1
Comanche/O x T X F Ks47B129				30.3	30.3	1
Orfed				47.1	47.1	1
Yogo Elite Composite				41.8	41.8	1
Yogo Poor Composite				33.4	33.4	1
Yogo Good Composite				33.4	33.4	1

Table XCII. Four year summary of winter wheat work done in Northwestern Montana under dryland conditions 1950-1953.

Variety or Cross	Creston	Stillwater Lake	Missoula	Mineral	Lincoln	Sanders[1]	Sanders[2]	Average Bu./A	No. Trials
Yogo	43.0	33.1	21.0	15.1	29.8	7.4	13.8	8.6	21.5	11
Yogo x Wasatch-6	30.1	17.5							23.8	3
Karmont	41.9	26.7	19.3	17.5	26.2	6.4	13.3	11.4	20.3	11
Yogo x Wasatch-8	35.8	20.9							28.3	3
Yogo x Wasatch-3	31.2	24.3							27.8	3
Cache	59.0	27.0							43.0	2
Rio/Rex x Cheyenne M472361	30.3	20.7	19.5	16.1	30.7	5.5	11.2	14.5	18.5	9
Wasatch	38.2	23.6	20.0	16.7	28.7	9.8	13.8	8.2	19.9	12
Newturk	40.9	28.3	19.0	18.4	18.2	5.3	13.0	9.5	19.1	11
Turkey x Cro 205	32.4								32.4	1
Turkey x Cro 216	40.1								40.1	1
Turkey x Cro 221	39.0	20.9							30.0	6
Karakof	39.4	21.3							30.4	4
Nebred	40.6								40.6	2
Comanche	33.3	14.4							23.9	4
Cheyenne	38.9								38.9	3
Tenmark	34.2								34.2	3
Minter	30.6								30.6	3
Huntley 44	44.4								44.4	1
Yogo x Wasatch-9	31.2								31.2	2
Yogo x Wasatch-11	32.2								32.2	1
Forty Fold	39.0	23.1							31.1	2
Yogo x Wasatch-4	30.3	17.7							24.0	2
Blackhull/Rex-Cheyenne M 482296	48.1	18.4	20.6	14.4	31.9	4.3	15.4	11.9	20.6	8
Rio/Rex M43131	38.0	16.7							27.4	2
Rio/Rex x Nebred M-482215	41.5	21.6							31.6	2
Rio/Rex x Nebred M-482235	42.0	22.7	24.8	18.4	36.5	5.7	17.7	11.7	22.4	8
Marguillo x Cro/O x T x F Ks47B9	47.8								47.8	1
Camanche/O x T x F Ks47B129	30.3	16.8							30.3	1
Orfed	47.1		14.0	9.4	21.4	4.6	8.6	5.1	15.7	7
Yogo Elite Composite	41.8								41.8	1
Yogo Poor Composite	33.4								33.4	1
Yogo Good Composite	33.4								33.4	1

Table XCII .(Con't) Four year summary of winter wheat work done in Northwestern Montana under dryland conditions 1950-1953.

Variety or Cross.	Creston	Stillwater	Lake	Missoula	Mineral	Lincoln	Sanders[1]	Sanders[2]	Average Bu./A	No Trials
Rio/Rex Cheyenne M 482161		19.1							19.1	1
Rio/Rex x Nebred M 482232		21.4							21.4	1
Blackhull/Rio x Rex		21.1							21.1	1
Blackhull x Rex/Rio x Rex		16.0							16.0	1
Rex x Rio^{3}-5		17.4							17.4	1
Rex x Rio^{3}-14		19.1							19.1	1
Orfed x Wasatch		20.0							20.0	1
Rex x Rio M43096		14.4	16.3	11.9	25.0	5.1	9.8	6.3	12.7	7
Rio		18.4							18.4	1
Mich s H44 x Mint. O/M x T x Kh Pe1197		17.9							17.9	1
M x O x O x T/Med x Hope x Pn		21.3							21.3	1

[1]Plains, Montana
[2]Camas, Praire, Montana

WINTER GRAIN IMPROVEMENT

Winter Barley

Seven winter barley nurseries were seeded in the fall of 1952. One on the station containing 16 varieties and six off-station with ten varieties each. The off-station nurseries were seeded in the following counties. Lake (Ronan), Sanders (Camas Praire and Plains), Mineral (Tarkio), Missoula (Frenchtown), Lincoln (Eureka).

Only four of the nurseries were harvested, one on the station and three off-station (Sanders and Lincoln Counties). The barley was left for harvesting until the winter wheat in the same area was ready. Therefore the wheat that ripened late made the barley so ripe that most of it had shattered, making yield comparison and data very unreliable.

The barley yields on the station were very high this past season with a high of 96.8 bushels per acre for, From Sweden 7189. This variety and New York 563a 2-9-6 were significantly higher in yield than Winter Club used as a check. Stands were very good both in the fall and spring. Lodging was very severe except in Winter Club, Ohio Winter 1, New York 563a 2-9-6, and From Sweden. Table XCIII.

Table XCIV shows yield data from the nursery at Camas Praire. These data show some of the Boz CC10's yielding more than the checks. Stands were not too even in this nursery due to the location. Also considerable shattering was done during the harvesting operation.

Boz CC10 - 272 and Boz CC10 - 220 were the high yielders in the nursery at Plains. There was good stands in this nursery however there was a large number of cheat grass plants in the nursery. Mean yield was 20.35 bushels per acre. Table XCV.

Drowth conditions and poor stands contribute to the low yields and high C. V. in the nursery at Eureka. Purdue 1101 sel. was the highest yielder with 10.41 bushels per acre. Yields were significant when analysed statistically. Table XCVI.

Table XCVIa gives a summary of work done this past season. For this period From Sweden ranks number one with 33.56 bushels per acre.

Table XCVII gives the work done on winter barley 1951-1953 on basis of three year average. Purdue 1101 sel. leads in production of grain.

Table XCIII. Agronomic data from dryland winter barley nursery, Creston, Montana 1953. Triplicated three row plots.

Date Planted, September 20, 1952 Date Harvested, July 29, 1953

Variety or Cross	C. I. or N No.	Heading Date	Stand	% Lodging	Plot Yield in Bushels per Acre I	II	III	Total Bushels	Average Bushel Per Acre	Rank
Ohio Winter 1	7072	6-6	90	-	66.4	78.8	54.0	199.2	66.4	10
Winter Club	592	6-13	85	-	77.9	74.3	69.9	222.1	74.0	3
Composite Cross X	6625	6-10	92	100	78.8	78.8	63.7	221.3	73.8	4
Purdue 1101 Sel.	7523	6-11	100	100	53.1	65.5	66.4	185.0	61.7	11
W. Va. CC10-1-45-22	7582	6-9	85	93	42.5	54.0	49.6	146.1	48.7	13
Kearney	7580	6-1	96	100	34.5	38.9	31.0	104.4	34.8	14
From Sweden	7189	6-7	90	23	97.4	114.2	78.8	290.4	96.8*	1
N. Y. 563a 2-9-6	8069	6-1	93	-	113.3	77.0	94.7	285.0	95.0*	2
Boz. CC10 -220	9175	6-8	100	100	56.6	77.0	61.1	194.7	64.9	9
Boz. CC10 -242	9176	6-8	93	100	71.7	77.0	56.6	205.3	68.4	8
Boz. CC10 -272	9177	6-6	100	100	76.1	78.8	55.8	210.7	70.2	7
Boz. CC10 -349		6-10	98	100	56.6	61.1	58.4	176.1	58.7	12
Boz. CC10 -306		6-10	100	100	70.8	79.6	64.6	215.0	71.7	6
Boz. CC10 -259		6-5	100	100	60.2	84.0	54.9	199.1	66.4	10
Boz. CC10 -303		6-5	98	100	55.8	75.2	68.1	199.1	66.4	10
Boz. CC10 -311		6-12	100	100	64.6	78.8	76.1	219.5	73.2	5

*Varieties yielding significantly more than Winter Club 5%.

Mean Yield.....68.18
S. E. $\bar{x}$..... 6.299
L.S.D. 5%.....17.08
L.S.D. 1%.....24.49
C. V. 9.2%

Table XCIV. Yield data from winter barley nursery grown under dryland conditions in Sanders County. Single row plots, four replications, on Richard Sipes Farm, Camas Paraire, Montana.

Date Planted, September 19, 1952 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Ohio Winter (check)	7072	7.09	4.43	8.86	7.98	28.36	7.09
Winter Club (check)	592	2.66	1.77	8.86	7.09	20.38	5.10
Purdue 1101 Sel.	7523	6.20	4.43	12.41	15.07	38.11	9.53
W. Va. CC10-145-22	7582	5.32	3.55	12.41	8.86	30.14	7.54
Boz. CC10-306		10.63	8.86	3.55	11.52	34.56	8.64
Boz. CC10-259		12.41	13.29	13.29	16.84	55.84	13.96**
Boz. CC10-349		17.73	8.86	11.52	17.73	55.84	13.96**
Boz. CC10-272	9177	14.18	13.29	15.95	13.29	56.71	14.18
Boz. CC10-220	9175	2.66	7.09	8.86	5.32	23.93	5.98
From Sweden	7189	7.09	9.75	14.18	23.93	54.95	13.74**

**Varieties yielding significantly more than the average of the checks(1%).

Mean Yield.....9.96
S. E. $\bar{x}$.....1.574
L.S.D.(5%).....4.57
L.S.D.(1%).....6.17
C. V.....15.80%

Table XCV. Yield data from winter barley nursery grown under dryland conditions in Sanders, County. Single row plots, four replications, on Arnold Kruger farm, Plains, Montana.

Date Planted, September 19, 1952 Size of Plot 16 feet.

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushel Per Acre	Bushel Weight Pounds
Ohio Winter (check)	7072	14.18	20.38	13.30	11.52	59.38	14.85	
Winter Club (check)	592	16.84	21.27	17.73	11.52	67.36	16.84	
Purdue 1101 Sel.	7523	27.48	23.04	13.29	15.95	79.76	19.94	
W. Va. CC10-145-22	7582	30.13	31.91	16.84	14.18	93.06	23.27**	
Boz. CC10-306		27.47	23.93	19.50	15.95	86.85	21.71*	45
Boz. CC10-259		28.36	23.93	18.61	17.73	70.90	17.73	48
Boz. CC10-349		26.59	12.41	15.95	13.29	68.24	17.06	
Boz. CC10-272	9177	28.36	31.02	19.50	18.61	97.49	24.37**	47
Boz. CC10-220	9175	26.59	28.36	20.38	22.16	97.49	24.37**	
From Sweden	7189	23.93	23.93	14.18	13.29	75.33	18.83	

*Varieties yielding significantly more than the average of the checks (5%).

**Varieties yielding significantly more than the average of the checks (1%).

Mean Yield.....20.35
S. E. $\bar{x}$ 1.656
L.S.D. (5%).... 4.78
L.S.D. (1%).... 6.49
C. V. 8.14%

Table XCVI. Yield data from winter barley nursery grown under dryland conditions in Lincoln, County. Single row plots four replications, on Horace Hudson farm Eureka, Montana.

Date Planted September 25, 1953 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
Ohio Winter (check)	7072	4.43	2.66	8.86	7.09	23.04	5.76
Winter Club (check)	592	.89	2.66	5.32	.89	9.76	2.44
Purdue 1101 Sel.	7523	11.52	7.98	11.52	10.63	41.65	10.41**
W. Va. CC10-145-22	7582	.89	1.77	2.66	1.77	7.09	1.77
Boz. CC10-306		5.32	8.86	7.98	1.77	23.93	5.98
Boz. CC10-259		4.43	11.52	6.20	4.43	26.58	6.65
Boz. CC10-349		7.09	5.32	11.52	8.86	32.79	8.20*
Boz. CC10-272	9177	10.63	14.18	9.75	3.55	38.11	9.53**
Boz. CC10-220	9175	6.20	3.55	7.98	2.66	20.39	5.10
From Sweden	7189	7.09	3.55	5.32	3.55	19.51	4.88

*Varieties yielding significantly more than the average of the checks (5%).

**Varieties yielding significantly more than the average of the checks (1%).

Mean Yield.....6.06
S. E. $\bar{x}$ 1.237
L.S.D.(5%)..... 3.58
L.S.D.(1%)..... 4.86
C. V. 20.40%

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Table XCVI a . Summary of work done in Northwestern Montana on winter barley, 1953.

Variety or Cross	C. I. or N No.	Creston	Camas Praire	Plains	Eureka	Average Bu/A	Rank
Ohio Winter	7072	66.4	7.09	14.85	5.76	23.53	9
Winter Club	592	74.0	5.10	16.84	2.44	24.60	7
Purdue 1101 Sel.	7523	61.7	9.53	19.94	10.41	25.40	5
W. Va. CC10-145-22	7582	48.7	7.54	23.27	1.77	20.31	10
Boz CC10-306		71.7	8.64	21.71	5.98	27.01	3
Boz CC10-259		66.4	13.96	17.73	6.65	26.19	4
Boz CC10-349		58.7	13.96	17.06	8.20	24.48	8
Boz CC10-272	9177	70.2	14.18	24.37	9.53	29.57	2
Boz CC10-220	9175	64.9	5.98	24.37	5.10	25.09	6
From Sweden	7189	96.8	13.74	18.83	4.88	33.56	1

Table XCVII. Summary of work done in Northwestern Montana on winter barley.

Variety or Cross	C. I. or N No.	1951	1952	1953	Average	No. of Trials
Ohio Winter # 1	7072	43.68	29.57	64.40	46.55	3
Winter Club	592	44.75	41.33	74.00	53.36	3
Composite Cross X	6625	53.13	33.40	73.80	53.44	3
Purdue 1101 Sel	7523	71.39	42.87	61.70	58.65	3
W. Va. CC10-1-45-22	7582	41.60	15.97	48.70	35.42	3
Kearney	7580	34.50	28.67	34.80	32.66	3
Pubelo	8070	48.40	32.80		40.60	2
Boz CC10-242		55.75	20.97	68.40	48.37	3
Boz CC10-272		51.33	37.20	70.20	52.91	3
Boz CC10-284			40.47		40.47	2
Boz CC10-220		54.58	39.60	64.90	53.03	3
Boz CC10-349			41.93	58.70	50.32	2
Boz CC10-311			40.17	73.20	56.68	2
Boz CC10-222			40.47		40.47	1
Boz CC10-343			33.07		33.07	1
From Sweden	7189		45.03	96.80	70.92	2
Reno		38.80			38.80	1
B550 Kty 5 x MEB		42.18			42.18	1
Brier		69.95			69.95	1
B546 Kty 5 x MEB		45.13			45.13	1
B699 Admive x MEB		50.80			50.80	1
Boz CC10-284		54.00			54.00	1
N. Y.563a 2-9-6				95.00	95.00	1
Boz CC10-306				71.70	71.70	1
Boz CC10-259				66.40	66.40	1
Boz CC10-303				66.40	66.40	1

Irrigation Studies

In the study of irrigation rates and frequencies in 1953 some increase from higher rates was obtained when applied to hay and pasture. This was not true with grain, and samples taken of potato and beet crops failed to indicate any advantage of one treatment over another.

Some revision of the study seems necessary in order to secure measurable differences, and establish the desirability of some irrigation system over another. Wider range in treatments, more adequate sampling of the crops produced, and more replication, are planned as possible modifications which may improve the study.

1953 YIELDS PER ACRE IN IRRIGATION STUDY BY CROPS

Barley

One 2 inch irrigation	7/8					76 bu./A
Two 2 inch irrigations	7/8	7/22				76 bu./A

Alfalfa Hay

Three 2 inch irrigations	7/10	7/22	8/5			3.63 T./A
Three 3 inch irrigations	7/10	7/22	8/5			4.43 T./A

Mixed Hay

Three 2 inch irrigations	7/10	7/22	8/6			3.53 T./A
Three 3 inch irrigations	7/10	7/22	8/6			4.44 T./A

Potatoes

Four 2 inch irrigations	7/9	7/21	8/5	8/21		323 CWT./A
Four 2½ inch irrigations	7/9	7/21	8/5	8/21		325.8 CWT/A

Sugar Beets

Four 2 inch irrigations	7/8	7/21	8/4	8/20		15.5 T./A
Five 2 inch irrigations	7/8	7/21	8/4	8/20	9/7	12.15 T/A.
Five 2½ inch irrigations	7/8	7/21	8/4	8/20	9/7	14.99 T./A.

Lamb Gain On Pasture

Four 2 inch irrigations	7/11	7/23	8/6	8/21		375 lbs./A
Four 3 inch irrigations	7/11	7/23	8/6	8/21		390 lbs./A*

*Plus 22 pound gain on ewes, whereas ewes in other pasture made no gain.

DRYLAND-IRRIGATED YIELD COMPARISONS 1953

Each year, in addition to the regular irrigation studies, we are able to secure some direct dryland-irrigated yield comparisons on similar crops on similar soils. This information is interesting and helps determine the value of irrigation for various crops.

CROP AND TREATMENT	YIELD PER ACRE
21 Variety White Wheat Nursery No irrigation	Mean yield 69.46 bu.
21 Variety White Wheat Nursery Two irrigations	Mean Yield 51.31 bu.(1)
Gem Seed Potatoes, no fertilizer, dryland	143.5 CWT.
Gem Seed Potatoes, no fertilizer, irrigated	225.3 CWT.

(1) This reduction was thought due to lodging, rust, and mildew.

SUB-SURFACE MOISTURE LEVELS

Sub-surface moisture levels at four locations on the farm can be measured in "wells" cased with galvanized down-spout.

Depth of Free-Water by Well and Location (Inches)

Location	1 D-4	2 C-9	3 B-4	4 E-1
Date				
12/2/52	95	89	89	145
4/2/53	75	62	66	143
5/6/53	85	53	65	143
6/3/53	88	70	68	143
7/3/53	86	64	70	Dry at 12 ft.
9/3/53	97	92	92	Dry at 12 ft.

SOILS RESEARCH

SOIL FERTILITY STUDIES ON AGRONOMY CROPS 1953

Soil fertility work this year includes replicated fertilizer trials on oats, seed peas, alfalfa hay, clover seed, and grass seed on the Station; some study of the effect of sawdust application to crops on the Station, and off-station fertilizer trials on oats and grass hay. A grass-alfalfa mixture for hay was seeded in three off-station locations for fertilizer application in 1954.

Soil samples from the locations of the fertilizer trials were secured on the date the application was made and analized by the Flathead County Soils Lab at the County Agents Office. The laboratory report on the soils helps explain the results secured. In most cases the yields were improved by the application of the material indicated as being in short supply by the laboratory analysis.

In our attempt to determine the extent of deficiencies of minor elements by making an application of Es-min-el in a number of locations, we were unsuccessful, apparently some element in the mixture was toxic in the amounts and manner applied.

We were very much surprised by the yield of non-treated plots of Russian Wild Rye seed and Red Clover seed in the fertilizer trials on these crops, for they were several times as high as yields of these same crops in other studies, and very near the yields for treated plots this season. Should this continue through other years larger plots will be used to lessen the effect of treatments on non-treated plots.

Results of the fertilizer trials will be reported by crops.

SOILS RESEARCH

Fertilizer on Alfalfa Hay 1953

Forty 5 ft. x 20 ft. alfalfa plots were seeded in 1952 for fertilizer application annually each harvest year. Ten fertilizer treatments were made, each replicated four times. Fertilizers were applied with a four row tractor operated belt seeder adapted for the job by special shoes which drilled equal amounts of fertilizer into the soil on each side of the row. Amounts for each row were carefully weighed and packaged prior to application.

Table XCVIII shows yield data for the first year of harvest. Evidence of improved yield from fertilizer is not too clear, but 20 pounds of nitrogen with 80 pounds of phosphate was responsible for increases which analysis shows to be significant. More increase over checks during each successive season may be expected. Analysis by the Flathead County Lab. shows the available phosphate content to be very low, 12#. Organic Content is estimated at 3.9%. In this trial 80 pounds P_2O_5 was needed for yield improvement.

Fertilizer for Clover Seed 1953

This trial was seeded adjacent to, and in the same manner as the alfalfa trial above. The same soil analysis applies and the same treatments were made. Seed was taken from the second cutting after early clipping. Table XCIX shows this seasons yields. No significant seed yield increases were obtained, but all yields were near or above 300 pounds per acre.

Fertilizer on Russian Wild Rye 1953

This is the first harvest year in this trial, and even though yields from all treatments are high, 213 to 383 pounds per acre as compared to about 75 pounds per acre in other trials on the farm with this grass, no significant increases were obtained. Treatments appeared to affect forage growth more than seed production, and lodging, molds, and mildew were noted in some plots which may have reduced the yields from some treatments to near check levels. Table C presents plot yield data.

Table XCVIII. 1953 Yield of Alfalfa in fertilizer trial. Two cuttings, 6/23 and 8/22.

D-1

Treatment	Yield Per Plot in Pounds I	II	III	IV	Total Per Cutting	Season Total	Pounds Per Acre
0	4.62	6.08	5.44	5.34	21.48	43.55	7906.14
	4.68	6.69	5.35	5.35	22.07		
10 N	3.45	5.56	5.72	5.05	19.78	41.18	7470.54
	5.35	6.02	5.35	4.68	21.40		
20 N	5.33	3.23	4.97	3.93	17.46	38.86	7056.72
	6.02	5.35	5.35	4.68	21.40		
40 P	4.84	4.84	6.19	5.36	21.23	42.63	7739.16
	4.68	5.35	6.02	5.35	21.40		
80 P	5.72	6.20	6.0	5.25	23.17	45.91	8334.48
	5.35	6.02	5.35	6.02	22.74		
10-40	5.16	5.12	5.98	5.09	21.35	43.42	7877.10
	6.02	4.68	6.02	5.35	22.07		
10-80	6.59	6.09	5.53	6.03	24.24	47.65	8646.66
	6.02	6.02	5.35	6.02	23.41		
20-40	5.94	5.0	6.19	6.52	23.65	48.40	8784.60
	6.02	6.02	6.02	6.69	24.75		
20-80	5.56	5.34	6.72	6.42	24.04	51.46	9336.36*
	8.02	6.02	7.36	6.02	27.42		

*Treatment yielding significantly more than the check at 5%.

Mean Yield.....8131.20
S. E. $\bar{x}$ 404.382
L.S.D. (5%).....1219.68
C. V. 5.15%

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Table XCIX. Fertilizer on Red Clover seed, 1953. Fertilizer applied April 2, Harvested September 11, 1953

D-1

Pounds Per Acre	I	II	III	IV	Total	Pounds Per Acre
Check 0	13.50	14.00	12.00	9.62[1]	49.12	348.26
10 N	13.75	8.25	9.75	9.50	41.25	292.46
20 N	11.25	16.25	13.25	9.50	50.25	356.27
40 P	13.50	14.75	15.25	8.50	52.00	368.68
80 P	14.75	14.75	12.50	11.75	53.75	379.32
10 40	14.25	16.00	8.00	11.50	49.75	352.72
10 80	16.25	13.25	11.50	10.50	51.50	365.14
20 40	13.25	11.75	19.25	7.75	52.00	368.68
20 80	12.75	14.00	14.00	10.00	50.75	354.50

[1]Calculated missing plot.

Mean Yield.....354.77
S. E. $\bar{x}$ 33.59
L.S.D. (5%).....N. S.
C. V. 9.47%

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Table C. Fertilizer on Russian Wild Rye Seed-1953. Plots- 1 center row -16 ft. sp. 2 ft. or 32 square feet.

N in Treatment	I	II	III	IV	Total	Pounds Per Acre
1. None	5	4.50	2	1.25	12.75	271.19
2. 50 each	4	4.25	2.75	1.50	12.50	265.87
3. 100 each	4.50	3.75	4	3	15.25	324.37
4. 200 each	4.50	5.25	1.75	2.75	14.25	303.10
5. 50 2nd & 3rd	4.75	3.50	3.25	2.75	14.25	303.10
6. 100 2nd & 3rd	4.25	3.50	2.25	.75	10.75	228.65
7. 200 2nd & 3rd	4.50	1.75	3.25	1.25	10.75	228.65
8. 50 3rd	2	3.75	2.75	1.50	10.00	212.7
9. 100 3rd	6	2.75	5	.25	14.00	297.78
10. 200 3rd	4	2.25	2.75	1.50	10.50	223.33
11. 50 1st	4	4.75	5.50	3.75	18.00	382.86
12. 100 1st	4.75	3.75	3.75	4.25	16.50	350.95
13. 200 1st	4.50	4	1.75	3.75	14.00	297.78
14. 50 1st & 2nd	5.50	3.75	3.75	2.50	15.50	329.68
15. 100 1st & 2nd	5.75	3.25	3.25	2.75	15.00	319.05
16. 200 1st & 2nd	5	2	3	2.50	12.50	265.87
17. 50 2nd	4.75	3	2	1.75	11.50	244.60
18. 100 2nd	6.50	3.25	3.25	1.75	14.75	313.73
19. 200 2nd	6	4.75	4	2	16.75	356.27
20. 50 1st, 100 2nd, 200 3rd.	3.75	4.00	4.25	2.50	14.50	308.41

Mean Yield.....292.67
S. E. $\bar{x}$ 40.82
L.S.D. (5%)..... N. S.
C. V. 13.95%

SOILS RESEARCH
Nitrogen for Native Meadows 1953

In a cooperative off-station trial in Flathead County three amounts of Nitrogen were drilled on native meadow on the Carter Hardy ranch in Pleasant Valley. This is a high meadow north east of McGregor Lake. Good percentage increases were obtained but the total yield was in all cases below one ton per acre. Limiting moisture is thought to be the reason for the low yield, in combination with a highly alkaline soil situation.

Table CI shows the yields of this trial.

The rancher secured some nitrogen fertilizer and applied this to a portion of his meadow that he could flood irrigate, at approximately 80 pounds N. per acre. The yields of hay in this treated area were determined by samples taken by the Station Staff, as were yields of irrigated hay with no Nitrogen fertilizer. These are shown in Table CII. This indicates need for both Nitrogen fertilizer and supplemental irrigation in this situation. Work on this meadow will be continued.

Table CI. Nitrogen fertilizer on non-irrigated Native hay. Carter Hardy farm, Flathead County, 1953. (Nitrogen drilled on April 14. Three, 3 ft. x 50 ft. samples taken July 10).

Rate Per Acre	Plot Yield In Pounds I	II	III	Total Dry	Pounds Per Acre
25# N	2.0	2.8	3.2	8.0	774.4
50# N	2.4	4.4	4.0	10.8	1065.44
100# N	6.0	6.0	4.0	16.0	1548.8
Check	3.6	3.2	2.0	8.8	851.84

Mean Yield.....1054.15
S. E. $\bar{x}$ 141.13
L.S.D. (5%)..... N. S.
C. V.....13.39%

Table CII. Nitrogen fertilizer on Irrigated Native hay, Carter Hardy farm, Flathead County, 1953. (Three 3 ft. x 50 ft samples taken July 10 from meadow where 80 lbs. Nitrogen had been applied and adjoining area where none was used).

Rate Per Acre	Plot Yield In Pounds I	II	III	Total Dry	Pounds Per Acre
Check	3.08	6.47	5.85	15.40	1490.1
80# N	15.44	10.01	9.15	34.60	3349.2

SOIL RESEARCH

Fertilizers on Seed Peas

Nine fertilizer treatments were made on Early Harvest peas in May 1953. The peas were seeded in four row plots 18 feet long and fertilizer applied with the seed. Yields were taken by harvesting 16 feet of the two center rows.

High rates of nitrogen and P_2O_5 affected the germination of the peas resulting in a very poor stand at the high rates of fertilizers. With this method of application 60 pound of P_2O_5 and 10 pounds of nitrogen with 30 pounds of P_2O_5 gave yields significantly higher than the check Table CIII.

Table CIV shows the results of two years trials on peas at Creston, 1952 and 1953. In these two years of testing 60 pounds of P_2O_5 per acre has given the highest yield, followed next by 10 pounds of Nitrogen with 30 pounds of P_2O_5.

Table CIII. Agronomic data from fertilizer applications on seed peas (Early Alaskas), Under irrigated conditions, Creston, Montana in 1953. Four row plots, four replications, 18 feet rows.

P5

Treatment and Rate per Acre	Plot Yields in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bu. Per Acre
Check	30.87	38.75	40.00	39.06	148.68	37.17
10 N	34.96	40.63	48.82	46.31	170.73	42.68
20 N	25.83	40.32	47.25	34.65	148.05	37.01
30 $P_2 O_5$	30.24	40.00	48.20	37.17	155.61	39.15
60 $P_2 O_5$	39.69	51.35	50.40	43.47	184.91	46.23*
10 N, 30 $P_2 O_5$	38.75	39.06	67.10	38.12	183.04	45.76*
10 N, 60 $P_2 O_5$	38.43	41.57	38.75	45.99	164.74	41.19
20 N, 30 $P_2 O_5$	25.52	36.23	40.95	44.10	146.80	36.70
20 N, 60 $P_2 O_5$	25.20	35.28	34.02	32.44	126.94	31.73

Note: Fertilizer applied at planting time with the seed.

*Treatments yielding significantly more than the check (5%).

Mean Yield.....39.88
S. E. $\bar{x}$ 2.71
L.S.D. (5%).....7.90
C. V. 6.80%

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Table CIV. Two year average of fertilizer studies on peas under favorable moisture conditions.

Pounds per Acre and Fertilizer	1952	1953	Total Bushels	Average Bushels Per acre	Rank
Check	29.57	37.17	66.74	33.37	8
10 N	35.76	42.68	78.44	39.22	3
20 N	35.06	37.01	72.07	36.04	7
30 $P_2 O_5$	36.10	39.15	75.25	37.63	5
60 $P_2 O_5$	34.68	46.23	80.91	40.46	1
10 N, 30 $P_2 O_5$	34.95	45.76	80.71	40.36	2
10 N, 60 $P_2 O_5$	35.63	41.19	76.82	38.41	4
20 N, 30 $P_2 O_5$	36.38	36.70	73.08	36.54	6
20 N, 60 $P_2 O_5$	31.37	31.73	63.10	31.55	9
Mean Yield	34.53	39.88			
L. S. D.	N. S.	7.90			
C. V.	7.6%	6.8%			

SOILS RESEARCH

Fertilizers on Oats

Six fertilizer studies were seeded in 1953. One at Creston and five off-station plots in the following counties: Lake(Ronan and Polson), Lincoln (Eureka), Sanders(Hotsprings), and Mineral(Superior).

These studies consisted of nine treatments of fertilizer and one check. Three row plots eighteen feet long with four replications. Fertilizers were applied at planting time by mixing with the seed. Four of the studies were irrigated and one was a dry land study, namely the one at Superior. The center row was harvested for yield. Park oats was the variety used in all trials. Two of the studies were not harvested because of damage by livestock or deer.

The highest yields at Creston were obtained with 60 pounds of $P_2 O_5$ treatment. However there were no significant differences when analysed statistically. Table CV.

Fertilizer treatments in the trial at Polson did not increase the yields but in all cases tended to decrease the yield. The results were not significant when analysed statistically. Table CVI.

Sixty pounds of $P_2 O_5$ and 30 pounds of nitrogen plus 60 pounds of $P_2 O_5$ gave yield increases over the check in the trial at Ronan. A soil test by the Flathead county agent indicated a need for $P_2 O_5$ only. Table CVII.

The trial on dryland in Mineral county was not significant and had a very high C. V. These conditions were due to very low moisture conditions. Table CVIII.

All trials were treated with 100 pounds per acre of "Esminnel". This material tended to decrease germination and inhibit the early growth of the plants.

On a two year average at Creston 60 pounds of $P_2 O_5$ has given the highest yields. Table CIX.

Table CX shows yields of fertilizers under favorable conditions in Northwestern Montana 1952 and 1953. Greatest yields have been obtained with 60 pounds $P_2 O_5$ per acre with an average yield 154.07 bushels per acre in four trials.

Table CV. Agronomic data from fertilizer trials on Park oats under irrigated conditions. Creston, Montana. 1953.

Date Planted, May 15, 1953 Size of Plot 16 feet.

D-5

Fertilizer and Rate Per Acre	Yield per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
Check	106.40	114.38	122.36	146.30	489.44	122.36	39
Esminnel 100	122.36	106.40	147.63	122.36	498.75	124.68	38
15 N	126.35	114.38	151.62	144.97	537.32	134.33	38
30 N	148.96	83.79	138.32	176.89	547.96	136.99	38
30 P_2 O_5	119.70	148.96	143.64	111.72	524.02	131.01	39
60 P_2 O_5	148.96	159.60	190.19	176.89	675.64	168.91	40
15 N - 30 P_2 O_5	65.17	73.15	172.90	156.94	468.16	117.04	39
15 N - 60 P_2 O_5	102.41	166.25	143.64	152.95	565.25	141.31	36
30 N - 30 P_2 O_5	138.32	167.58	99.75	133.00	538.65	134.66	40
30 N - 60 P_2 O_5	151.62	119.70	133.00	114.38	518.70	129.68	40

Mean Yield.....134.06
S. E. $\bar{x}$.....13.63
L.S.D.(5%).....N. S.
C. V.....10.17%

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Table CVI. Agronomic data from commercial fertilizer on Park oats under irrigated conditions. Grown in Lake County on the Smurr farm, Polson, Montana. Three row plots, four replications.

Date Planted April 27, 1953 Size of Plot 16 feet

Rate Per Acre	Yield Per Plot in Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
[1]N - 0, P_2O_5 - 0	147.63	139.65	170.24	123.69	581.21	145.30	39
Esminnel 100	118.37	81.13	142.31	66.50	341.81	85.45	38
N- 15, P_2O_5 - 0	188.86	117.04	170.24	86.45	562.59	140.65	38
N - 30, P_2O_5 - 0	138.32	126.35	134.33	89.11	399.00	99.75	38
N - 0, P_2O_5 -30	102.41	148.96	151.62	107.73	510.72	127.68	38
N - 0, P_2O_5 - 60	135.66	140.98	133.00	146.30	555.94	138.99	38
N - 15, P_2O_5 - 30	159.60	105.07	170.24	133.00	567.91	141.98	39
N - 15, P_2O_5 - 60	158.27	144.97	160.93	109.06	573.23	143.31	38
N - 30, P_2O_5 - 30	144.97	148.96	127.68	103.74	525.35	131.34	39
N - 30, P_2O_5 - 60	140.98	148.96	121.03	131.67	542.64	135.66	37

[1]N- Nitrogen, P_2O_5 - Phosphate.

Mean Yield.....132.89
S. E. % 10.61
L.S.D. (5%).....N. S.
C. V. 7.99%

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Table CVII. Agronomic data from commercial fertilizer applications on Park oats under irrigated conditions. Grown in Lake county on the Metzger farm, Ronan, Montana. Three row plots, four replications.

Date Planted, April 27, 1953. Size of Plot 16 feet

Rate Per Acre in Pounds	I	II	III	IV	Total Bushels	Average Bushels Per Acre	Bushel Weight Pounds
[1]N - 0, P_2O_5 - 0	123.69	163.59	131.67	117.04	535.99	134.00	34
Esminmel 100	125.02	95.76	110.39	103.41	433.58	108.40	34
N - 15, P_2O_5 - 0	129.01	163.59	144.97	151.62	589.19	147.30	36
N - 30, P_2O_5 - 0	99.75	130.34	182.21	150.29	562.59	140.65	34
N - 0, P_2O_5 - 30	170.24	117.00	129.01	194.18	610.43	152.61	37
N - 0, P_2O_5 - 60	183.54	166.25	182.21	188.86	720.86	180.22*	38
N - 15, P_2O_5 - 30	190.19	162.26	151.62	158.27	662.34	165.59	37
N - 15, P_2O_5 - 60	186.20	203.49	133.00	174.23	696.92	174.23*	36
N - 30, P_2O_5 - 30	156.94	140.98	170.24	139.65	607.81	151.95	36
N -30, P_2O_5 - 60	163.59	164.92	135.66	204.82	668.99	167.25	37

[1]N - Nitrogen, P_2O_5 - Phosphate.

*Treatments yielding significantly more than the check.

Mean Yield.....152.21
S. E. M.....12.21
L.S.D. (5%).....35.43
C. V. 8.02%

Table CVIII. Agronomic data from commercial fertilizers on Park oats under dryland conditions in Mineral county on the Jostad farm, Superior, Montana. Three row plots, four replications.

Date Planted May 6, 1953 Size of Plot 16 feet

Rate Per Acre In Pounds	Yield Per Plot In Bushels Per Acre I	II	III	IV	Total Bushels	Average Bushels Per Acre
[1]N - 0, P_2O_5 - 0	3.99	7.98	5.32	5.32	22.61	5.65
Esminnel 100#/A	1.33	3.99	3.99	7.98	17.29	4.32
N - 7.5, P_2O_5 - 0	2.66	5.40[2]	6.65	5.32	20.03	5.01
N - 15, P_2O_5 - 0	2.66	3.99	2.66	7.98	17.29	4.32
N - 0, P_2O_5 - 15	3.99	2.66	1.33	6.65	14.63	3.66
N - 0, P_2O_5 - 30	3.99	2.66	3.99	3.99	14.63	3.66
N - 7.5, P_2O_5 - 15	5.32	5.32	3.99	2.66	17.29	4.32
N - 7.5, P_2O_5 - 30	2.66	5.32	3.99	3.99	15.96	3.99
N - 15, P_2O_5 - 15	5.32	10.64	5.32	6.65	27.93	6.98
N - 15, P_2O_5 - 30	5.32	1.33	2.66	4.38[2]	13.69	3.42

[1]N - Nitrogen, P_2O_5 - Phosphate.

[2]Calculated Missing Plot.

Mean Yield.....4.53
S. E. $\bar{x}$ ..... .959
L.S.D. (5%).....N. S.
C. V. 21.16%

SOILS RESEARCH

Effect of Sawdust in a Rotation

A study to determine the value of sawdust in a rotation was started in the spring of 1953. Sawdust was applied at the rate of six tons per acre to summer fallow and as a mulch to spring wheat. Where application was made as a mulch to spring wheat this past season, this same area will be summer fallowed this coming season or 1954. The area summer fallowed in 1953 is in winter wheat, being seed in September 1953. Yields will be taken on these areas for the next few years.

The results of this years yields with observations are given below.

Rate: Six tons per acre

Date Seeded: May 12, 1953

Date of Application: May 28, 1953 (Applied to spring wheat as a mulch)

Observations:

Wheat with sawdust mulch was yellow and lacked vigor twenty days after application, thin stand at harvest time. These comparisons were made with the check.

Results:

Yields taken from a strip 6 feet wide by 200 feet long, with IHC combine.

Yields of check- 39.93 bu/a
Quality of check- Uniform Maturity.

Yield of Sawdust treatment: 24.8 bu/A
Quality: High percent of green kernels.

WEED CONTROL
Weed Research

Chemical weed research for control of quackgrass and wild oats was started the spring of 1953. Five chemicals were used in this test and how they were used, rates, and kinds will be given in the liturature that follows. The division of work will be by weeds.

Wild oats (Avena fatua)

TCA (trichloro acetate), CMU (3-(p-chlorophenyl)-1, 1-dimethylurea), CIPC (isopropyl N-(3-chlorophenyl) carbamate), IPC (Isopropyl carbamate), and MH (maleic hydrazide), are the chemicals used on wild oats this past season. Each chemical, as to use and result will be discussed individually.

TCA applications were made June 5, 1953, when the oats were in the five leaf stage. The area used was naturally seeded. Rates of application were 10, 20, and 40 pounds per acre of acid. Moisture conditions were very good at the time of application. No crop was planted in the area the past season.

Check plots were very vigiours after treatment. The greatest reduction in growth was noted in the 40 pound rate, however by the end of the growing season all plots had recovered and appeared normal.

CMU applications were made June 5, 1953 when oats were in the five leaf stage. The area treated was naturally seeded. Moisture conditions were very good. Rates of applications were 1, 2, and 4 pounds per acre.

There was no differences in plots due to treatments. No yield data or counts of any kind were made on this experiment.

IPC and CIPC were used for control of wild oats in peas. Application was made before planting. The area was sprayed and then the material was disked into the soil. Rates of application for both chemicals was 2, 4, and 6 pounds per acre. Date of application was May 12, 1953. Peas were seeded May 13.

Table CIX shows the yield and percent stands of wild oats in each rate of treatment. There were no significant differences between treatment in the yield of peas. Six pounds of CIPC and 6 pounds of IPC were the rates that decreased the number of wild oats the most.

Maleic Hydrazide applications were not made the past season.

Quackgrass (A. repens)

No controlled experiment was set up on quackgrass. Several areas were sprayed with approximately 50# per acre. In the areas sprayed all quackgrass was dead in about three weeks time. This chemical was very slow acting.

Table CIX . Agronomic data from I P C applications for control of wild oats (Avena fatua) in seed peas.

Date of treatment, May 12, 1953.

Treatment	Rate Pounds Per Acre	%wild oat Stand[1]	Yield Per Plot In Bushels Per Acre I	II	III	IV	Total Bushel
None	0	100	14.3	14.4	19.3	17.4	65.4
I P C	2	98	13.2	11.5	21.4	10.4	56.5
I P C	4	54	12.1	16.4	15.1	21.2	64.8
I P C	6	43	11.0	14.6	11.7	12.5	49.8
C I P C	2	81	12.5	10.8	17.2	16.8	57.3
C I P C	4	56	10.7[2]	17.8	10.6	14.2	53.3
C I P C	6	20	8.9	17.4	14.0	17.4	57.7

[1]Estimation in percent of check.

[2]Calculated missing plot.

Mean Yield.....14.46
S. E. ₹..... 1.658
L.S.D. (5%).....N. S.
C. V. 11.46

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Calcium Cyanamide Trials

Rates of 50, 100, and 200 pounds per acre of Calcium Cyanamide were applied to a heavy winter wheat stubble on October 14, 1953. This material was applied with a crop duster in the special grade form. After application it was worked into the soil with a I H C disk-tiller.

Next crop season this will be seeded to peas (field). Yields will be taken on the peas and wild oat counts will be made during the growing season.

Weed Control

(General Farm)

Several pounds of 2,4-D were used in weed control on the station this past season. All small grains were sprayed in the four to five leaf stage. Kenland red clover was sprayed in the five leaf stage with .3 of a pound per acre for control of fan weed. Canada thistle was sprayed in the pasture with approximately two pounds of 2,4-D per acre.

In all spraying done with 2,4-D good control was obtained. A second spraying in the pasture area would have been desirable.

CMU was used in the registered Alta fescue field to remove blue grass that had worked into the field. A rate of 20 pounds per acre was used in this operation. In the areas sprayed all growth was killed with one application

M. H. was used on the borders of the lawn around Residence #2. There was no reduction in growth of grass due to this treatment.

POTATO IMPROVEMENT

Influence of fertilizers under irrigation

1953 is the fifth concecutive year of a fertilizer study on Netted Gem seed potatoes, in which eight fertilizer treatments are applied to three row plots 130 feet long, rows spaced 42 inches. Three replications have had 12 loads of barnyard manure per acre worked into the soil, three have had no manure. Irrigation and cultivation have been uniform for all treatments, as has planting and harvest dates and methods. Fertilizers have been applied in bands on each side of the row at planting time. The center row of each plot is harvested for yield data.

Table H-1 presents yield data for 1953 for manured plots, Table H-2 contains yield data for the non-manured plots.

Compared with previous results, increase from nitrogen, 150 pounds per acre of ammonium nitrate, has been much higher than normal on manured land, and higher than the increase from 200 pounds per acre of Treble Super Phosphate. Just as in past years the type, maturity, and quality of the potatoes produced on the nitrogen plots was far from desirable; so from the standpoint of beneficial use nitrogen in combination with sufficient phosphate is again the best treatment. Five of the eight treatments have produced significant increases over the checks this season at the 1% level, with the greatest increase in high quality potatoes coming from 200 and 400 pounds per acre of 10-20-0 and 400 pounds per acre of 6-30-0.

On non-manured land increases significant at the 1 per cent level have resulted from treatments of 200 and 400 pounds of 10-20-0 and 400 pounds of 6-30-0 per acre. Increase from nitrogen alone has been greater this year than increase from phosphate alone, but here again the quality of the nitrogen treated potatoes is not good.

Tables H-3 and H-4 show four year averages in hundred weight per acre for the eight treatments on manured and non-manured plots. (Five year tables would not be directly comparable as green manure was used the second year of the trial instead of barnyard manure.) Study of these tables shows that yields of manured plots has averaged 27.7 cwt per acre more than for non-manured plots. Greatest four year average increases, on both manured and non-manured land, has come from applications of 400 pounds of 10-20-0 and 200 pounds of 10-20-0 and 400 pounds of 6-30-0 in that order, with very little difference between 200 pounds of 10-20-0 and 400 pounds of 6-30-0.

Table H-1. Fertilizer on Potatoes, 1953. Irrigated - Manured. Cwt per plot is 130 ft. of 3½ ft. row.

Treatment	Plot Yield in Cwt. I	II	III	Total	Cwt Per Acre
None	2.56	2.77	2.44	7.77	247.96
1-10-20	2.99	2.77	2.54	8.30	264.87
2-10-20	3.08	3.20	2.84	9.12	291.04**
4-10-20-	3.56	3.40	3.18	10.14	323.59**
1-6-30	2.83	3.19	3.12	9.14	291.67**
2-6-30	3.03	3.00	2.45	8.48	270.61
4-6-30	3.43	3.42	3.13	9.98	318.48**
200 T S P	2.71	3.01	2.60	8.32	265.51
150 Amon. Nit.	3.46	3.24	2.68	9.38	299.33**

Plots of 455 sq. ft. x 95.736 = Acre

**Treatment yielding significantly more than the check (1%).

Mean Yield.....286.25
S. E. $\bar{x}$..... 9.247
L.S.D. (5%).....27.73
L.S.D. (1%).....38.19
C. V. 3.23%

Table H-2. Fertilizers on Potatoes 1953. Irrigated - No Manure. Cwt per plot 130 ft. of 3½ ft row.

Treatment	I	II	III	Total	Cwt Per Acre
None	2.24	2.33	2.49	7.06	225.26
1-10-20	2.77	2.03	2.63	7.43	237.11
2-10-20	2.98	2.74	2.99	8.71	277.95**
4-10-20	3.10	2.92	3.07	9.09	290.08**
1-6-30	2.93	2.63	2.68	8.24	262.95*
2-6-30	2.97	2.56	2.57	8.10	258.49*
4-6-30	2.83	2.94	3.22	8.99	286.89**
200 T S P	2.79	2.43	2.59	7.81	249.23
150 Amon. Nit.	3.07	2.60	2.59	8.26	263.59*

Plots of 455 sq. ft. x 95.736 = Cwt/A

*Treatments yielding significantly more than the check (5%).

**Treatments yielding significantly more than the check (1%).

Mean Yield.....261.36
S. E. $\bar{x}$..... 9.746
L.S.D. (5%).....29.20
L.S.D. (1%).....40.31
C. V. 3.73%

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Table H-3. Irrigated potatoes. Hundred weight per acre, manured plots. Four year Average.

Treatment	1949	1951	1952	1953	Total	Average	
Check	183	192	254	248	877	219.25	
1 10-20-0	235	265	299	265	1064	266.00	46.75
2 10-20-0	267	281	315	291	1154	288.50	69.25
4 10-20-0	267	267	316	323.6	1173.6	293.40	74.15
1 6-30-0	207	284	277	291.7	1059.7	264.90	45.65
2 6-30-0	237	261	322	270.6	1090.6	272.65	53.4
4 6-30-0	248	279	308	318.5	1153.5	288.40	69.15
2 T. S. P.	204	275	330	265.5	1074.5	268.60	49.37
150 Ammon. Nit.	224	223	307	299	1053	263.20	43.95

269.4
241.7
27.7

Table H-4. Irrigated potatoes. Hundred wight per acre, no manure. Four year Average

Treatment	1949	1951	1952	1953	Total	Average	Gain
Check	136	168	223	225	752	188.00	
1 10-20-0	212	226	365	237	940	235.00	47
2 10-20-0	249	266	286	278	1079	269.75	81.75
4 10-20-0	246	280	301	290	1117	279.25	91.25
1 6-30-0	166	261	261	263	951	237.75	49.75
2 6-30-0	204	245	295	258.5	1002.5	250.60	62.6
4 6-30-0	230	259	279	287	1055	263.75	75.75
2 T. S. P.	158	248	267	249	922	230.50	42.5
150 Amon. Nit.	151	185	284	263.60	883.6	220.90	32.9

mean 241.7

Influence of Fertilizers on Dryland

This is the third year of a study of fertilizer application to Netted Gem Seed Potatoes on dryland. Treatments are the same as those on irrigated land except that the highest rate is not used. The center row of three row plots 792 ft long are harvested for yield. Yields average some higher this year than last, but as in past years the Nitrogen-Phosphate combinations have increased yields more than has phosphate alone.

The 1953 yields are shown in Table H-5.

Three year averages yields are shown in Table H-6.

Study of this table shows that each year all N-P combinations have produced considerably more increase over checks than has Phosphate alone, and the three year average increases for the combinations is 35 cwt per acre more than for phosphate, 45.5 cwt per acre more than untreated checks.

Table H-5. Fertilizers for Potatoes 1953. Dryland No Manure.
Cwt per plot. 792 ft of 3½ ft row.

Treatment	Plot	Cwt Per Acre
Check	9.13	143.47
1-10-20	11.84	186.05
2-10-20	12.10	190.14
1-6-30	11.67	183.38
2-6-30	11.04	173.48
200 T S P	9.58	150.54
150 Amon. Nit.	10.86	170.65

Plot yield x 15.714 = Acre Yield.

Table H-6. Three year average yields, dryland fertilizer trials on potatoes in hundred weight per acre.

Treatment	1951	1952	1953	Total	Average
Check	128.6	111.6	143.5	383.7	127.9
1 10-20-0	189.3	145.5	186.0	520.8	173.6
2 10-20-0	197.5	144.6	190.1	532.2	177.4
1 6-30-0	184.2	146.2	183.4	513.8	171.3
2 6-30-0	190.3	150.4	173.5	514.2	171.4
200 T. S. P.	134.7	129.9	150.5	415.1	138.4
150 Amon. Nit.	103.3		170.6	273.9[1]	136.9

[1] Two years only.

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Preliminary Study of Factors Influencing Size of Tubers

A preliminary study was made in 1953 in an attempt to get indications of what seed piece size, spacing, date of planting, and fertilizer combination would produce the greatest yield of tubers of baking size. Single row plots were used. Harvest dates were the same for all plots. The trial was planted on sandy loam soil that had produced clover seed, and was irrigated.

Tubers were not actually counted to measure set or weighed individually to determine size, but observation showed a higher percentage of large tubers in plots with wide spacing from small seed pieces. Date of planting made little yield difference. The greatest yield was from plots treated with 200 pounds 10-20-0 at planting time.

A replicated study is planned for 1954 in which seed piece size and spacing will be the major treatments. Planting dates will not be used, neither will fertilizer variations, since planting date seems to have little effect and fertilizers have been the principal treatment in former trials and data seems conclusive.

Data taken in this preliminary trial is shown in Table H-7. Summary by treatment is shown on the page immediately following the Table, H-8.

Table H-7. Preliminary potato study 1953. Single row plots 30 ft of 3½ ft row. Pounds Per Plot

Planting Date	Seed Size (Ounces)	Spacing (Inches)	Fertilizer at seeding time None	40 P_2O_5	20 N 40 P_2O_5	40 P_2O_5 [1]	Total
May 16	1.50	9	75	77	78	70	300
May 16	1.50	15	63	61	67	61	252
May 16	2.50	15	79	65	79	64	287
May 16	2.50	9	79	64	75	72	290
			296	267	299	267	1129
May 26	1.50	9	70	74	80	72	296
May 26	1.50	15	66	60	68	62	256
May 26	2.50	15	75	75	87	70	307
May 26	2.50	9	79	67	80	80	306
			290	276	315	284	1165

[1] 15# N sprinkled on in three applications.

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Table H-8. Date of Planting Comparisons.

			Average lbs/plot	CWT/Acre
May 16	Average of 16 plots		70.5	292.5
May 26	Average of 16 plots		72.8	302.0
		Seed Pieces Size Comparisons		
	Average of 16 plots 1.50 ounces		69.0	286.3
	Average of 16 plots 2.50 ounces		74.4	308.7
		Spacing Comparisons		
	Average of 16 plots 9 inches		74.5	309.1
	Average of 16 plots 15 inches		68.9	285.8
		Fertilizer Comparisons		
	Average of 8 plots	No Fertilizer	73.25	303.88
	Average of 8 plots	40 $P_2 O_5$	67.87	281.56
	Average of 8 plots	20 N, 40 $P_2 O_5$	76.75	318.40
	Average of 8 plots	40 $P_2 O_5$ and side dressing of N	68.87	285.71

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POTATOES FOR EARLY HARVEST 1953

Two scab resistant potatoe varieties were seeded May 16 in single row plots 30 ft. long, each plot containing 25 hills, four replications. Eight hills were dug by hand on each of three dates from each plot. Nothing under four ounces was weighed for yield.

Early Gem potatoes were sufficiently mature for harvest on all dates, but yields were progressively better on each succeeding date.

Cayuga potatoes were immature on all dates, although approaching acceptable maturity at the last date. Yields of this variety were less than for Early Gem at all dates.

From this study it appears that Early Gem might have a place in home gardens or commercial plantings made for early harvest.

At Troy, Montana Mrs. Art Behling planted six potato varieties in her garden for early harvest, and counted and weighed the tubers from three hills dug on three dates. Her report follows:

No. and Lbs. Tubers. Hills. Three Dates

Variety	Date 1		Date 2		Date 3		Total	Scab
Progress	39	6½	47	10½	82	14½	168-31½	Medium
Soda	33	10	35	10½	30	9½	98-30	Light
Early Gem	24	5	35	8	20	5½	79-18½	None
Triumph	34	10½	67	10	52	7	153-27½	Medium
Cayuga	48	7½	36	7½	60	7½	144-22½	Light

It would appear that in the garden in Troy, Soda might be the best early potato, since the scab was light and the average size greater than the other varieties. Early Gem is however, the only scab free variety in this group, and it would appear likely that by closer spacing of hills that yields might be obtained comparable to the other varieties.

Table H-9. Early Potatoes, 1953. Two scab resistant varieties compared under irrigation. Eight hills each variety dug each of three dates, four replications.

Variety	Pounds per plot I	II	III	IV	Total	Cwt/acre
Aug 10- Early Gem	3.00	5.50	3.25	3.00	14.75	45.89
Cayuga	.50	.50	1.25	.75	3.00	9.33
Aug 19- Early Gem	8.00	7.50	8.00	4.50	28.00	87.12
Cayuga	1.75	2.25	3.00	1.25	8.25	24.89
Aug 29- Early Gem	9.50	11.25	10.75	7.50	39.00	121.35
Cayuga	6.75	7.50	8.50	6.50	29.25	91.01

Note: Nothing under four ounces weighed.

POTATO VARIETIES - IMPORTS 1953

Potato variety work in 1953 included six varieties in a replicated yield trial and single row plots of some recent introductions from which type, scab, yield and maturity notes were taken.

As in past variety trials yield is relatively unimportant for the reason that scab, hollow heart, and other quality factors usually eliminate a large number of varieties that produce well. Three varieties in this years trial appeared to have sufficient scab resistance to be of use in the area. Early Gem has scab resistance plus type, fair quality, and early maturity, but produces considerably less than Netted Gem. This variety may be useful as a home garden variety and in the production of potatoes for early harvest. P45.1-101 produced a good yield of good type, mature tubers with only light scab. A high percentage were hollow however. P 45-14-6 is sufficiently scab resistant to warrant furthur study, since quality and maturity appeared desirable. A few air checks at digging time was the most noticeable fault.

1953 yields in the replicated variety are shown in Table H-10.

Six of the eleven introductions secured from the Inter-Regional Potato Introduction Station at Sturgeon Bay, Wisconsin produced tubers, four showed considerable yield potential. Of these four were free of scab. One red, Carnes 188751, and one white, Hindenberg 2860, appeared to have scab resistance, yield potential, early maturity, type and quality to a degree that furthur study of these should be made.

Data taken on these importations is shown in Table H-11.

Table H-10. Potato Varieties, 1953. Twenty-five hills in 30 ft of 3½ ft row-single row plots, Four replications, six varieties.

Variety	Plot yields in pounds I	II	III	IV	Total	Cwt. Per Acre
Netted Gem	49	60	66	59	234	242.69
Early Gem	37	59	66	34	196	203.27
P 45.11-101	57	63	68	49	237	245.80
P 45.14-6	44	62	57	35	198	205.35
Canso	34	59	64	61	218	226.09
Columbia Russet	54	74	88	71	287	297.65

Canso and Col.Russet very scabby.

P 45.1-101 mature, good type, light scab, hollow.

P 45-14-6 Maturity, type and yield good. Some checks.

Mean Yield.....236.80
S. E. M..... 14.66
L.S.D. (5%)..... 44.14
L.S.D. (1%)..... 61.19
C. V. 6.19%

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Table H-11. Potato Imports 1953. Three to six hill each of 11 imported potatoes were planted on irrigated land May 16. Data collected on all producing tubers indicates maturity, yield and presence or absence of scab.

Species	Vine Character	Tuber Character	No Hills	Weight Tubers	Scab Notes
Panther-182556	Large	Late-long white	5	15 lbs	Quite scabby
Yssetster-2906	Small	Mature-red	4	4 lbs	No scab
Carnes-188751	Very Large	Mature-round red	6	19 lbs	No scab
Askersegen-182550	Very Large	Late-round to flat-white	6	21 lbs	No scab
Hindenberg-2860	Very Large	Mature-varied white	4	13 lbs	No scab
S. Com. 197760	Large	late	6	5 lbs	Scabby

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SUGAR BEET VARIETIES

Four varieties of Sugar Beets were planted April 25 from seed furnished by the American Crystal Sugar Co. in four row plots 24 ft. ong, rows spaced 2 ft. Varieties were replicated four times. Beets were thinned by hand. Some difficulty was experienced in getting comparable stands because of wire worm infestation in the plots.

Even though four plot averages varied from 12.93 tons to 15.77 tons per acre no statistically significant differences are shown because of variations between replications.

Sugar content of the several samples varied from 18.0 to 19.5 percent when the samples were tested, after drying in burlap for a week prior to test. In this regard as in yield there seems to be no variety difference.

About all we learned from this work, it seems, is that this season we could have produced from 13 to 16 tons of beets at Creston with about 17 percent sugar.

Plot yield data is shown in Table H-12.

Table H-12. Sugar Beet Varieties 1953. Four varieties planted April 25 in latin square design. Rows 24 feet long spaced 2 feet. Twelve feet harvested for yield October 15.

Variety	I	II	III	IV	Total	Tons Per Acre
U.S. 22	29	31	29	42	131	14.85 [1]
Amer. # 3N	26	42	29	42	139	15.77
U. S. 33	27	29	30	37	123	13.95
Amer # 5	24	26	29	33	114	12.93

[1] Estimated 5% Tare

Mean Yield.....14.36
S. E. M.....1.70
L.S. D.....N. S
C. V.....11.85%

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SWEET CORN 1953

Instead of an observation type trial of many varieties this years work with sweet corns is the beginning of yield trials of fewer varieties for the purpose of determining which of the adapted varieties will produce best in each of four date of harvest groups.

Twenty-one varieties were seeded May 21 in three row plots, 20 feet long, varieties replicated three times. Yields were taken from 10 hills (15 ft.) of the center row. Number and weight of ears, stalk height, and harvest dates were recorded.

Variety	Stalk Height Inches	Harvest Dates	Replications I		II		III	
			No.	Lbs.	No.	Lbs.	No.	Lbs.
Gold Mine	48	8/19-9/5	12	5	12	5	16	7
Imp. Spanc.	42	8/24-9/1	10	5	10	5½	11	5½
Charter	38	8/19-9/5	19	5	23	6	15	4
Alpine Sweet	48	8/26-9/9	14	7	9	5	13	7
Sun-up	48	8/24-9/5	13	7	11	5	10	4½
Seneca 60	44	8/24-9/5	16	7	15	6½	16	7
Golden Honey	40	8/24-9/5	11	6	12	6	14	7
North Star	48	8/22-9/9	11	6	11	6	11	6
Surprise	44	8/19-9/9	11	6	11	6	13	7½
Sunlite	44	8/29Frost	11	6	10	6½	10	7
Exp. Hyb.	44	8/19-9/5	10	5½	12	7	10	5
Golden Glacier	48	Too Late						
Hyb No. 33	48	8/29Frost	12	8	12	8	10	6
Golden Princess	48	Too Late						
Our Choice	44	8/26-9/10	11	7	13	8	11	6½
Jefferson	48	8/29Frost	10	6	12	9	12	9
Harvard	40	8/26Frost	14	5	14	4½	17	5
Golden Jewel	54	8/29Frost	13	9	11	7	14	9
Northern Cross	56	9/5Frost	18	11	18	11	15	9
Hyb. Gold. Hunn.	48	Too Late						
Boquet	54	Too Late						
Tunxis	42	8/24-9/5	Used as Border					

Table H-13 shows comparisons of some of these varieties in pounds per plot and per Acre.

Table H-13. Sweet Corn Study. Comparison in Pounds per plot and per Acre.

Date	Variety	I	II	III	Total	Pounds/Acre
(Earliest) Group I						
8-19	Gold Mine	5	5	7	17	4810.7
8-19	Charter	5	6	4	15	4244.8
8-19	Surprise	6	6	7.5	19.5	5518.2
8-19	Exp. Hybrid	5.5	7	5	17.5	4952.2
(Early) Group II						
8-22	North Star	6	6	6	18	5093.7
8-24	Imp. Spancross	5	5	7	17	4810.7
8-24	Sun-up	7	5	4.5	16.5	4669.2
8-24	Seneca 60	7	6.5	7	20.5	5801.2
8-24	Golden Honey	6	6	7	19	5376.7
(Canning) Group III						
8-26	Our Choice	7	8	6.5	21.5	6084.2
8-26	Harvard	5	4.5	5	14.5	4103.3
8-26	Alpine Sweet	7	5	7	19	5376.7
(Late) Group IV						
8-29	Golden Jewel	9	7	9	25	7074.6
8-29	Jefferson	6	9	9	24	6791.6
8-29	Hybrid	8	8	6	22	6225.7
8-29	Sunlite	6	6.5	7	19.5	5518.2
(Very Late) Group V						
9-5	Northern Cross	11	11	9	31	8772.5

Onions From Plants

Onion plants of six varieties received from the Horticulture Department, Montana State College were set in single row plots, 100 ft. long and two feet apart on May 13, about 100 plants per row.

Survival varied with varieties from 16 to 82.

Plants were set in good garden soil and irrigated.

The onions were pulled September 13, and weighed after drying. The number of onions, their weight, and quality and maturity notes were recorded.

Variety	Source of Seed	Number	Weight	Notes
Ea. Yel. Globe	Crookham Co.	39	24 lbs.	Mature
Asgrow Y40	Assoc. Seed Grow.	47	35 lbs.	Some Thicknecks Fair Maturity
Asgrow Y41	Assoc. Seed Grow.	80	77 lbs.	Mature
Asgrow Y42	Assoc. Seed Grow.	16	13 lbs.	Green Thicknecks
Crookham No. 6	Crookham Co.	33	15 lbs.	Mature
Yel. Sw. Spanish	Crookham Co.	82	87 lbs.	Mature

While the percent of survival is probably due to the condition of the plants when set and should not be charged against a variety, the average size and maturity information obtained from the surviving plants is thought to be a fair indication of what could be expected from the varieties, under similar soil and climatic conditions.

SMALL FRUIT STUDIES

Work with Strawberry Varieties

Single row plots of ten strawberry varieties were set in the spring of 1953. While some varieties established themselves more quickly than others, this may have been due to the condition of the plants rather than to variety. At any rate all plots should be comparable after thinning to a given number per row in 1954, so that yield and quality indications can be obtained.

Twenty-five plants of each variety were set in 50 ft. rows, four feet apart. Blossoms were pinched off until July 1, after which time they were permitted to bear. Plants that did not survive were replaced with new plants from runners. A straw mulch was applied for winter protection.

During the 1953 season fruit was produced by Sel. 4931, Streamliner, Red Rich, Superfection, and Gem, in that approximate order. No weights were taken.

Varieties in the 1953 Planting

Variety	Source	Date Set	Descriptive Notes
U. S. 2127	Hort. Branch Sta.	4/23	Very large plants. No fruit.
Red Rich	Hort. Branch Sta.	4/23	Vigorous. Large tasty fruit.
Premier	Fairbault	4/30	Slow to start. Few runners.
Superfection	Fairbault	4/30	Vigorous. Few runners.
Streamliner	Fairbault	4/30	Small plants. Few runners.
Dunlap	Fairbault	4/30	Vigorous. Many runners.
Sioux	Fairbault	4/30	Vigorous. Many runners.
Sel 4931	Creston*	4/30	Vigorous. Great many runners. (Most productive first season).
U. C. 47229-1	Bozeman	5/11	Vigorous. No Fruit.
Gem	Bozeman	5/11	Small vigorous plants.

*Original plants from Kreh Bros. Nursery, Loveland, Colorado. 1952.

ORNAMENTALS

Chrysanthemums

Several of the plants set in a bed on the south side of Res. #1 in March 1951 remained vigorous and produced flowers in 1953. Enough to utelize the space and make a beautiful bed.

Only one plant of the 43 set May 1, 1953 was lost. These almost to the plant made vigorous growth and bloomed as well perhaps as older plants would have. Plants were furnished by the Horticulture Department, Montana State College.

Mums set May 1, 1953

Kind	Number	Number Oct. 9, 1953
7-51-H-3	5	5
PFK-3	4	4
11-51-H-30	4	4
15-51-H-9	4	4
CMB-1	5	5
Zantha	2	2
Lemon Drop	5	5
Dorothy Howard	5	5
DG-3	5	5
15-51-H-8	2	2
Prairie Gold	2	1

Survival Of Lillies From Oregon Bulb Farm

Single bulbs of 17 varieties were set October 22, 1951. All survived the first winter and grew vigorously, varying in height from 24 to 46 inches. All bloomed, producing from 3 to 15 blossoms from June 15 to July 25.

Twelve of the seventeen survived the second winter and bloomed during the summer of 1953. Stems near the blossoms were generally flattened and abnormally large, possibly indicating frost damage, but this condition did not materially restrict the size and number of blooms.

Varieties Set. All blooming in 1952	Surviving and blooming in 1953.
Apache	
Fireflame	
Goldrush	Goldrush
Harlequin	
Serenade	Serenade
Vagabond	Vagabond
Valencia	Valencia
Campfire	Campfire
Enchantment	Enchantment
Harmony	Harmony
Pagoda	
Joan Evans	
Hollywood Hybrids	Hollywood Hybrids
Fiesta Hybrids	Fiesta Hybrids
Golden Chalice Hybrids	Golden Chalice Hybrids
Talisman	Talsiman
Olympic Hybrids	Olympic Hybrids

All were dug in the fall of 1953 and two of each remaining variety set in a new bed. Three to eight nice bulbs were found, together with numerous bulblets.

ACTIVITIES 1953

Perhaps as simple a way as any to point out major activities participated in without going into lengthy detail would be to mention these in the order in which they occured, with a brief statement about the nature of the participation.

January...Annual Conference.
Montana Potato and Seed Show. Exhibits and Slide Lecture.
Advisory Committee Meeting, Report on Station work.

February..Fertilizer School, Kalispell. Talk on Fertilizers.
Meetings to plan off-station work. Kalispell and Thompson Falls.

March.....Farm Bureau, Missoula, Talk on Station Work.
Annual Meeting of Seed Growers, Charlo. Slide lecture.
Meeting to plan off-station work. Hot Springs.
Conservation Day Programs, Eureka, Libby, Kalispell, Trout Creek, Hot Springs, Polson, Missoula, Slide lecture at each program.

April.....To Bozeman to confer on Station Projects.

May.....Seeding of off-station trials in six counties.

June.....Observation of off-station trials.

July.....Field Day. Off-station harvest.

August....Judge at Lake Co. Jr. Fair. Sanders Co. Fair. Charlo Community Fair. Off-station harvest.

September.Potato Day. Seed off-station winter grains.

October...Sugar Beet Day. Threshing.

November..Montana Reclamation Assn. Meeting. Slide lecture. Conservation Caravan Committee.

December..Grange at Round Butte. Talk on Station work. Kalispell Chamber of Commerce. Arrangements for Montana Potato and Seed Show. Prepare new Slides.

LIVESTOCK

The Northwestern Montana Branch Station now owns some livestock. Repayment in kind for sheep furnished by Thain and Ernie White has been made to their satisfaction. Columbia sheep now on hand are:

8 ewes, born 1950
5 ewes, born 1951
7 ewes, born 1952
1 ewe, born 1953

Application was made for registration of eligible ewes. All but one passed inspection, and under date of February 8, 1954 seven registration certificates were sent us from the Secretary of the Columbia Sheep Breeders of America, P. O. Box 315, Logan, Utah.

Records have been kept of the lambs and wool produced by each of the ewes we have which will be helpful in decisions as to which to keep in the flock and keep replacements from. These records follow.

Lambs weaned and Wool shorn from Station Ewes

Ewe No.	Year Born	1951* Lambs	1952 Lambs	Wool	1953 Lambs	Wool
T172	1950	1	1	10	2	13
T017	1950	1	0	13	2	15
T6271	1950	1	1	10	2	12
T347	1950	1	1	9	1	13
C 7181	1950	1	0	11	1	12
T038	1950	1	1	13	1	13
T081	1950	1	1	12½	2	14
T0151	1950	1	1	9	2	9
1-299	1951			6	1	11
1-294	1951			7	0	13
1-342	1951			6	1	13
1-305	1951			7	1	11
1-324	1951			7	2	12½
F-7684	1952					10
F-7681	1952					6
F-7686	1952					6
F-7683	1952					7
F-7682	1952					6
F-7685	1952					7
2406	1952					6
F-7687	1953					0

*Secured after being shorn.

Table W-1. Summary of climatic data by months for the 1952-1953 crop year (September to August) and averages for the period, 1949-1953, at the Agricultural Experiment Station, Creston, Montana.

	Month												Total or Ave.
	Sept. 1952	Oct. 1952	Nov. 1952	Dec. 1952	Jan. 1953	Feb. 1953	Mar. 1953	Apr. 1953	May 1953	June 1953	July 1953	Aug. 1953	Growing Season
Precipitation (inches)													
Current year	.13	.05	.60	.98	1.84	1.14	.98	2.07	2.00	3.31	T	1.62	14.72
Ave. 1949 to 1952-53	1.01	2.99	1.28	2.24	1.53	1.13	1.30	1.11	1.75	3.37	1.57	1.43	20.69
Mean temperature (°F)													
Current year	56.0	45.5	30.4	27.6	36.0	32.9	37.2	41.2	49.5	54.6	64.3	63.1	44.86
Ave 1949 to 1952-53	52.8	42.7	33.6	23.9	8.1	26.6	29.2	44.3	51.2	56.0	63.4	62.5	41.1

Last killing frost in spring*
1953 - May 31 (32°)
Ave. 1949-1953 - June 8

First killing frost in fall*
1953 - Sept. 16 (31°)
Ave. 1949-1953 - Sept. 11

Frost free period
1953 - 108 days
Ave. 1949-1953 - 94 days

Maximum summer temperature - - - - - - - - - - - - - - - - - 97° on July 12, 1953

Minimum winter temperature - - - - - - - - - - - - - - - - - 1° on Nov. 26, 1952

* In this summary 32° is considered a killing frost.