A N N U A L R E P O R T

1952

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 1952.

Development of the Northwestern
Montana Branch Station

A program of Station development has been continued during 1952 with a number of small and relatively inexpensive projects which have added much to the appearance of the farmstead, increased the amount of tillable land on the Station and resulted in saving operating costs.

Residence No. 2 was made ready for occupancy by installing an oil furnace, lowering ceilings, insulating walls, and ceilings; and further improved by exterior painting and made more comfortable with storm doors and windows. A lawn was seeded, evergreens set in a foundation planting, shrubs set, and sidewalks poured.

The appearance of Residence No. 1 was considerably improved by replacing a badly rotted wooden porch with one made of concrete and faced with flat stone, and by a foundation planting of evergreens. Heat loss was checked in the residence, and in the office, by additional insulation.

Removal of dolapidated poultry and hog houses from the farmstead, moving a service pole, and building an outdoor fireplace with salvaged brick made still other improvements in Station appearance.

One new building was erected. Rather a sound section of poultry house present when the farm was purchased was moved to a desirable location, placed on a foundation, and built on to to make an open shed shelter for the Station farm flock of Columbia sheep.

Two acres of additional farm land was cleared of stumps and plowed. Needed repair was made to outside fence.

The cost in addition to regular labor for Station improvement in 1952 was approximately $3,000.00, of which $1387.00 went for labor, $794.00 for a furnace, $45.00 for trees and shrubs, and $872.00 for paint, lumber, cement, insulation, storm windows, and other material items.

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Russian Wild Rye
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Sawdust.

Ten Pasture Mixtures - Irrigated

Ten pasture mixtures were seeded in the spring of 1949, in 5 x 24 ft. plots, four replications, rows spaced six inches. Yields are determined by frequent clippings. Three x 20 ft. plot centers are harvested and saved until dry for weighing. The percentage of legume is estimated at the time of clipping.

Growth in 1952, was quite satisfactory until late July, following spring application of 200 pounds per acre of 10-20-0. Late summer and fall growth did not justify late clippings.

Table I, shows the annual dry forage production in ounces per plot, the four plot average yields in pounds per acre, and the season average legume percentage for each of the ten mixtures. Clippings were made on May 17, June 7, July 5, and July 31.

Two simple mixtures, orchardgrass with ladino and alta fescue with ladino lead huntley and modified huntleys in production in this seasons trials.

Table II, shows the seasons yield for three years and the three year average seasons yield in pounds per acre for the ten mixtures. Also, three year average legume percentages are shown.

The same simple mixtures are high in production for the three year period that are ahead in this years trial, followed closely by brome and alfalfa.

Table I. Pasture plot yields in ounces and four plot average yields in pounds per acre for ten pasture mixtures in 1952.

Mixture	Plot Yield in Ounces I	II	III	IV	Total Ounces	Average Ounces	Yield Lbs./A	Percent Legume
Huntley	46.75	42.75	47.00	40.00	176.50	44.5	2019.18	3½
Huntley A	51.25	43.25	44.50	56.00	195.00	48.7	2209.76	3
Huntley B	39.75	43.00	46.75	43.25	172.75	43.2	1960.20	3½
Huntley C	42.75	47.75	41.00	39.75	171.25	42.8	1942.00	3
Orchard-ladino	56.25	60.50	55.00	43.75	215.50	53.9	2445.70	3
Brome-ladino	48.00	38.75	46.75	47.25	180.75	45.2	2050.95	4
Alta-ladino	66.75	57.00	72.75	48.50	245.00	61.2	2776.95	2½
Tall blue-ladino	47.50	31.75	42.25	39.25	160.75	40.2	1824.10	11
Brome-alfalfa	49.00	44.00	48.50	51.00	192.50	48.1	2182.50	17½
Tall blue-trefoil	34.00	35.50	58.50	37.75	165.75	41.4	1878.50	73

Mean Yield 2127.63
S. E. $\bar{x}$ 142.30
L.S.D. (P= .05) 412.46
L.S.D. (P= .01) 557.21
C. V. 6.69%

Table II. Three year average yields and legume percent of ten pasture mixtures in pounds per acre.

Mixture	% Legume	1950	1951	1952	Three Year Average
Huntley	8	3145	2235	2019	2466
Huntley A	10	3097	2291	2210	2533
Huntley B	6½	2980	2087	1960	2342
Huntley C	6	3545	2303	1942	2597
Orchard - Ladino	6	3624	2428	2456	2836
Brome - Ladino	8	3460	2144	2051	2552
Alta - Ladino	7	3025	2700	2777	2834
Tall Blue- Ladino	30	1948	1577	1824	1783
Brome - Alfalfa	24	3582	2427	2182	2730
Tall Blue - Trefoil	72	1982	2155	1878	2005

Thirteen Hay Mixtures - Irrigated

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

Yields are obtained by cutting 3 x 20 ft. plot centers. Two cuttings are usually secured. Green forage is dried before being weighed.

In 1952, the first cutting was quite good. The second growth of grasses was considered to short for harvest and alfalfa showed great border effect, as well as considerable variation between replications, even though treated with 200 pounds of 10-20-0 in the spring.

Table III, gives the 1952 plot data for the thirteen species or mixtures as well as four replication average yields in pounds per acre.

Greater yield differences in favor of alfalfa-grass mixtures over grass alone occur this year than in the two preceeding years.

Table IV, shows the seasons average four plot yield in pounds per acre for each of three years and the three year average yield for each of the thirteen species or mixtures. While not high in any case considerable advantage from mixtures over single grasses is shown, except in the case of alta fescue which alone has produced nearly as much as with alfalfa.

Table III. 1952 plot yields in ounces and four plot average yields in pounds per acre for thirteen irrigated hays.

Species or Mixture	Plot Yield in Ounces A	B	C	D	Total Ounces	Average Ounces	Pounds Per Acre
Alfalfa	69.00	74.50	104.50	42.50	290.50	72.6	3294.23
Brome	64.50	57.25	52.25	52.75	226.75	56.7	2572.76
Brome & Alfalfa	86.50	104.25	97.25	175.00	463.00	115.7	5249.90
Orchard	59.00	59.00	53.00	73.75	244.75	61.2	2776.95
Orchard & Alfalfa	97.00	123.25	145.25	101.25	466.75	116.7	5295.30
Alta Fescue	82.00	85.00	82.50	56.50	306.00	76.5	3471.20
Alta Fescue & Alfalfa	100.25	97.75	149.75	52.75	400.50	100.0	4537.50
Crested	50.75	37.25	44.00	18.50	150.50	37.6	1706.10
Crested & Alfalfa	67.50	106.75	93.25	83.75	351.25	87.8	3983.90
Canary	98.00	43.50	33.75	25.50	200.75	50.2	2268.75
Canary & Alfalfa	132.00	154.00	108.25	135.00	529.25	132.3	6003.10
Timothy	73.00	59.50	45.00	46.25	223.75	55.9	2536.46
Timothy & Alfalfa	120.25	96.00	114.50	58.75	389.50	97.4	4419.50

Mean Yield 3702.60
S. E. $\bar{X}$..... 539.28
L.S.D. (P= .05%) 1548.19
L.S.D. (P= .01%) 2074.09
C. V. 14.52%

Table IV. Seasons yield by years and three year average yields per acre for thirteen irrigated hays.

Species or Mixture	1950	1951	1952		Three Year Average	
Alfalfa	3604	2720	3294		3206	
Smooth Brome	6506	3979	2573		4353	
Brome and Alfalfa	5936	4510	5250	2.62	5232	2.61
Orchardgrass	5984	3596	2777		4119	
Orchard - Alfalfa	5975	4294	5295	2.65	5188	2.59
Alta Fescue	6562	5173	3471		5069	
Alta - Alfalfa	6032	4674	4537	2.27	5081	2.54
Crested	4336	2870	1706		2971	
Crested - Alfalfa	4557	3913	3984		4151	
Reed Canary	4849	3456	2269		3518	
Canary - Alfalfa	5031	4430	6003		5151	
Hopkins Timothy	6395	3449	2536		4127	
Timothy - Alfalfa	5536	4041	4420	2.21	4666	2.33

Fifteen Grasses for Seed - Irrigated

Fifteen grasses were seeded in three row plots 24 feet long, spaced three feet part, in 1949. Fair to good stands of fourteen species were secured the first season and the one remaining speci es came up in 1950 so seed was harvested in 1950 from all fifteen.

Of the original fifteen, six remain in good stands for the third seed crop, and one other, astoria bent, remains in fair stands although considerable rogueing of voluntier blue grass was required before seed could be harvested. The remaining 8 species have very largely been taken over by blue-grass.

Table V, shows the plot yields in ounces, the four plot averages and pounds per acre for seven species. Three species, alta fescue, nanohar, smooth brome, and tall oat grass produced in excess of 300 pounds of seed per acre.

Table VI, shows yields per acre for three years and three year average yields in pounds per acre. It will be seen from this table that yields were very much less the second year than the first. Fifty pounds of nitrogen per acre was applied April 30, this year may have helped the yield of brome grass.

Table V. Grass seed yields in ounces per plot and four plot average yields in pounds per acre, irrigated, 1952.

Species	Plot Yield in Ounces I	II	III	IV	Total Ounces	Average Ounces	Pounds Per Acre
Alta fescue	10.68	10.00	10.00	11.13	41.81	10.45	474.17
Smooth brome	7.23	9.99	9.56	13.18	39.96	9.99	453.30
Tall oat	4.55	8.40	7.88	9.80	30.63	7.66	347.57
Erect brome	3.12	6.44	7.41	5.27	22.24	5.56	252.29
Orchardgrass	1.61	1.61	1.61	2.99	7.82	1.95	88.48
Bent	.70*	1.13	2.68	2.00	6.71	1.68	76.23
Reed canary	2.34	2.88	3.06	3.42	11.70	2.92	132.50

* Calculated missing plot formula.

Mean yield 260.91
S. E. $\bar{x}$. 27.91
L.S.D. (P= .05) 83.49
L.S.D. (P= .01) 114.35
C. V. 10.69%

Table VI. Grass seed yields in pounds per acre by years and three year average of species.

Species	1950	1951	1952	53	Three Year Average
Alta fescue	910	524	474	510	633
Smooth brome	617	216	453	103	429
Tall Oatgrass	628	392	348	351	456
Erect brome	1160	374	252	503	595
Orchard grass	500	167	88	358	252
	5|3815	1673	1615	1825	2365
	763	335	325	365	473

Seven Legumes for Seed - Irrigated

Seven legumes were seeded in 5 x 24 ft. plots, four replications, rows spaced one foot in the spring of 1949. Good stands were obtained.

Forage growth has been better this year for some species than in some preceeding years. Kenland red clover remains in good stands. Hop clover and Strawberry clover were barely visible and no seed was harvested.

Table VII, shows plot yields of clean seed in ounces and four plot averages in pounds per acre for 1952. Again this year Birdsfoot trefoil appears to be the most promising of the legumes in the planting as a seed crop from a yield stand point.

Table VII. Clean seed in ounces per plot and four plot average yields in pounds per acre for legume species, 1952.

Species	I	II	III	IV	Total Ounces	Average Ounces	Pounds Per A
Alfalfa	3.12	2.76	2.52	1.08	9.48	2.37	107.53
Red clover	1.15	1.40	2.17	2.04	6.76	1.69	76.68
Birdsfoot-trefoil	5.10	5.78	4.76	5.44	21.08	5.27	239.13
Ladino (Pr.)	.83	.83	.83	.67	3.16	.79	35.85
Ladino (Fd.)	.67	.67	.67	.83	2.84	.71	32.22

Mean Yield 98.46
S. E. $\bar{x}$ 12.25
L.S.D. ($P = .05$) 37.66
L.S.D. ($P = .01$) 53.08
C. V. 12.44%

Fourteen Bromegrass Strains - Irrigated

Fourteen strains of brome grass were seeded in the spring of 1950 in three row plots 20 feet long, rows spaced three feet, plots replicated three times.

Seeding rates varied considerably and stand percentage varied accordingly for the first two years. Rows had fairly well filled in by 1952.

Table VIII shows the seed yield in ounces per plot for the center row, and the pounds per acre for each strain based on three plot averages. In this years work Lincoln brome leads in seed produced.

Table IX shows forage yields for the brome strains. One row of the three row plots was cut and dried for forage yields. Even though these were outside rows growing between one row of the same and one row of another strain they give some indication of forage growth.

Table VIII. Ounces per plot, of clean seed and pounds per acre for fourteen bromegrass strains based on three plot averages, 1952.

Strain	I	II	III	Total Ounces	Average Ounces	Pounds Per Acre
Parkland	8.70	5.00	11.29	24.99	8.3	376.60
Nebraska 44	8.70	12.43	8.70	29.83	9.9	449.20
South Dakota	11.04	9.49	8.28	28.81	9.6	435.60
Manchar	9.55	9.55	8.71	27.81	9.3	421.98
Canadian Common	9.56	13.85	10.73	34.14	11.4	512.74
B in 12	14.94	9.72	8.64	33.30	11.1	503.66
Meadow	15.39	7.69	8.70	31.78	10.6	480.97
Mandan 404*	17.76	6.20	7.71	31.67	10.5	476.40
Achanbach	12.94	6.04	11.39	30.37	10.1	458.29
Lincoln	12.40	6.20	15.91	34.51	11.5	521.80
Nebraska 36	15.39	9.88	6.27	31.54	10.5	476.40
Elsberry	9.07	7.77	4.26	21.10	7.0	317.60 *
Martin	10.23	7.25	10.08	27.56	9.2	417.45
Fischer	13.46	8.39	9.95	31.80	10.6	480.97

* Three plot total is right, but thresher plugged so Rep. I sample contains seed from Rep. II and Rep. III.

Mean Yield 452.84
S. E. $\bar{X}$ 63.39
L.S.D. (P= .05) 184.68
C. V. 14.00%

Table IX. Dry weight of forage in pounds per plot and pounds per acre for fourteen Bromegrass strains.

Strain	I	II	III	Total Pounds	Average Pounds	Pounds /acre
Elsberry	6.50	7.15	8.125	21.775	7.26	5270.76
Achenbach	7.15	7.475	6.50	21.125	7.04	5111.04
Lincoln	7.475	7.475	6.825	21.775	7.26	5270.76
Fischer	8.45	5.85	10.40	24.70	8.23	5974.98
Nebraska 36	4.55	7.15	6.50	18.20	6.07	4406.82
Nebraska 44	8.125	8.45	6.175	22.75	7.58	5503.08
B in 12	9.10	7.80	7.15	24.05	8.02	5822.52
Martin	7.475	5.525	8.45	21.45	7.15	5190.90
Manchar	8.45	9.75	7.475	25.675	8.56	6214.56
Mandon 404	6.50	8.45	5.85	20.80	6.93	5031.18
Canadian Common	6.175	6.175	4.55	16.90	5.63	4087.38
South Dakota	9.425	7.80	7.80	25.025	8.34	6054.84
Parkland	7.15	4.55	8.125	19.825	6.61	4798.86
Meadow	7.475	7.475	6.825	21.775	7.26	5270.76

Mean Yield 5285.28
S. E. $\bar{x}$ 532.16
L.S.D. (P= .05) ..... N. S.
C. V. 10.06%

Nine Orchardgrass Strains

Nine strains of orchardgrass were seeded April 26, 1951. Plots are 5 x 20 ft. with rows spaced six inches, strains replicated four times.

Growth was very good early in 1952, but late summer growth was very slow, so no second cutting was harvested. Yields reported are for one cutting only.

Table X, shows the ounces of dry forage per plot and pounds per acre for the nine strains based on four plot averages. Significant forage yield differences are apparent. Three x 20 ft. plot centers were harvested June 18.

Table X. Ounces of dry forage per plot and pounds per acre for nine orchardgrass strains. 1952.

Strain	I	II	III	IV	Total Ounces	Average Ounces	Pounds /acre
Wisconsin 51	91.25	117.0 0	82.50	112.00	402.75	100.69	4568.80
Beltsville	65.00	78.75	104.00	92.25	340.00	85.00	3856.88
Virginia	73.25	79.50	91.50	89.00	333.25	83.31	3780.19
New Zealand	67.50	89.75	70.50	69.50	297.25	74.31	3371.89
Trogdon	75.25	105.25	98.75	93.00	372.25	93.06	4222.59
Akaroa	43.50	65.75	71.25	69.00	249.50	62.375	2830.27
Aber S-37 (Wales)	45.50	84.25	70.50	87.75	288.00	72.00	3267.00
Aber S-143 (Wales)	60.25	71.00	53.00	72.75	257.00	64.25	2915.34
S-143 (Mont.)	91.50	78.00	85.50	66.75	321.75	80.44	3649.97

Mean Yield 3606.86
S. E. M 263.86
L.S.D. (P= .05) 768.19
L.S.D. (P= .01) 1044.08
C. V. 7.31%

Grass and Legume Adaptation Nurseries - Irrigated

Of the five, forty-two species grass adaptation nurseries seeded in off-station locations in the spring of 1951 one has fair to good stands of nearly all species, one has fair stands of several species, one has fair stands of a few species, one has poor stands of a few species. One failed to produce stands of all species.

Two are sufficiently complete to provide information on the adaptability of the species seeded, one in Flathead and one in Lincoln County. The others can serve no further purpose. They have already demonstrated that a few species commonly used; brome, orchardgrass, alta fescue, and tall oatgrass, are easier to establish than less commonly used grasses.

The Lincoln County Agent believes that after two years growth a few less commonly used species show some promise for that area so harvesting of promising species is planned for 1953, to measure relative forage production.

Notes taken July 30, 1952, list the promising species in the order of apparent yield as follows: 1. Lincoln brome. 2. Tall oat. 3. Intermediate wheat. 4. Red top. 5. Canada wildrye. 6. Hopkins timothy.

Legume adaptation nurseries of 20-22 species were seeded in the spring of 1952 in three off-station irrigated locations. Only one of the three came up satisfactorily.

Moisture was considered adequate in all cases. Seed beds were not too firm and seed may have been placed too deep. Whatever may have been the cause of poor germination and establishment, doubtlessly reseeding will be required, and an attempt should be made to establish good stands of the several legumes in each N. W. Mont. County.

The one off-station legume nursery showing promise is located near Charlo, Montana in Lake County, on the William Eldridge farm. The planting plan follows.

Planting Plan - Three Off-Station Legume Nurseries Sent to Creston, Spring of 1952. Three replications of 3 row plots, 20 feet long, 1 foot apart.

	Plot Number in Replication		
	I	II	III
Birdsfoot Trefoil, Montana Early	1	26	52
Birdsfoot Trefoil, Empire	2	27	53
Birdsfoot Trefoil, Cascade	3	28	54
Big Trefoil	4	25	55
Medium Red Clover	5	33	51
Mammoth Red Clover	6	34	50
Clover, Ladino	7	36	46
Clover, White	8	35	45
Clover, Strawberry	9	37	49
Clover, Alsike	10	39	47
Clover, Hop	11	38	48
Milkvetch, sickle	12	21	57
Milkvetch, Cicer	13	22	56
Milkvetch, Ruby Valley	14	31	43
Alfalfa, Nomad	15	29	42
Alfalfa, Sevelra	16	32	44
Alfalfa, Ranger	17	30	41
Alfalfa, Rhizoma	18	24	58
Alfalfa, Ladak	19	23	60
Sweetclover, Common Yellow	20	40	59

Hybrid Corns for Silage

Six varieties of hybrid corn were planted in four row plots, three replications, 36 inch rows with 42 inches between hills.

Forage yields were taken September 8, 1952. The two outside rows of the plot were used for yield data. The remaining two center rows were used for grain yields. Forage weights are given in green and dry matter content. Thirty percent being used for the basis of calculation of dry matter.

Grain yields are calculated on the basis of 60 pounds of ear corn per bushel. Tables, XI, XII, XIII, XIV.

In this test all of the commercial hybrids were significantly better in forage yield than any of the breeding material, with Minn. Hybrid 802 yielding the greatest amount of forage. The grain yields were not significant in this test.

In addition to the variety tests, five Dekalb hybrids were grown under field conditions. Random samples were taken of these hybrids, and the yield calculated, which was 15 tons per acre.

There were not any of these five varieties mature enough at harvest time to warrant further study under these climatic conditions.

Table XI. Hybrid corn trials under irrigated conditions, Creston, Montana in 1952.

Date Planted, May 20, 1952. Date Harvested, Forage, Sept. 8, 195
Grain Oct. 21, 195

Name or Number	Grain Bushel Per Acre	Green Forage Tons/acre	Dry Forage Tons/acre
Bozeman Composite	36.33	8.33	2.50
Minn. Hybrid 802	58.82	20.60	6.19
Wis. Hybrid 279	57.09	15.24	4.57
(D x 49) x (538 x 2061)	60.54	16.73	5.03
(2069 x 2054) (2059 x 2061)	47.56	12.44	3.73
Wis. 275	54.49	18.63	5.59
Difference required for significance (5%)	N. S.	3.10	.9
(1%)	N. S.	4.40	1.2
Mean Yield	52.47	14.50	4.35
C. V.	10.68%	6.77%	6.77%

Table XII. Hybrid corn trials - Forage.

Date Planted, May 20, 1952. Date Harvested, Forage Sept. 8, 1952

Name or Number	Yield per plot in pounds I	II	III	Total in lbs.	Average in lbs.	Pounds /acre
Bozeman Composite	18.0	23.7	30.6	72.3	24.1	4,999
Minn. Hybrid 802	38.1	48.0	49.5	135.6	45.2	9,376
Wis. Hybrid 279	42.3	48.6	41.4	132.3	44.1	9,147
(D x 49) (538 x 2061)	40.5	54.6	50.1	145.2	48.4	10,039
(2069 x 2054) (2059 x 2061)	39.9	35.4	32.7	108.0	36.0	7,467
Wisconsin 275	45.0	57.3	59.4	161.7	53.9	11,135

Mean Yield 8,701.50
S. E. 589.10
L.S.D. (P= .05) 1856.00
L.S.D. (P= .01) 2640.5
C. V. 6.77%

Table XIII. Hybrid corn trials - Grain production

Date Planted, May 20, 1952. Date Harvested, Grain, Oct. 21, 1952

Name or Number	Yield per plot in pounds I	II	III	Total in lbs.	Average in lbs.	Pounds /acre
Bozeman Composite	10	15	17	42	14	36.33
Minn. Hybrid 802	19	23	26	68	22.67	58.82
Wis. Hybrid 279	18	23	25	66	22.00	57.09
(D x 49) x (538 x 2061)	11	29	30	70	23.33	60.54
(2069 x 2054) (2059 x 2061)	18	17	20	55	18.33	47.56
Wisconsin 275	20	21	22	63	21.00	54.49

Note: Eighty pounds per bushel used in calculating yield per acre.

Mean Yield 52.47
S. E. $\bar{x}$. 5.60
L.S.D. (P= .05) ..... N. S.
C. V. 10.68%

Table XIV. Hybrid corn trials - Green Forage

Date Planted, May 20, 1952. Date Harvested, Forage, Sept. 8, 1952

Name or Number	Yield per plot in lbs. I	II	III	Total Pounds	Average Pounds	Pounds Per Acre
Bozeman Composite	60	79	102	241	80.33	16,663
Minn. Hybrid 802	127	160	165	452	150.66	31,251
Wis. Hybrid 279	141	162	138	441	147.00	30,492
(D x 49) x (538 x 2061)	135	182	167	484	161.33	33,465
(2069 x 2054) (2059 x 2061)	133	118	109	360	120.00	24,891
Wisconsin 275	150	191	198	539	179.67	37,268

Mean Yield 29,504.98
S. E. $\bar{X}$ 1,966.40
L.S.D. (P= .05) 6,198.00
L.S.D. (P= .01) 8,811.62
C. V. 6.77%

Registered Seed Production - Irrigated

Hopkins timothy seeded in 1951 from seed secured from M.S.C. is the current registered forage seed project under irrigation.

Forage growth was heavy reaching four to five feet in height. Seed heads five inches long were not uncommon.

Shattering caused by rubbing heads together in the wind changed the method of harvesting from combining as planned to mowing and threshing after forage dried. 102 pounds clean seed was secured, according to the seed cleaning report from the Co-op Seed Growers, Charlo, Montana. There is about one-third acre in the planting.

Thirteen Hay Mixtures - Dryland

Alfalfa, six grasses, and each of the six grasses seeded with alfalfa are included in this study. These were seeded in five x 24 ft. plots, four replications, rows spaced one foot, in the spring of 1949.

Yields of alfalfa and of mixtures containing alfalfa have been surprisingly high for dryland conditions in this study. In Nov. 1952 a four inch hole was dug near the hay mixtures to a depth of 13½ feet to determine location of sub-surface moisture if any. A saturated condition was located at the 11 foot level.

Three x 20 ft plot centers are harvested for yield. Two cuttings of alfalfa and alfalfa-grass mixtures were obtained in 1952. Grasses alone produced only one cutting.

Table XV lists plot yields in ounces and four plot average yields in pounds per acre for each species or mixture.

Little actual difference exhists between yields of alfalfa alone and grass-alfalfa mixtures in this years trials. No single grass approaches the yield of alfalfa.

Table XVI shows the annual and three year average yields for each of the 13 dryland hays in pounds per acre.

Table XV. Plot yields in ounces and four plot average yields of thirteen dryland hays in pounds per acre - 1952.

Kind Or Mixture	Plot yield in ounces I	II	III	IV	Total	Average Ounces	Pounds /acre
Alfalfa	189.50	194.25	192.50	165.50	741.75	185.40	8412.50
Brome	31.75	33.25	33.25	45.75	144.00	36.00	1633.50
Brome-alfalfa	204.25	172.00	182.25	185.50	744.00	186.00	8439.75
Orchard	38.50	27.00	37.25	33.50	136.25	34.00	1542.75
Orchard-alfalfa	194.50	197.00	178.75	159.75	730.00	182.50	8280.90
Alta fescue	65.25	64.50	65.00	74.50	269.25	67.30	3053.70
Alta-alfalfa	203.25	205.00	182.00	175.25	765.50	191.40	8684.77
Crested	80.00	54.75	60.25	31.50	226.50	56.60	2568.20
Crested-alfalfa	208.25	195.25	175.25	183.50	762.25	190.50	8643.90
Canary	32.00	27.00	30.50	40.00	129.50	32.40	1470.15
Canary-alfalfa	196.25	194.25	163.75	186.25	740.50	185.10	8398.90
Timothy	39.50	29.25	41.00	29. 75	139.50	34.90	1583.59
Timothy-alfalfa	210.50	193.75	193.25	199.75	797.25	199.30	9043.20

Mean yield 5520.32
S. E. X 280.87
L.S.D. (P= .05) 805.86
L.S.D. (P= .01) 1079.93
C. V. 5.09%

Table XVI. Annual and three year average yields of thirteen Dryland hays in pounds per acre.

Kind or Mixture	Pounds per Acre 1950	1951	1952	Total	Three Year Average
Alfalfa	7354	7467	8412	23,233	7744
Smooth brome	2592	1679	1633	5,904	1968
Brome-alfalfa	6974	7180	8440	22,594	7531
Orchardgrass	3346	1373	1543	6,262	2087
Orchard-alfalfa	6367	6853	8281	21,501	7167
Alta fescue	3100	2654	3054	8,808	2936
Alta-alfalfa	6432	7492	8685	22,609	7536
Crested (Standard)	3457	2365	2568	8390	2797
Crested-Alfalfa	6962	7929	8644	23,535	7845
Reed canary	2538	1645	1470	5,653	1884
Canary-alfalfa	7189	7430	8399	23,018	7673
Hopkins timothy	3015	1202	1584	5,801	1934
Timothy-alfalfa	7115	7153	9043	23,311	7770

Fifteen Grasses for Seed - Dryland

Fifteen grass species were planted in the spring of 1949 in three row plots, 24 ft. long rows spaced three ft, four replications. Twelve of the fifteen species survived in fair stands.

Table XVII. 1952 Plot yields clean of seed in ounces per plot and four plot average yields of dryland grass seeds in pounds per acre.

Species	Plot yield in Ounces I	II	III	IV	Total Ounces	Average Ounces	Pounds /acre
Crested wheat	13.3	19.9	14.9	16.6	64.7	16.2	735.0
Russian Wild rye	.4	.4	.4	.6	1.8	.45	20.4
Intermediate wheat grass	4.1	5.3	3.0	5.1	17.5	4.4	199.6
Mountain brome	14.7	16.6	15.1	15.4*	61.8	15.4	698.8
Alta fescue	20.5	26.5	23.6	26.2	96.8	24.2	1098.0
Smooth brome	10.0	11.5	18.7	12.0	52.2	13.0	590.0
Tall oat grass	6.8	6.0	7.7	5.8	26.3	6.6	299.0
Erect brome	3.5	8.8	7.4	7.6	27.3	6.8	308.0
Bluebranch wheat	4.2	4.0	2.7	1.5	12.4	3.1	140.7
Orchard grass	5.3	4.8	6.9	4.8	21.8	5.45	247.3
Creeping red fescue	2.8	3.4	5.1	3.8*	15.1	3.8	172.0
Reed canary	1.6	2.3	2.5	1.6	8.0	2.0	90.7

* Calculated by missing plot formula.

Mean Yield 383.42
S. E. $\bar{X}$ 40.93
L.S.D.(P= .05) 117.97
L.S.D.(P= .01) 159.27
C. V. 10.67

Table XVIIa shows three year average dryland grass seed yields for twelve species and annual yields for the three years. 1951 yields of some species are dissapointing when compared to 1950 yields. Fifty pounds nitrogen (150# Amon. Nitrate) per acre was used on these plots this spring to (4-24-52) attempt to reverse this downward trend.

Table XVIIa. Annual and three year average yields of dryland grass seeds in pounds per acre.

Species	1950	1951	1952	Total	Average
Crested	1135	486	735	2356	785
Russian wild rye	138	131	20	289	96
Intermediate wheat	469	399	200	1068	356
Mountain brome	418	256	699	1373	458
Alta fescue	498	643	1098	2239	746
Smooth brome	765	407	590	1762	587
Tall oatgrass	408	370	299	1077	359
Erect brome	712	383	308	1403	468
Bluebranch wheat	203	113	141	457	152
Orchardgrass	236	121	247	604	201
Creeping red fescue	200	229	172	601	200
Reed canary	36	93	91	220	73

Annual Hays - Dryland

Oats alone, and with field peas and with vetch are seeded on dryland for hay each year. Plots are usually 14 ft. x 100 ft., each mixture replicated three times. Samples are taken and dried for weighing and yield determination.

Table XVIII shows plot yields in pounds dry forage from 300 square feet of each plot and three plot average yields in pounds per acre.

Table XVIII. Data from annual forage study under dryland conditions, Creston, Montana, 1952. Plots yields based on 300 square feet and calculated from dry weights.

Crop or Mixture	Plot yield in pounds I	II	III	Total Pounds	Average Pounds	Yield in #/acre
Oats	12.1	13.6	12.8	38.5	12.83	1863
Oats and peas	15.2	19.2	20.2	54.6	18.2	2643*
Oats and Vetch	14.1	13.4	16.5	44.0	14.66	2129*

*Forages yielding more than oats.

Mean yield 2211.4
S. E. $\bar{X}$ 128.2
L.S.D.(P= .05) 50.38
C. V. 5.80%

Annual Hays - Dryland

Table XIX shows annual yields and three year average yields in tons per acre.

Table XIX. Annual and three year average yields of dryland annual hays in tons per acre.

Crop or Mixture	1950	1951	1952	Total tons	Average tons
Oats	1.97	2.24	.93	5.14	1.71
Oats and Vetch	1.74	1.78	1.32	4.84	1.61
Oats and Peas	1.79	1.70	1.06	4.55	1.52

Adaptation Nurseries - Dryland

Neither of the three 42 species grass nurseries seeded off-station on dryland became sufficiently well established to be of value in determining the comparable value of the species for forage production in the area.

On June 3, 1952, six grass species were seeded in 5x 25 ft plots, four replications, rows spaced one foot in Lincoln County, in Warren Koebel's meadow which produces largely rushes and sedges. If comparable stands are secured, comparable yield data will be secured under these conditions.

Nine alfalfa varieties including creeping types were seeded on the station, May 5, 1952. Fair to quite good stands were secured in all replications. The planting plan for this study follows.

Planting Plan - Dryland Creeping Alfalfas, Creston, 1952.
Four row plots, 20' long, 1' between rows,
2' between plots.

Variety	Mont. No.	Plot number in replication I	II	III	IV
Nomad	271	1	12	26	28
Rhizoma	228	2	11	24	30
Ladak (check)	147	3	10	27	34
Sevelna	263	4	17	23	31
A-224		5	14	20	33
Ranger (check)	116	6	13	25	36
637-C37	168	7	16	19	29
Buffalo (check)	99	8	18	21	35
A-169	169	9	15	22	32

Replications 1 and 2, alfalfa alone at rate of 6 lbs. per acre.

Replications 3 and 4, alfalfa 2 lbs per acre and crested wheatgrass 8 lbs. per acre.

Registered Seed Production Dryland

Seven and one-half acres of alta fescue for registered seed production was seeded in the spring of 1949, using two pounds of seed per acre in rows spaced 35 inches. This field has been cultivated and rogued each year to maintain a pure stand.

Yields of clean seed for each year are as follows:

1950	2057 pounds
1951	2290 pounds
1952	2126 pounds

SPRING GRAIN IMPROVEMENT
Spring wheat (Irrigated)

A Total of six spring wheat nurseries were seeded in the spring of 1952. Two of these were located on the station at Creston, and four were located off-station. The off-station nurseries were located in Sanders County (Lonepine, not harvested), Lincoln County (Eureka), Lake County (Charlo), and Missoula County (Potomac).

The advance yield and western regional nurseries were grown on the station. The mean yield for the advance yield nursery was 50.58 bushel per acre. There was no significant difference when this test was analysised statistically. Considerable leaf rust was noted in this nursery. Table XX. The mean yield for the western regional white wheat nursery was 61.21 bushel per acre. Using Onas as a check, White Federation 38, Dart 46, and Thatcher were significantly less in yield. Considerable stem and leaf rust were noted. Table XXI.

The off-station nurseries contained nine varieties three of which were white wheat and six hard red spring wheats. Considerable damage was done by deer in the nursery at Potomac in Missoula County. Table XXII. Yields were outstanding in the nursery in Lincoln County, with a mean yield of 52.44. Eighty-five percent of this nursery lodged. A great amount of mildew and leaf rust were noted on most of the varieties. Table XXIII.

Table XXIV shows the results of test at Charlo, Lake County. In this test, three white and two hard red spring wheats were significantly better then Thatcher.

Table XXV gives the average of all trials under irrigation in 1952. Named Onas ranks number one followed by Onas, Lemhi, and Pilot respectively.

Data for the period 1949-1952 is shown in Table XXVI. For thirteen station years Pilot has produced more than any of the hard red spring wheats. Onas was highest yielding white wheat for the same period.

Table XX. Agronomic data from spring wheat advanced yield nursery grown under irrigated conditions, three replications, Creston, Montana, in 1952.

Date of seeding 5-8-52 Date of emergence 5-15-52 Size of plots 16 feet

Variety or Cross	C. I. or N No.	First Headed date	Plant Height (ins.)	Leaf Rust %	Stem Rust	Lodging %	Test wt.	Yield Per plot, bu/a I	II	III	Total	Average Bushels /a
1764 x Rescue	B49-90	7-16	49	9	-	-	62	46.1	54.6	44.7	145.4	48.47
1552 x Mida	12746	7-8	51	1	-	-	61	44.7	51.7	43.2	139.6	46.53
1750 x Rescue	B50-120	7-10	52	53	-	-	62	38.3	40.4	60.2	138.9	46.30
Rescue	12435	7-10	48	40	1t*	-	62	50.3	50.3	52.4	153.0	51.00
1750 x 1753 (N2256)	12975	7-9	47	2	-	-	63	46.1	58.1	66.6	170.8	56.93
Thatcher	10003	7-8	45	50	-	-	61	39.7	57.4	47.5	144.6	48.20
Ceres	6900	7-9	51	22	-	-	63	49.6	60.2	41.1	150.9	50.30
Thatcher x S615	H-4258	7-9	50	50	-	-	62	39.7	49.6	41.1	130.4	43.47
Rushmore	12273	7-7	46	-	-	1%	62	46.1	70.2	53.1	169.4	56.47
Supreme	8026	7-7	51	38	1t*	5%	61	39.0	63.1	41.8	143.9	47.97
Pilot	11945	7-9	47	8	-	-	62	50.3	60.9	52.4	163.6	54.53
1750 x Rescue	B49-102	7-11	48	7	-	-	63	48.2	40.4	60.2	148.8	49.60
Lee	12488	7-4	47	10	-	-	61	51.7	58.9	53.9	164.5	54.83
1764 x Henry (N2211)	12733	7-3	46	-	-	-	62	35.4	56.7	48.9	141.0	47.00
Mida	12008	7-7	52	22	-	-	62	46.1	60.9	54.6	161.6	53.87
Pilot x Thatcher N2170	12974	7-9	49	7	-	-	62	41.8	70.9	48.9	161.6	53.87

Note: The analysis of variance indicates no significant yield difference.
* It indicates very light rust.

Mean yield 50.58
S. E. $\bar{X}$ 4.23
L.S.D. (P= .05).....N. S.
C. V..... 8.36%

Table XXI. Agronomic data from western regional white wheat yield nurseries of three replications under irrigated conditions, Creston, Montana, in 1952.

Date of seeding 7-12-52 Date of emergence 5-19-52 Size of plot 16 feet

Variety or Cross	C. I. or N No.	First Headed date	Plant Height (ins.)	Leaf Rust %	Stem Rust	Lodging %	Test wt.	Yield Per plot, bu/a I	II	III	Total	Average Bushels /a
Marfed	11919	7-16	46	62	x	-	62	65.2	56.7	64.5	186.4	62.1
Onas	6221	7-18	45	83	x	-	61	65.2	68.0	68.0	201.2	67.1
White Fed 38	11906	7-8	43	53	x	-	60	55.3	53.1	51.0	159.4	53.1*
Baart	1697	7-15	52	80	-	30	63	61.7	68.0	58.9	188.6	62.9
Lemhi	11415	7-14	48	72	x	-	62	68.0	65.2	73.0	206.2	68.7
Hope x Lemhi^4	12685	7-14	47	52	x	-	61	73.0	61.7	65.2	199.9	66.6
Henry	12265	7-12	48	42	-	-	60	56.7	58.9	73.7	189.3	63.1
Idaed	11706	7-5	45	57	x	-	61	64.5	68.0	51.7	184.2	61.4
Federation	4734	7-19	48	82	x	-	61	67.3	49.6	62.4	179.3	59.8
Baart 46	12386	7-15	53	82	-	35	62	56.0	50.3	54.6	160.9	53.6*
Awned Onas	12235	7-16	46	77	x	-	61	60.2	61.7	63.8	185.7	61.9
Thatcher	10003	7-10	45	37	-	-	61	56.0	49.6	56.7	162.3	54.1*

Note: Onas is considered the check variety for this nursery.
* Varieties yielding significantly less than Onas.
x Stem rust present.

Mean yield.....61.21
S. E. $\bar{x}$..... 2.91
L.S.D. (P= .05)..... 8.51
C. V..... 4.75%

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

Date Planted 5-20-52 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield per plot, bu/a I	II	III	IV	Total	Average bushels /a
Awned Onas	12235	9.9	24.8	26.9	17.0	78.6	19.65
1764 x Henry (N2211)	12733	12.8	16.8[1]	19.8	23.4	72.8	18.20
Ceres	6900	17.0	22.7	15.5	32.6	87.8	21.95*
Rescue	12435	2.8	8.5	20.6	21.3	53.2	13.30
Lemhi	11415	4.3	3.85	5.7	5.7	19.2	4.80
Lee	12488	12.0	17.0	27.6	25.5	82.1	20.53*
Thatcher	10003	5.7	9.2	17.7	19.1	51.7	12.93
Onas	6221	3.5	8.5	10.8[1]	7.8	30.6	7.65
Pilot	11945	20.8	17.7	24.8	25.5	88.8	22.20**

* Varieties yielding significantly more than Thatcher (5%).
** Varieties yielding significantly more than Thatcher (1%).
1 Calculated by missing plot formula.
Note: Thatcher is considered the check in this nursery.

Mean Yield.....15.69
S. E. $\bar{X}$..... 2.31
L.S.D. (P= .05)..... 6.76
L.S.D. (P= .01)..... 9.21
C. V. 14.72%

Table XXIII. Yield data from Spring wheat nursery grown under irrigated conditions in Lincoln County. Single row plots four replication on Wilfred Johnson ranch, Eureka, Montana.

Date Planted 5-14-52 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield per plot, bushel per acre I	II	III	IV	Total	Average Bushels Per acre
Lee	12488	41.1	45.4	58.9	40.4	185.8	46.45
Lemhi	11415	26.2	65.9	64.5	49.6	206.2	51.55
Thatcher	10003	38.3	43.9	43.9	48.2	174.3	43.58
Ceres	6900	53.9	65.2	65.9	59.5	244.5	61.13*
N1764 x Henry (N2211)	12733	73.7	56.7	60.9	49.6	240.9	60.22*
Aumed Onas	12235	65.2	59.5	60.2	50.3	235.2	58.80*
Rescue	12435	41.8	39.7	44.7	47.5	173.7	43.42
Onas	6221	61.7	59.5	49.6	55.3	226.1	56.53*
Pilot	11945	50.3	54.6	54.6	41.8	201.3	50.32

Note: Thatcher is considered check in this nursery.
* Varieties yielding significantly more than Thatcher.

Mean Yield 52.44
S. E. $\bar{x}$. 4.27
L.S.D. (P= .05) 12.43
C. V. 8.13%

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

Date Planted 5-9-52 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield per plot, bu/a I	II	III	IV	Total	Average Bushels /a
Lee	12488	14.8	20.6	24.8	22.0	82.2	20.55
Lemhi	11415	26.6	31.2	27.6	27.6	113.0	28.25**
Thatcher	10003	17.7	21.3	24.8	15.5	79.3	19.83
Ceres	6900	18.4	28.3	26.9	17.7	91.3	22.82
1764 x Henry (N2211)	12733	25.5	22.7	26.2	22.0	96.4	24.10
Awned Onas	12235	26.9	26.9	23.4	29.8	107.0	26.75**
Rescue	12435	22.0	26.9	36.9	25.5	111.3	27.83**
Onas	6221	21.3	26.9	28.3	27.6	104.1	26.03*
Pilot	11945	24.8	24.1	29.1	26.9	104.9	26.23*

* Varieties yielding significantly more than Thatcher (5%).
** Varieties yielding significantly more than Thatcher (1%).
Note: Thatcher is considered the check in this nursery.

Mean Yield.....24.71
S. E. %..... 1.64
L.S.D. (P= .05)..... 4.79
L.S.D. (P= .01)..... 6.51
C. V. 6.66%

Table XXV. Summary of nine varieties of wheat in Northwest Montana under irrigated conditions in 1952.

Variety or Cross	Station or Location				Average	Rank
	Creston	Charlo	Potomac	Eureka	Bu/acre	
Lee	54.83	20.55	20.53	46.45	35.58	7
Lemhi[1]	68.70	28.25	4.80	51.55	38.33	4
Thatcher	48.20	19.83	12.93	43.58	31.14	9
Ceres	50.30	22.82	21.95	61.13	39.05	3
1764 x Henry (H2211)	47.00	24.10	18.20	60.22	37.38	6
Awned Onas[1]	61.90	26.75	19.65	58.80	41.75	1
Rescue	51.00	27.83	13.30	43.42	33.89	8
Onas[1]	67.10	26.03	7.65	56.53	39.33	2
Pilot	54.53	26.23	22.20	50.32	38.32	5

[1]White wheats.

ble XXVI. Spring wheat data, selected varieties, of varietal work done in Northwest Montana, 1949-1952. (Irrigated Experiments).

Variety or Cross	Creston 1949-1952 4 yr. Av.	Lincoln Co. 1949, 51, 52 3 yr. Av.	Ravalli Co. 1950-51 2 yr. Av.	Lake Co. 1950-52 3 yr. Av.	Missoula Co. 1952 1 year	Average	Rank	Station Years
atcher	49.1	32.7	41.8	30.9	12.9	33.4	7	13
llot	48.9	35.4	46.3	28.9	22.2	36.6	3	13
res	44.7	38.5	45.0	22.0	22.0	30.0	10	13
e	50.3*	46.5***	——	20.6***	20.5	34.4	5	6
764 x Henry (N2211)	59.9**	60.2***	——	24.1***	18.2	40.8	2	5
uprene	42.6*	22.9***	——	——	——	32.7	8	4
ward	40.2*	16.3***	——	——	——	28.2	11	4
scue	48.4**	38.1**	44.7	26.7	13.3	34.2	6	10
nas[1]	54.3	39.3	52.3	27.7	7.7	36.3	3	13
med Onas[1]	63.0*	48.3**	48.8	26.0	19.7	41.2	1	11
arquis	38.7**	20.1**	38.8***	25.7***	——	30.8	9	5
mhi[1]	34.4	37.2	58.8	22.7	4.8	35.6	4	13

hite wheat.

Three year average only.
* Two year average only.
** One year only.

SPRING GRAIN IMPROVEMENT
Oats (Irrigated)

Five irrigated oat nurseries were seeded in the spring of 1952, during the month of May. A twenty variety nursery was grown on the station at Creston. The off-station nursery seeded in Lake County contained nine varieties and the nurseries seeded in Lincoln, Missoula, and Sanders Counties were ten variety plantings.

The mean yield of the station nursery was 132.84 bushels per acre. Using Bridger, Mission and Gopher as checks, Cody was the only variety that was significantly better in yield. Table XXVII.

The mean yield of the nursery in Lake County on the Eldridge farm was 74.31 bushel per acre. With Mission as a check variety, Clinton x Overland^2 C. I. 6611, Bridger and Bannock were significantly better in yield. Table XXVIII.

Deer damage in the nursery at Potomac in Missoula County, reduced the yield and makes this test not very reliable. Table XXIX.

Lodging in the range of 90 to 100 percent was found in the nursery in Lincoln County, near Eureka. The mean yield was 102.20 bushel per acre. Mildew and leaf spot were noted to be present in much of the nursery. Table XXX.

Table XXXI gives the yield of ten varieties for work done in 1952 in Northwest Montana. The average of seven to fourteen station years ranks Canada Hybrid as number one for yields followed by Bridger, Bannock and Overland respectively. Table XXXII.

Table XXVII. Agronomic data from irrigated oat nursery, Creston, Montana in 1952, three row plots three replication.

Date Planted 5-7-52 Size of plot 16 feet

Variety or Grass	C. I. or H No.	Heading Date	Heading Height	Test wt.	Yield per plot in ounces I	II	III	Total Ounces	Average Bushels /a
Cody	3916	7-12	44	42	29.75	27.75	30.00	87.50	155.16*
V-R x Bannock	4283	7-7	43	42	31.25	24.25	24.25	79.75	141.42
Markton - Rainbow x Mission	43-2-25	7-8	46	42	25.25	22.50	15.75	63.50	112.60
Mission	2588	7-7	52	41	24.00	27.25	21.50	72.50	129.01
Maganskii 044	4515	7-3	59	42	27.75	28.50	22.75	79.00	140.09
Bannock	2592	7-12	52	41	33.00	25.00	26.75	84.75	150.28
Canada Hybrid	2795-11-5	7-7	47	41	26.00	27.00	22.25	75.25	133.44
Aberystwyth 584	3549	7-18	49	42	26.50	26.25	23.00	75.75	134.33
Gopher x Bridger	44-5-3-13	7-5	45	43	23.50	14.75	19.00	57.25	101.52
Exeter	4158	7-12	46	42	26.46[1]	21.75	25.75	73.96	131.15
Bridger	2611	7-13	56	42	23.50	24.00	24.75	72.25	128.12
Clinton x Overland[2]	6611	7-12	43	42	25.75	24.50	22.50	72.75	129.01
Clinton x Overland[2]	AB 5989	7-10	47	42	28.25	26.00	28.25	82.50	146.30
Clinton x Overland[2]	AB 6014	7-11	46	42	32.50	26.00	23.00	81.50	144.52
Clinton x Overland[2]	AB 6016	7-11	47	41	21.50	20.50	22.50	64.50	114.38
C. I. 4189 x Overland	5347	7-9	47	41	28.00	24.25	21.25	73.50	130.34
Gopher	2027	7-5	46	41	25.50	26.50	23.00	75.00	133.00
Golden Rain	4512	7-13	53	43	25.25	24.75	30.50	80.50	142.75
Beaver	4521	7-10	51	40	26.00	22.00	21.50	69.50	123.24
Shelby	4372	7-6	48	42	25.75	26.00	24.75	76.50	135.66

[1] Calculated missing plot formula

* Varieties yielding significantly more than the average of three recommended varieties (5%).

Mean Yield.....132.84

S. E. $\bar{x}$..... 78.62

L.S.D. (P=.05)..... 22.55

L.S.D. (P=.01)..... 30.27

C.V..... 5.92%

Table XXVIII. Yield data from Oat nursery grown under irrigated conditions in Lake, County, Montana in 1952, on William Kidridge farm, Charlo, Montana.

Date Planted 5-9-52 Size of plot 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Gopher	2027	71.82	71.82	83.79	69.16	296.59	74.15
Zephyr	4800	70.49	70.49	70.49	78.47	289.94	72.49
V-R x Bannock	4283	67.83	55.86	83.79	70.49	277.97	69.49
Bannock	2592	62.51	67.83	87.78	88.12	306.24	76.56*
Mission	2588	73.15	58.52	82.46	67.83	281.96	70.49
Bridger	2611	82.46	73.15	85.12	98.42	339.15	84.79**
Clinton x Overland^2	6611	70.49	67.83	66.50	102.74	307.56	76.89**
Clinton x Overland^2	AB6016	66.50	83.79	62.51	63.84	276.64	69.16
Canada Hybrid	2795-11-5	74.48	70.49	81.13	73.15	299.25	74.81

Note: Mission is considered the check variety in this nursery.
* Varieties yielding significantly more than Mission (5%).
** Varieties yielding significantly more than Mission (1%).

Mean Yield 74.31
S. E. M 1.54
L.S.D. (P= .05)..... 4.49
L.S.D. (P= .01)..... 6.10
C. V. 2.07%

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Table XXIX. Yield Data from Oat Nursery grown under irrigated conditions in Missoula, County, Montana in 1952, on Hays farm, Potomac, Montana.

Date Planted 5-20-52 Size of plot 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Gopher	2027	11.97	22.61	23.94	21.28	79.80	19.95
Bridger	2611	21.28	29.26	37.24	47.88	135.66	33.91
Cody	3916	22.61	27.93	39.90	38.57	129.01	32.25
Clinton x Overland[2]	6611	21.28	23.94	33.25	14.63	93.10	23.28
V-R x Bannock	4283	22.61	23.94	26.60	26.60	99.75	24.94
Mission	2588	23.94	21.28	27.93	31.92	105.07	26.27
Canada Hybrid	2795-11-5	30.59	35.41	41.23	27.93	135.16	33.79
Bannock	2592	32.83[1]	27.93	43.59	47.88	152.23	38.06**
Shelby	4372	18.63	15.95	27.93	21.28	83.79	20.95
Overland	4181	23.94	33.25	25.27	31.92	114.38	28.60

Note: Mission considered the check variety for this nursery.
1 Calculated using the missing plot formula.
** Varieties yielding significantly more than Mission (1%).

Mean Yield..... 28.20
S. E. $\bar{x}$..... 2.86
L.S.D.(P= .05)..... 8.33
L.S.D.(P= .01)..... 11.24
C. V. 10.14%

Table XXX. Yield Data from Oat Nursery grown under irrigated conditions in Lincoln, County, Montana in 1952 on, Wilford Johnson farm, Eureka, Montana.

Date Planted 5-14-52 Size of plot, 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bushels per acre I	II	III	IV	Total	Average Bushels Per Acre
Gopher	2027	122.36	93.10	106.40	82.46	404.32	101.08*
Bridger	2611	98.42	109.06	115.71	102.74	426.93	106.73*
Cody	3916	90.44	106.40	101.08	114.38	412.30	103.08*
Clinton x Overland[2]	6611	111.72	102.41	111.72	83.79	409.64	102.41*
V-R x Bannock	4283	122.36	111.72**	110.39	102.41	446.88	111.72*
Mission	2588	93.10	89.11	75.18	69.16	327.18	81.80
Canada Hybrid	2795-11-5	99.75	118.37	131.67	91.77	440.23	110.06*
Bannock	2592	121.03	97.09	114.38	121.03	453.53	113.38*
Shelby	4372	89.11	85.12	101.08	82.46	357.77	89.44
Overland	4181	95.76	110.39	91.77	113.05	410.97	102.74*

Note: Mission is the check variety for this nursery.
* Varieties yielding significantly more than Mission.
** Calculated missing plot formula.

Mean Yield 102.20
S. E. $\bar{x}$ 6.006
L.S.D. (P= .05) 17.44
C. V. 5.88%

Table 1. Yields of the varieties or crosses in northwest Montana under irrigation in 1952.

Variety or Cross	C. I. Number	Station or Location				Average Bushel /acre	Rank
		Creston	Charlo	Potomac	Eureka		
Gopher	2027	133.00	74.15	19.95	101.08	82.04	7
Bridger	2611	128.12	84.79	33.91	106.73	88.39	4
Cody	3916	155.16	——	32.25	103.08	96.83	2
Clinton x Overland	6611	129.01	76.89	23.28	102.41	82.90	6
V-R x Bannock	4283	141.42	——	24.94	111.72	92.69	3
Mission	2588	129.01	——	26.27	81.80	79.03	9
Canada Hybrid	2795-11-5	133.44	74.81	33.79	110.06	88.03	5
Bannock	2592	150.28	——	38.06	113.38	100.57	1
Shelby	4372	135.66	——	20.95	89.44	82.02	8
Overland	4181	——	——	28.60	102.74	65.67	10

Table XXXII. Oat data, selected varieties, of varietal work done in Northwestern Montana, 1949-1952. (Irrigated Experiments).

Variety or Cross	C. I. or H No.	Creston 1949-52 4 yr. Av.	Lincoln Co. 1949-1952 2 yr. Av.	Lake Co. 1949-52 4 yr. Av.	Sanders Co. 1949 1 year	Ravalli Co. 1950-51 2 yr. Av.	Missoula Co. 1952 1 year	Average	Rank	Station Years
y	3916	147.52[2]	103.08[1]	——	——	——	32.25	94.28[4]	——	4
x Bannock	4283	112.59	70.71	76.9	29.7	102.15	24.94	65.04	8	14
sion	2588	100.07	81.80[1]	64.5	40.8	87.85	26.27	66.88	6	13
nock	2592	121.70	72.44	79.9	49.2	96.90	38.06	76.37	3	14
ada Hybrid	2795-11-5	130.78[2]	110.06[1]	71.15[2]	——	90.80[1]	33.79	87.32	1	7
her	2027	105.28	62.49	71.18	45.70	87.50	19.95	65.35	7	14
nton x Overland[2]	6611	115.60	71.60	75.18	39.50	98.16	23.28	70.57	5	14
den Rain	4512	137.87[2]	——	——	——	——	——	137.84[4]	——	2
rland	4181	103.45[3]	64.22	82.50[2]	25.70	103.30[1]	28.60	72.46	4	10
lly	4372	135.66[1]	89.44[1]	——	——	——	20.95	82.01[4]	——	3
dger	2611	115.67	103.46	81.38	45.20	96.95	33.91	79.42	2	14
nton x Overland	AB6014	147.63[2]	——	——	——	——	——	147.63[4]		2

e year average.
o year average.
ree year average.
t included in rank column.

SPRING GRAIN IMPROVEMENT
Barley (Irrigated)

Five irrigated barley nurseries were seeded in May of 1952. A twenty-four variety nursery was grown on the station at Creston. The off-station nurseries contained nine varieties. These were seeded in Lincoln, Missoula, Lake, and Sanders Counties. The nursery in Sanders County was not harvested because of a poor stand.

The mean yield of the station nursery was 93.98 bushels per acre. Using Titan as a check several varieties were significantly greater in yield. However none of the recommended varieties were included in this group. Table XXXIII.

Table XXXIV shows the yield data of the nursery grown in Lake County, near Charlo, with a mean yield of 49.57 bushels per acre. Harlan was the only variety significantly better t an Titan in this test.

The mean yield of the nursery in Missoula County at Potomac was 45.47 bushels per acre. With Titan as a check Canada Hybrid, and Plush were significantly better in yield at five percent whereas, Velvon 11, Harlan, and B. C. 4-15 were significantly better at the one percent level. Table XXXV.

There was considerable lodging rangeing from 80 to 100 percent of all varieties in the nursery in Lincoln County. The mean yield of the nursery was 109.04 bushels per acre. Canada Hybrid, Plush and B. C. 4-15 were significantly higher in yield at the one percent level when compared with Titan. Table XXXVI.

Table XXXVII gives the yield of nine varieties grown in Northwestern Montana nurseries in 1952. The average of the varieties grown in Northwest Montana was for nine to 15 station years ranks, B. C. 4-15 number one, and Canada Hybrid number two. For the fifteen station year period Canada Hybrid is number one. Table XXXVIII.

Table XXIII Agronomic data from irrigated barley nursery, Crookston, Minnesota, 1952. Triplicate three row plots in triple-lattice design.

Date Planted 5-8-52 Size of plot 16 feet

Variety or Cross	C. I. or N No.	Heading Date	Heading Height Inches	Loose Smut L-M-H	Lodging %	Test wt.	Plot yield in ounces I	II	III	Total Ounces	Average Bushels /acre
Harlan	7008	7-2	44	-	68.3	49	33.75	34.00	35.00	102.75	121.42**
Plush	6095	7-4	43	L	10.0	50	22.00	22.00	18.00	62.00	73.26
Canada Hybrid	3951-1356	7-3	43	-	20.0	50	21.50	26.25	29.75	77.50	91.58
Gem	7243	6-30	40	M	20.0	48	22.50	23.50	28.25	74.25	87.74
Titan	7055	6-29	41	L	-	50	19.75	24.00	25.25	69.00	81.53
Compana	5438	7-3	35	-	35.0	50	18.75	20.75	24.50	64.00	75.63
Velvon 1-17	8058	7-4	41	H	61.7	47	20.75	25.25	26.25	72.25	85.37
W. S. 471	8055	6-30	37	-	41.7	48	24.75	27.00	26.00	77.75	91.87
Guster	8053	6-29	41	L	20.0	47	28.00	25.75	26.75	80.50	95.12
B.C. 120-78-10	8059	7-2	38	M	16.7	48	34.50	30.75	33.50	98.75	116.69**
B.C. 4-15	7558	7-7	45	-	78.3	48	30.75	23.50	30.25	84.50	99.85*
Bonneville	7248	7-7	41	-	20.0	48	33.25	33.75	31.00	98.00	115.80**
Velvon 11	7088	7-3	43	H	76.7	47	29.00	29.50	31.00	89.50	105.76**
Danish	E.Mont.	7-5	37	-	10.0	54	26.00	26.00	21.75	73.75	87.15
Freya	7130	7-3	38	-	10.0	54	31.00	24.25	32.00	87.25	103.10*
Ymer	7275	7-4	39	-	45.0	53	33.00	23.75	25.75	82.50	97.49
Otis	7557	6-25	35	M	51.7	54	28.50	26.25	23.00	77.75	91.87
W.S. 480	8104	7-6	41	-	56.7	50	32.25	24.50	27.25	84.00	99.26*
Frontier	7155	7-7	39	-	21.7	51	32.25	26.00	22.00	80.25	94.83
Moore	7251	7-4	48	-	-	50	28.00	22.75	19.00	69.75	82.42
Trebi	936	6-29	39	-	88.3	48	30.25	27.50	29.50	87.25	103.10*
Vantage	7324	6-30	47	-	23.3	52	32.00	25.25	26.75	84.00	99.26*
Glacier x Compana	47-7405-IV	6-30	40	H	-	45	25.25	21.50	22.25	69.00	81.53
Glacier x Compana	47-7405-V	7-3	45	M	-	45	22.25	19.75	20.75	62.75	74.5

* Varieties yielding significantly more than Titan (5%).
** Varieties yielding significantly more than Titan (1%).

Mean Yield 93.98
S. E. $\bar{X}$ 6.02
L.S.D. (P= .05) 17.08
L.S.D. (P= .01) 22.90
C. V. 6.40%

Table XXXIV. Yield data from Spring Barley Nursery grown under irrigated conditions in Lake, County, Montana in 1952, on William Eldridge farm Charlo, Montana.

Date Planted 5-9-1952

Size of plot 16 feet

Variety or Cross	C. I. or H Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Compana	5438	46.1	39.9	42.5	26.6	155.1	38.78
Titan	7055	52.3	55.8	41.7	24.9	174.7	43.68
Frontier	7155	44.3	48.7	49.6	45.2	187.8	46.95
Plush	6095	57.6	54.9	53.2	47.0	212.7	53.18
Canada Hybrid	3951-1356	57.6	38.1	48.7	62.9	207.3	51.82
Velvon 11	7088	44.3	58.4	51.4	51.4	205.5	51.38
Gem	7243	45.2	54.1	44.3	43.4	187.0	46.75
Harlan	7008	55.8	61.1	59.4	61.1	237.4	59.35*
B. C. 4-15	7558	55.8	58.4	41.7	61.1	217.0	54.25

* Varieties yielding significantly more than Titan. (5%).

Mean Yield.....49.57
S. E. $\bar{x}$..... 3.94
L.S.D.(P= .05).....11.48
C. V. 7.95%

Table XXXV. Yield data from spring barley nursery grown under irrigated conditions in Missoula County Montana in 1952 on Hays farm Potomac, Montana.

Date Planted 5-20-52 Size of plot 16 feet

Variety or Cross	C. I. or H Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Compana	5438	25.7	23.0	40.8	32.8	122.3	30.58
Titan	7055	21.3	34.6	43.4	49.6	148.9	37.23
Frontier	7155	37.2	31.9	49.6	39.9	158.6	39.65
Plush	6095	38.1	41.7	60.3	55.8	195.9	48.98*
Canada Hybrid	3951-1356	42.5	39.9	47.9	61.1	191.4	47.85*
Velvon 11	7088	46.1	47.0	57.6	69.1	219.8	54.95**
Gem	7243	37.2	43.4	45.2	53.2	179.0	44.75
Harlan	7008	39.9	46.1	54.9	62.9	203.8	50.95**
B. C. 4-15	7558	43.4	34.6	60.3	78.9	217.2	54.30**

* Varieties yielding significantly more than Titan (5%)
** Varieties yielding significantly more than Titan (1%)

Mean Yield.....45.47
S. E. $\bar{X}$ 3.04
L.S.D. (P= .05)..... 8.84
L.S.D. (P= .01).....12.01
C. V. 6.68%

Table XXXVI. Yield data from spring barley nursery grown under irrigated conditions in Lincoln, County Montana in 1952 on Wilfred Johnson farm, Eureka, Montana.

Date Planted 5-14-52 Size of plot. 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Compana	5438	48.7	58.4	56.6	46.9	210.6	52.65
Titan	7055	130.1	97.4	72.6	92.9	393.0	98.25
Frontier	7155	97.4	102.7	110.5	100.0	410.0	102.50
Plush	6095	116.8	144.3	115.1	131.0	507.2	126.80**
Canada Hybrid	3951-1356	122.1	143.4	133.7	129.2	528.4	132.10**
Velvon 11	7088	127.4	123.0	115.1	120.3	485.8	121.45*
Gem	7243	108.9	116.8	104.4	91.1	421.2	105.30
Harlan	7008	122.1	97.4	121.4	129.2	470.1	117.53*
B. C. 4-15	7558	121.3	123.0	116.8	131.9	493.0	123.25**

* Varieties yielding significantly more than Titan (5%)
** Varieties yielding significantly more than Titan (1%)

Mean Yield.....109.04
S. E. $\bar{X}$ 6.14
L.S.D. (P= .05) 17.87
L.S.D. (P= .01) 24.28
C. V. 5.63

Table XXXVII. Summary of nine varieties of barley in Northwest Montana under irrigation in 1952.

Variety or Cross	C. I. or H No.	Station or Location Creston	Charlo	Potomac	Eureka	Average Bushel Per Acre	Rank
Compana	5438	75.63	38.78	30.58	52.65	49.41	9
Titan	7055	81.53	43.68	37.23	98.25	65.17	8
Frontier	7155	94.83	46.95	39.65	102.50	70.98	7
Flush	6095	73.26	53.18	48.98	126.80	75.56	5
Canada Hybrid	3951-1356	91.58	51.82	47.85	132.10	80.83	4
Velvon 11	7088	105.76	51.38	54.95	121.45	83.39	2
Gem	7243	87.74	46.75	44.75	105.30	71.13	6
Harlan	7008	121.42	59.35	50.95	117.53	87.31	1
B. C. 4-15	7558	99.85	54.25	54.30	123.25	82.91	3

Table LIX. Barley data, selected varieties, of work done in Northwestern Montana, 1949-52 under dryland conditions.

Variety or Cross	C. I. or N No.	Creston 1949-52 4 yr. av.	Lincln County 1949-50, 52 3 yr. av.	Sanders County 1949-50, 52 3 year av.	Flathead County* 1950 1 year	Average	Rank	Station Years
Gem	7243	75.2	15.4	28.1	20.7	34.9	2	11
Glacier	6976	79.5	11.6[2]	23.5[2]	22.7	34.3	3	9
Titan	7055	65.3	16.2	26.2	20.4	32.0	6	11
Canada Hybrid	3951-1356	72.5	15.0	29.5	23.9	35.2	1	11
Plush	6095	66.7	12.6	29.9	17.1	31.6	8	11
Velvon 11	7088	69.4[3]	16.1	26.2	21.3	33.3	5	10
Compana	5438	65.1	16.0	23.0	23.6	31.9	7	11
B. C. 4-15	7558	82.3[3]	12.6[1]	27.3[1]	——	40.7[4]	-	5
Frontier	7155	71.0[2]	11.6	21.9	32.2	34.2	4	9
Harlan	7008	92.5[2]	17.1[1]	28.7[1]	——	46.1[4]	-	4

*Off Station
[1]One year average.
[2]Two year average.
[3]Three year average.
[4]Not included in the rank column.

Table XXXVIII. Barley data, selected varieties, of varietal work done in Northwestern Montana, 1949-1952, irrigated experiments.

Variety or Cross	C. I. or H No.	Creston 1949-52 4 yr. Av.	Lake Co. 1949-52 4 yr. Av.	Lincoln Co. 1949, 51-52 3 yr. Av.	Sanders Co. 1949 1 year	Ravalli Co. 1950-51 2 yr. Av.	Missoula Co. 1952 1 year	Average	Rank	Station Years
Compana	5438	63.8	47.6	38.1	51.1	70.7	30.6	50.3	9	15
Titan	7055	67.3	60.1	55.6	46.4	85.7	37.2	58.7	7	15
Canada Hybrid	3951-1356	76.4	69.7	72.7	50.8	96.1	47.9	68.9	2	15
Frontier	7155	76.9	67.4	61.2	51.1	73.7	39.7	61.7	5	15
Velvon 11	7088	80.7	66.0	65.6	54.9	72.2	55.0	65.7	4	15
B.C. 4-15	7558	93.7[3]	51.3[2]	89.2[2]	-	72.6[1]	54.3	72.2	1	9
Moore	7251	71.4[3]	59.1[1]	-	-	75.6[1]	-	68.7[4]		5
Glacier	6976	60.9[3]	74.5[2]	26.6[1]	48.5	73.6[1]	-	56.8	8	8
Flush	6095	67.5	68.7	88.2[2]	47.9	82.8	49.0	67.3	3	14
Gem	7243	70.9	58.0	58.5	51.1	80.8	44.6	60.7	6	15

[1]One year Average.
[2]Two year Average.
[3]Three year Average.
[4]Not included in rank column.

DATE OF PLANTING STUDY
Wheat, Oats, Barley
(Irrigated)

A study started in 1952 was set up to determine the best date for planting of small grain in Northwestern Montana.

In the past season wheat, (Pilot), Oats (Park), and barley (Vantage), were planted at five different dates ten days apart beginning April 15. The experiment was set up in a split plot randomized block, where dates were the main effect and crops secondary. The experiment was irrigated once during the growing season.

When analysised statistically there was found to be no significant difference due to date of planting. The only significant difference was due to different crops. The highest yield for oats was the April 25, planting which was 122.8 bushels per acre. The May 5, planting was the highest yield for wheat and barley with 44.33 and 93.35 bushels per acre respectively. Table XXXIX.

Table XXXIX. Agronomic data date of planting study on wheat, oats, and barley, three row plots three replications, five dates of planting.

Date Planted and Crop	Heading Date	Ripening Date	Heading Height Inches	Yield per Plot In Ounces I	II	III	Total Ounces	Average Bushels Per Acre
April 15, 1952								
Wheat	6-21	8-12	46	13.25	14.00	13.00	40.25	37.56
Oats	6-27	8-11	39	26.75	21.75	20.00	68.50	121.45
Barley	6-16	8-10	40	28	22.00	20.00	70.00	82.71
April 25, 1952								
Wheat	6-27	8-18	43	19.75	11.25	13.75	44.75	41.76
Oats	7-3	8-16	39	22.50	23.75	23.00	69.25	122.80
Barley	6-20	8-14	41	22.00	25.25	21.50	68.75	81.24
May 5, 1952								
Wheat	7-5	8-26	44	13.00	15.00	19.50	47.50	44.33
Oats	7-9	8-18	40	22.00	20.50	23.50	66.00	117.04
Barley	6-29	8-17	40	25.50	30.00	23.50	79.00	93.35
May 15, 1952								
Wheat	7-10	8-31	42	14.25	13.75	13.25	41.25	38.49
Oats	7-16	9-1	39	23.75	21.25	16.25	61.25	108.62
Barley	7-11	8-29	36	18.50	26.75	19.50	64.75	76.52
May 25, 1952								
Wheat	7-20	9-3	44	12.00	12.50	16.75	41.25	38.49
Oats	7-21	9-3	40	19.75	17.75	23.25	60.75	107.73
Barley	7-15	9-1	38	25.00	24.75	8.250	58.00	68.54

SPRING GRAIN IMPROVEMENT
Wheat (Dryland)

Seven dryland nurseries were seeded during May 1952, in four Northwest Montana Counties. Two of these seven nurseries were located on the home station at Creston. The remaining five were off-station in Lincoln, Sanders, and Mineral Counties. One nursery was seeded in each county except Sanders where three nurseries were seeded. Only two of the nurseries were harvested in Sanders County.

The mean yield of the advanced yield nursery was 40.54 bushels per acre. When analysed statistically there was no significant difference in yield. Table XL.

The western regional white wheat nursery had a mean yield of 65.21 bushels per acre. Considerable leaf rust was noted on all varieties, with Baart having a reading of 96%. Stem rust was found on all the white wheats but Baart, and Baart 46. Table XLI.

The nursery on the Harker farm in Sanders County was seeded quite late in the spring. This date was about two weeks after most plantings had been done in that area. The mean yield was 18.65 bushels per acre. All of the white wheats were significantly better when compared to Thatcher and Rescue was found to be significantly better than Thatcher. Table XLII.

The yields in the nursery at Camas Prairie were very low with a mean yield of 11.9 bushels per acre. Very little moisture fell during the growing season. There was no significant difference in the test when analysed statistically. Table XLIII.

Livestock damage in the Mineral County nursery reduced the yields and made the test inconclusive. The mean yield was 6.3 bushels per acre, with no significant difference between varieties. Table XLIV.

The mean yield of the nursery on the Grubb farm in Lincoln County was 13.70 bushels per acre. Using Thatcher as a check there was no variety significantly higher in yield. Table XLV.

Table XLVI shows work done in Northwest Montana in 1952. The white wheats rank in the following order; Onas, Awned Onas, Lemhi, followed by Ceres a hard red spring wheat. Table XLVII gives data for all trials and ranks Onas number one white wheat and Pilot is the highest yielding hard red spring wheat in 15 trials.

e XL . Agronomic data from spring wheat advanced yield nursery grown under dryland conditons, three replications, Creston, Montana, in 1952.

Date of seeding 5-8-52 Date of emergence 5-14-52 Size of plots 16 feet

ariety or Cross	C. I. or N No.	First Headed date	Plant Height (ins.)	Leaf Rust %	Stem Rust	Lod-ging %	Test wt.	Yield Per plot, bu/a I	II	III	Total	Average Bushels /a
cher	10003	7-5	40	2	-	-	62	35.4	28.3	31.9	95.6	31.87
nore	12273	7-4	41	-	-	-	62	36.9	51.7	33.3	121.9	40.63
x Rescue	B50-120	7-6	43	3	-	-	63	36.9	45.4	35.4	117.7	39.23
s	6900	7-8	44	1	-	-	64	39.7	46.8	34.7	121.2	40.40
t	11945	7-7	44	-	-	-	62	32.6	36.1	38.3	107.0	35.67
	6221	7-14	45	2	-	-	62	58.9	50.3	22.0	131.2	43.73
x Mida	12746	7-4	43	1	-	-	63	43.9	51.0	39.7	134.6	44.87
x 1753 (N2256)	12975	7-3	45	-	-	-	64	45.4	41.1	41.8	128.3	42.77
ame	8026	7-3	44	-	-	-	61	39.0	43.2	42.5	124.7	41.56
x Rescue	B49-102	7-8	42	2	-	-	64	42.5	45.4	35.4	123.3	41.10
	12008	7-5	42	-	-	-	63	41.8	41.8	36.1	119.7	39.90
x Henry (N2211)	12733	6-31	41	-	-	-	61	37.6	44.7	30.5	112.8	37.60
	12488	7-6	43	-	-	-	62	38.3	41.1	31.2	110.6	36.87
x Lemhi[4]	12685	7-8	43	-	-	-	61	48.9	46.8	43.2	138.9	46.30
t[2] x Thatcher (N2170)	12974	7-9	44	-	-	-	63	43.2	45.4	39.0	127.6	42.54
x Rescue	B-49-90	7-9	44	-	-	-	63	40.4	41.1	35.4	116.9	38.97
ue	12435	7-8	43	-	-	5%	63	48.2	32.6	35.4	116.2	38.73
d Onas	12235	7-10	42	10	-	-	62	54.6	56.7	41.1	152.4	50.80
cher x 5615	H-4258	7-3	45	-	-	-	62	41.1	36.9	31.9	109.9	36.63

: The analysis of variance indicates no significant yield difference.

Mean yield.....40.54
S. E. $\bar{x}$..... 3.26
L.S.D. (P= .05).....N. S.
C. V..... 8.04%

e XLI. Agronomic data from western regional white wheat yield nursery of three replications under dryland conditions, Creston, Montana, in 1952.

Date of seeding 5-12-52 Date of emergence 5-19-52 Size of plot 16 feet

ariety or Cross	C. I. or N No.	First Headed date	Plant Height (ins.)	Leaf Rust %	Stem Rust	Lodging %	Test wt.	Yield Per plot, bu/a I	II	III	Total	Average Bushels /a
d	11706	7-5	45	53	x	-	62	55.3	77.3	53.1	185.7	61.9
d Onas	12235	7-4	47	88	x	-	60	62.4	78.7	75.9	217.0	72.3
ed	11919	7-15	49	75	x	-	63	63.1	66.6	57.4	187.1	62.4
l	11415	7-12	47	70	x	-	62	80.1	89.1	51.0	220.2	73.4
ration	4734	7-18	47	87	x	-	61	60.9	60.9	58.9	180.7	60.2
Federation 38	11906	7-6	47	58	x	-	60	66.6	62.4	65.9	194.9	65.0
4	1697	7-15	54	96	x	10	62	85.1	65.9	67.3	218.3	72.8
46	12386	7-14	56	92	-	15	62	58.9	51.7	57.4	168.0	56.0
cher	10003	7-10	47	47	-	-	60	58.1	65.9	56.7	180.7	60.2
y	12265	7-10	48	25	-	10	60	90.1	53.9	42.5	186.5	62.2
	6221	7-16	50	83	x	15	61	56.0	68.7	65.9	190.6	63.5
x Lemhi	12685	7-13	50	85	x	-	60	85.1	70.9	62.4	218.4	72.8

: Onas is considered the check for this nursery.
Stem rust present.

Mean yield.....65.21
S. E. $\bar{x}$..... 6.36
L.S.D. (P= .05).....18.6
C. V. 9.74%

Table XLII. Yield data from Spring wheat nursery grown under dryland conditions in Sanders County. Single row plots four replication, John Harker farm, Noxon, Montana.

Date Planted 5-22-52 Size of plot 16 feet.

Variety or Cross	C. I. or N No.	Yield per plot, bu/a I	II	III	IV	Total	Average Bushels /a
Awned Onas	12235	21.3	18.4	19.1	17.0	75.8	18.95 *
1764 x Henry (N2211)	12733	17.0	14.8	17.7	11.3	60.8	15.20
Ceres	6900	18.4	18.4	20.6	14.8	72.2	18.05
Rescue	12435	18.4	20.6	26.9	18.4	84.3	21.07**
Lemhi	11415	19.1	26.6	26.9	19.8	92.4	23.10**
Lee	12488	17.0	17.0	24.8	14.2	73.0	18.25
Thatcher	10003	12.0	17.7	17.7	14.8	62.2	15.55
Onas	6221	19.1	19.8	20.6	17.7	77.2	19.30*
Pilot	11945	19.1	16.2	20.6	17.7	73.6	18.40

* Varieties yielding significantly more than Thatcher (5%).
** Varieties yielding significantly more than Thatcher (1%).
Note: Thatcher is considered the check in this nursery.

Mean Yield.....18.65
S. E. $\bar{x}$..... 1.09
L.S.D.(P= .05)..... 3.17
L.S.D.(P= .01)..... 4.30
C. V..... 5.82%

Table XLIII. Field data from Spring wheat nursery grown under dryland conditions in Sanders County.
Single row plots, four replication, Richard Sipes farm, Camas Praire, Montana.

Date Planted 5-16-52 Size of Plot 16 feet

Variety or Cross	C. I. or N No.	Yield per plot, bu/a I	II	III	IV	Total	Average bushels /a
Awned Onas	12235	12.8	12.1*	9.9	12.8	47.6	11.9
1764 x Henry (N2211)	12733	12.8	10.6	14.8	13.5	51.7	12.9
Ceres	6900	9.2	18.4	15.5	10.6	53.7	13.4
Rescue	12435	11.3	12.0	12.8	5.0	41.1	10.3
Lemhi	11415	13.5	7.1	10.6	13.5	44.7	11.2
Lee	12488	12.8	14.8	10.6	13.5	51.7	12.9
Thatcher	10003	11.3	11.3	12.0	8.5	43.1	10.8
Onas	6221	12.8	12.8	11.3	14.2	51.1	12.8
Pilot	11945	9.9	14.8	9.9	11.3	45.9	11.5

* Calculated b y missing plot formula
Note: Analysis of variance indicates no significant difference.

Mean Yield 11.9
S. E. $\bar{x}$ 1.34
L.S.D. (P= .05) .....N. S.
C. V.....11.21%

Table XLIV. Yield data from Spring wheat nursery grown under dryland conditions in Mineral County. Single row plots three replication, on Otto Hansen farm, Superior, Montana.

Date Planted 5-13-52 Size of plot 16 feet

Variety or Cross	C. I. or N No.	Yield per plot, bu/a I	II	III	IV	Total	Average bushels /a
Awned Onas	12235	4.3		7.1	5.7	17.1	5.7
1764 x Henry	12733	5.0		7.1	7.1	19.2	6.4
Ceres	6900	.7		5.7	7.8	14.2	4.3
Rescue	12435	2.1		6.4	9.2	17.7	5.9
Lemhi	11415	3.5		5.7	13.5	22.7	7.6
Lee	12488	2.8		6.4	9.2	18.4	6.1
Thatcher	10003	5.0		7.1	8.5	20.6	6.9
Onas	6221	3.8		7.1	8.5	19.4	6.5
Pilot	11045	4.3		9.2	9.9	23.4	7.8

Note: One rep destroyed by livestock.
The analysis of variance indicates no significant yield differences.

Mean Yield..... 6.3
S. E. $\bar{X}$..... .9228
L.S.D. ($P = .05$)..... N. S.
C. V. 14.48

Table XLV. Yield data from Spring wheat nursery grown under dryland conditions in Lincoln County. Single row plots four replication, on Fred Grubb farm, Eureka, Montana.

Date Planted 5-14-52 Size of plot 16 feet

Variety or Cross	C. I. or N No.	Yield per plot, bu/a I	II	III	IV	Total	Average bushels /a
Awned Onas	12235	9.2	8.5	8.5	10.0*	36.2	9.1
1764 x Henry (N2211)	12733	12.0	14.8	15.5	14.8	57.1	14.30
Ceres	6900	12.8	14.2	14.2	17.7	58.9	14.73
Rescue	12435	13.5	17.0	12.8	7.1	50.4	12.60
Lemhi	11415	12.0	16.2	13.5	14.2	55.9	14.00
Lee	12488	16.2	17.0	17.0	14.8	65.0	16.25
Thatcher	10003	9.9	12.8	13.1*	17.0	52.8	13.20
Onas	6221	13.5	13.5	12.8	18.4	58.2	14.55
Pilot	11945	11.3	14.8	14.8	17.7	58.6	14.6

* Calculated by missing plot formula.

Note: Thatcher considered check in this nursery.

Mean Yield.....13.70
S. E. $\bar{X}$..... 1.17
L.S.D. (X5%)..... 3.42
C. V..... 8.53%

Table XLVI. Summary of nine varieties of Wheat in Northwestern Montana in 1952, under dryland conditions.

Variety or Cross	C. I. or H No.	Station or Location					Average Bushel Per Acre	Rank
		Creston	Superior	Heron	Camas Praire	Eureka		
Awned Onas	12235	50.80	5.70	18.95	11.90	9.10	19.29	2
1764 x Henry	12733	37.60	6.40	15.20	12.90	14.30	17.28	8
Ceres	6900	40.40	4.30	18.05	13.40	14.73	18.18	4
Rescue	12435	38.73	5.90	21.07	10.30	12.60	17.72	6
Lemhi	11415	———	7.60	23.10	11.20	14.00	18.63	3
Lee	12488	36.87	6.10	18.25	12.90	16.25	18.07	5
Thatcher	10003	31.87	6.90	15.55	10.80	13.20	15.66	9
Onas	6221	43.73	6.50	19.30	12.80	14.55	19.30	1
Pilot	11945	35.67	7.80	18.40	11.50	14.60	17.59	7

Table XLVII. Wheat data, selected varieties, of varietal work done in Northwestern Montana 1949-52, (Dryland Experiments).

Variety or Cross	C. I. or H No.	Creston 1949-52 4 yr. Av.	Lake Co. 1949 1 year	Lincoln County 1949-50,51 3 yr. Av.	Sanders County 1949-50,52 3 yr. Av.	Flathead County 1950 1 year	Mineral County 1952 1 year	Average	Rank	Station Years
Thatcher	10003	42.10	9.00	11.00	15.00	16.50	6.90	16.80	5	13
Pilot	11945	46.50	9.50	10.70	16.10	12.50	7.80	17.20	3	13
Ceres	6900	48.10	8.50	11.30	16.00	13.40	4.30	16.90	4	13
Lee	12488	46.20[3]	----	16.30[1]	15.60[1]	----	6.10	21.10[4]		6
1764 x Henry	12733	42.50[2]	----	14.30[1]	14.00[1]	----	6.40	19.30[4]		5
Supreme	8026	36.20	9.00	4.60[1]	20.30[1]	----	----	17.50[4]		7
Reward	8182	39.70[3]	7.30	5.70[1]	19.10[1]	----	----	18.00[4]		6
Rescue	12435	41.80[3]	----	12.30[2]	13.90[2]	13.20	5.90	17.40[4]		9
Onas	6221	47.90[3]	9.20	11.60	17.80	13.90	6.50	17.80	2	12
Awned Onas	12235	50.30[2]	----	11.70[2]	15.00[2]	13.00	5.70	19.20[4]		8
Marquis	3641	45.40[3]	9.90	11.20[2]	14.90[2]	13.50	----	18.60[4]		9
Leuhi	11415	47.90[2]	9.90	11.90	18.50	15.00	7.60	18.50	1	11

[1]One year average.
[2]Two year average.
[3]Three year average.
[4]Not included in rank column.

SPRING GRAIN IMPROVEMENT
Oats (Dryland)

Five dryland oat nurseries were seeded in the spring of 1952. One nursery containing 20 varieties at Creston, and four nurseries containing nine varieties were seeded in Lincoln, Sanders (2), and Mineral Counties. One nursery in Sanders county was not harvested due to a poor stand, caused by insufficient moisture.

Table XLVIII shows agronomic data for the nursery grown at Creston. Clinton x Marion C. I. 5440, and Clinton x Marion C. I. 5647 were the only varieties that were significantly higher in yield when compared with the average of the three recommended varieties, (Mission, Gopher, Bridger). All varieties were higher in test weight than is required by U. S. D. A. standards. Several varieties had a test weight of 41 pounds per bushel. The mean yield of this nursery was 89.05 bushels per acre.

The nursery on the Hansen farm in Mineral county was damaged by livestock. The mean yield was 20.65 bushels per acre. When analyzed statistically there was no significant differences.

The mean yield of the nursery grown on the Harker farm in Sanders county was 47.56 bushels per acre. There were no significant differences between varieties in this test when analyzed. Table L.

Bannock, Bridger and Canada Hybrid were significantly better in yield than Mission in the test on the Grubb farm in Lincoln county. The mean yield of this nursery was 28.86 bushels per acre. Table LII.

In all dryland tests on oats in 1952 Bridger ranks number one followed by Cliton x Overland^2 C. I. AB6016 and Gopher. Table LII.

Table LIII shows data for all trials in Northwestern Montana and ranks Bridger number one, Overland two, and V-R x Bannock (C. I. 4283) three. These are for nine thru twelve station years.

Table XLVIII. Agronomic data from dryland oat nursery, Creston, Montana in 1952. Three-row plots, three replications.

Date Planted 5-7-52 Size of plot 16 feet

Variety or Cross	C. I. or N No.	Heading Date	Heading Height	Test wt.	Yield per plot in oz. I	II	III	Total Ounces	Average Bushel /acre
Clinton x Marion	5440	6-30	42	34	9.00	8.50	8.25	25.75	45.66**
Clinton x Marion	5647	6-30	40	37	13.25	14.00	10.75	38.00	67.39*
Clinton x Marion	5649	7-3	43	41	18.25	17.75	13.25	49.25	87.34
Columbia x Clinton	5630	6-30	43	38	16.00	16.25	18.50	50.75	89.99
Gopher	2027	7-5	40	38	16.00	15.75	16.50	48.25	85.56
Fulton x Clinton	4991	7-7	41	39	18.50	18.00	19.50	56.00	99.30
Reselect x Clinton	4969	6-30	38	39	16.00	16.00	16.50	48.50	86.01
Cody	3916	7-11	38	35	13.75	12.50	14.75	41.00	72.71
V - R x Bannock	4283	7-7	38	41	17.00	18.75	16.75	52.50	93.10
Mission	2588	7-7	44	41	18.50	17.50	17.62[1]	53.62	95.08
Markton - Rainbow x Mission	43-2-25	7-9	40	42	18.50	14.50	13.75	46.75	82.90
Clinton x Overland	6611	7-12	41	40	17.50	20.50	16.75	54.75	97.09
Clinton x Overland	AB6014	7-11	40	40	18.50	19.50	20.50	58.50	103.74
Clinton x Overland	AB6016	7-12	40	41	18.00	18.25	18.75	55.00	97.53
Exeter	4158	7-14	45	39	19.00	20.25	18.00	57.25	101.52
Bridger	2611	7-14	49	38	18.00	18.25	18.50	54.75	97.09
Andrew x Clinton	5636	6-30	42	38	18.83[1]	19.00	18.25	56.08	99.45
Clinton "59"	4259	6-30	37	39	16.25	15.75	18.00	50.00	88.67
Golden Rain	4512	7-13	49	41	17.50	17.00	16.00	50.50	89.55
Overland	4181	7-7	40	40	19.25	19.00	19.00	57.25	101.52

[1]Calculated missing plot formula.

* Varieties yielding significantly less than average of three recommended varieties (5%).

** Varieties yielding significantly less than average of three recommended varieties (1%).

Mean Yield	89.05
S. E. $\bar{X}$	7.40
L.S.D. (P= .05)	21.23
L.S.D. (P= .01)	28.41
C. V.	8.30%

Table XLIX. Yield data from Oat nursery grown under dryland conditions in Mineral, County, Montana, in 1952, on the Otto Hansen farm, Superior, Montana.

Date Planted 5-13-52 Size of plot 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Gopher	2027	18.63	17.29	23.94	17.29	77.15	19.29
Zephyr	4800	13.30	22.61	14.63	14.63	65.17	16.29
W-R x Bannock	4283	15.95	54.53	13.3	11.97	95.75	23.94
Bannock	2592	29.26	37.24	15.95	19.95	102.40	25.60
Mission	2588	15.95	19.95	18.63	17.29	71.82	17.96
Bridger	2611	31.92	27.93	17.29	30.59	107.73	26.93
Clinton x Overland^2	6611	18.63	11.97	14.63	19.95	65.18	16.30
Clinton x Overland^2	AB6016	19.95	17.29	15.95	17.29	70.48	17.62
Canada Hybrid	2795-11-5	27.93	19.95	19.95	19.95	87.78	21.95

Note: Analysis of variance indicates no significant difference.

Mean Yield 20.65
S. E. $\bar{X}$ 3.955
L.S.D.(P= .05)..... N. S.
C. V. 19.15%

Table. L. Yield data from Oat nursery grown under dryland conditions in Sanders, County, Montana in 1952, on John Harker farm, Noxon, Montana.

Date Planted 5-22-52 Size of plot 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Gopher	2027	38.57	55.86	42.56	33.90	170.89	42.72
Zephyr	4800	45.22	58.24	33.25	35.41	172.12	43.03
V-R x Bannock	4283	45.55	54.39[1]	29.26	51.87	181.07	45.27
Bannock	2592	45.22	67.83	41.23	50.54	204.82	51.21
Mission	2588	37.24	54.53	46.55	53.20	191.52	47.88
Bridger	2611	62.51	67.83	50.54	50.54	231.42	57.86
Clinton x Overland[2]	6611	51.87	49.21	30.59	50.54	182.21	45.55
Clinton x Overland[2]	AB6016	39.90	51.87	61.18	33.25	186.20	46.55
Canada Hybrid	2795-11-5	50.54	50.54	47.88	43.59	192.55	48.14

1 Calculated missing plot formula.
Note: Analysis of variance indicates no significant difference.

Mean Yield 47.58
S. E. M..... 4.176
L.S.D.(P= .05).....N. S.
C. V. 8.78%

Table LI . Yield of off station oats, grown under dryland conditions in Lincoln, County. Single row plots, four replications, grown on Fred Grubb farm Eureka, Montana.

Date Planted 5-14-52 Size of plot, 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Gopher	2027	23.64	33.25	33.25	33.25	123.39	30.84
Zephyr	4800	25.27	29.26	33.25	22.61	110.39	27.60
V-R x Bannock	4283	13.3	15.95	22.61	17.29	69.15	17.29
Bannock	2592	31.92	45.22	33.25	35.04[1]	145.43	36.35**
Mission	2588	23.94	27.93	30.59	22.61	105.07	26.27
Bridger	2611	35.41	37.24	26.6	31.92	131.17	32.79*
Clinton x Overland[2]	6611	25.72	26.6	30.59	26.6	109.51	27.38
Clinton x Overland	AB6016	30.59	29.26	25.27	27.93	113.05	28.26
Canada Hybrid	2795-11-5	33.25	34.58	33.25	30.59	131.67	32.96*

Note: Mission considered a check in this nursery.
1 Calculated by missing plot formula.
* Varieties yielding significantly higher than Mission (5%)
** Varieties yielding significantly higher than Mission (1%)

Mean Yield.....28.86
S. E. %..... 1.912
L.S.D. (P= .05)..... 5.62
L.S.D. (P= .01)..... 7.64
C. V. 6.63%

Table LII. Summary of ten varieties of oats in Northwestern Montana in 1952, (Dryland).

Variety or Cross	C. I. or N No.	Station or location				Average Bushel Per Acre	Rank
		Creston	Superior	Noxon	Eureka		
Gopher	2027	85.56	19.29	42.72	30.84	47.10	3
Zephyr	4800	——	16.29	43.03	27.60	28.98	9
V -R x Bannock	4283	93.10	23.94	45.27	17.29	44.90	6
Mission	2588	95.08	17.96	47.88	26.27	46.80	4
Bridger	2611	97.09	26.93	57.86	32.79	53.67	1
Clinton x Overland^2	6611	97.09	16.30	45.55	27.38	46.58	5
Clinton x Overland^2	AB6016	97.53	17.62	46.55	28.26	47.49	2
Canada Hybrid	2795-11-5	——	21.95	48.14	32.96	34.35	8
Bannock	2592	——	25.60	51.21	36.35	37.72	7

Table LIII. Oat data, selected varieties of varietal work done in Northwestern Montana, 1949-52, (Dryland experiments).

Variety or Cross	C. I. or N No.	Creston 1949-52 4 yr. Av.	Lincoln County 1949-50,52 3 yr. Av.	Sanders County 1949-50,52 3 yr. Av.	Mineral County 1952 1 year	Flathead County* 1950 1 year	Average	Rank	Station Years
Gopher	2027	94.99	26.75	36.27	19.29	31.5	41.76	6	12
Bannock	2592	50.10[1]	25.25	40.89	25.60	38.1	35.99	8	9
Mission	2588	90.86	21.32	38.38	17.96	31.0	39.90	7	12
Clinton x Overland[2]	6611	101.87	22.86	40.90	16.30	34.6	43.31	4	12
Clinton x Overland[2]	AB6014	119.89[3]	——	——	——	——	119.89[4]		3
Zephyer	4800	103.13[3]	27.03	37.79	16.29	31.4	43.13	5	11
Bridger	2611	97.87	24.40	48.64	26.93	37.7	47.11	1	12
Overland	4181	102.21	17.95[2]	33.38[2]	——	34.2	46.94	2	9
V-R x Bannock	4283	97.19	18.93	38.74	23.94	42.60	44.28	3	12
Cody	3916	96.75[2]	——	——	——	——	96.75[4]		2
Canada Hybrid	2795-11-5	155.6[1]	32.96[1]	48.14[1]	21.95	——	64.66[4]		4

*Off Station.
[1]One year average.
[2]Two year average.
[3]Three year average.
[4]Not included in rank column.

SPRING GRAIN IMPROVEMENT
Barley (Dryland)

Five dryland nurseries were seeded in May 1952. One nursery containing 26 varieties was seeded at Creston, and the other four were seeded off-station. The off-station nurseries contained nine varieties each.

The station nursery, with a mean yield of 65.31 bushels per acre, when analysised statistically was not significant. Table LIV.

When compared with Titan; Compana, Plush, Canada Hybrid, and B. C. 4-15 were found to be significantly better in yield in the nursery on the Fred Grubb farm in Lincoln County. The mean yield of this nursery was 16.27 bushels per acre. Table LV.

There was no significant difference in varieties in the nursery on the Richard Sipes farm in Sanders County. The mean yield of the nursery was 21.47 bushels per acre. Table LVI.

Table LVII shows a mean yield of 23.33 bushels per acre for the test conducted on the John Harker farm in Sanders County. There was no significant difference between varieties.

Table LXIII gives the results of work done on nine varieties in Northwestern Montana in 1952. Table LIX gives results of all dryland trials in the same area from 1949-52 on ten varieties.

Table LIV. Agronomic data from dryland barley nursery, Creston, Montana, 1952. Triplicate three row plots in a triple lattice.

Date Planted 5-5-52

Size of plot 16 feet

Variety or Cross	C. I. or N No.	Heading date	Heading Height Inches	Smut L&H	Lodging %	Test wt.	Plot yield in bu/a I	II	III	Total Bushel	Average Bushels Per acre
Gem	7243	6-26	38	L	6	44	85.1	65.6	71.8	222.5	74.17
Glacier	6976	6-26	36	L	1	47	105.5	57.6	101.0	264.1	88.03
Atlas 46	7323	6-25	37	M	-	45	86.9	66.5	47.0	200.4	66.80
Custer	8053	6-25	38	-	-	49	72.7	82.4	69.1	224.2	74.73
B. C. 4-15	7558	7-3	41	-	36	47	84.2	86.0	68.2	238.4	79.47
Harlan	7008	6-29	39	-	-	47	62.0	60.3	84.2	206.5	68.83
W. S. 471	8055	6-27	36	-	-	47	79.8	66.5	47.0	193.3	64.43
Titan	7055	6-25	40	-	3	49	62.9	61.1	51.4	175.4	58.47
Canada Hybrid	3951-1356	6-28	38	L	-	50	62.9	61.1	58.4	182.4	60.80
Vantage	7324	6-28	38	-	-	49	74.4	57.6	55.8	187.8	62.60
Plush	6095	6-30	40	-	1	49	77.1	60.3	55.8	193.2	64.39
Velvon 17	8058	7-1	37	-	1	45	73.6	54.1	81.5	209.2	69.73
Otis	7557	6-23	31	-	1	52	79.8	52.3	53.2	185.3	61.77
Compana	5438	6-26	33	-	-	49	69.1	63.8	82.4	215.3	71.77
Freya	7130	6-29	31	-	-	53	73.6	78.9	70.9	223.4	74.47
Prokoymus 143	6530	6-26	34	-	13	52	56.7	62.9	47.0	166.6	55.53
2 row	6240	7-1	41	-	-	50	66.5	48.7	59.4	174.6	58.20
Danish	E Mont.	7-3	32	-	1	53	47.9	58.4	95.7	202.0	67.33
Ledger	5076	6-30	36	-	1	55	62.0	79.8	47.0	188.8	62.93
Glacier x Compana	47-7405 IV	6-25	38	-	-	45	50.9	69.1	100.1	220.1	73.37
Glacier x Compana	47-7405 V	6-28	40	-	-	40	39.9	45.2	47.9	133.0	44.33
Glacier x Compana[1]	47-7405 V	6-28	39	-	-	45	46.1	25.7	78.9	150.7	50.23
Glacier x Compana	47-7405 VI	6-26	35	-	-	47	60.3	62.9	54.1	177.3	59.10
Glacier x Morgenrot	49-527-24	6-22	32	-	-	55	64.7	73.6	70.0	208.3	69.43
Sanalta	6087	7-5	39	-	-	51	47.0	52.3	64.7	164.0	54.66
Glacier x Morgenrot	49-527-5	6-22	31	-	-	51	40.8	83.3	62.9	187.0	62.33

[1]Double rate of seeding.

Mean Yield 65.31
S. E. ± 8.539
L.S.D. (P= .05) ..... N. S.
C. V. 13.07%

Table LV. Yield data from Spring Barley Nursery grown under dryland conditions in Lincoln, County, Montana in 1952 on Fred Grubb farm, Eureka, Montana.

Date Planted 5-14-52

Size of plot 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a.
Compana	5438	9.7	14.2	19.5	13.3	56.7	14.18*
Titan	7055	16.0	19.5	21.3	20.4	77.2	19.30
Frontier	7155	16.8	15.1	15.1	18.6	65.6	16.40
Plush	6095	16.0	13.3	10.6	12.4	52.3	13.08**
Canada Hybrid	3951-1356	16.8	12.4	19.5	11.5	60.2	15.05*
Velvon 11	7088	18.6	23.9	19.5	18.6[1]	80.6	20.15
Gem	7243	18.6	16.8	19.5	19.5	74.4	18.60
Carlan	7008	16.8	13.3	18.6	19.5	68.2	17.05
S. C. 4-15	7558	15.1	13.3	10.6	11.5	50.5	12.63**

[1] Calculated by missing plot formula.
* Varieties yielding significantly less than Titan (5%).
** Varieties yielding significantly less than Titan (1%).

Mean Yield 16.27
S. E. $\bar{X}$..... 1.33
L.S.D.(P= .05)..... 3.91
L.S.D.(P= .01)..... 5.30
C. V. 8.20%

Table LVI. Yield data from Spring Barley Nursery grown under dryland conditions in Sanders County, Montana in 1952 on Richard Sipes farm, Camas Praire, Montana.

Date Planted 5-16-52 Size of plot 16 feet

Variety or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Compana	5438	26.6	25.7	21.3	16.0	89.6	22.40
Titan	7055	10.6	26.6	31.9	25.7	94.8	23.70
Frontier	7155	19.5	16.0	16.8	14.2	66.5	16.63
Flush	6095	13.3	23.0	22.2	19.5	78.0	19.63
Canada Hybrid	3951-1356	23.0	16.8	26.6	21.3	87.7	21.93
Velvon 11	7088	22.2	30.1	26.6	13.3	92.2	23.05
Gem	7243	28.4	26.6	27.5	19.5	102.0	25.50
Harlan	7008	18.6	21.3	25.7	21.3	86.9	21.73
B. C. 4-15	7558	16.8	28.4	21.3	18.6	85.1	21.28

Mean Yield.....21.74
S. E. $\bar{X}$..... 2.38
L.S.D.(P= .05)..... N. S.
C. V. 10.94%

Table LVII. Yield data from Spring Barley Nursery grown under dryland conditions in Sanders County, Montana, in 1952 on John Harker farm, Noxon, Montana.

Date Planted 5-22-52 Size of plot 16 feet

Variety Or Cross	C. I. or N Number	Yield per plot in bu/a I	II	III	IV	Total	Average Bushels /a
Compana	5438	28.4	15.1	39.9	23.0	106.4	26.60
Titan	7055	35.4	25.7	32.8	23.9	117.8	29.45
Frontier	7155	35.4	20.4	37.2	26.6	119.6	29.90
Plush	6095	54.1	23.0	52.3	40.8	170.2	42.55
Canada Hybrid	3951-1356	31.9	40.8	43.4	26.6	142.7	35.68
Velvon 11	7088	26.6	21.3	54.1	23.0	125.0	31.25
Gem	7243	25.7	19.5	34.6	26.6	106.4	26.60
Harlan	7008	25.7	41.7	56.7	18.6	142.7	35.68
B. C. 4-15	7558	21.3	24.9	58.4	28.4	133.0	33.25

Mean Yield 32.33
S. E. $\bar{x}$..... 4.21
L.S.D.(P = .05).....N. S.
C. V. 13.02%

Table LVIII. Summary of nine barley varieties grown in Northwest Montana under dryland conditions in 1952.

Variety or Cross	C. I. or N No.	Station or Location Creston	Eureka	Camas Praire	Heron	Average Bushel Per Acre	Rank
Compana	5438	71.77	14.18	22.40	26.60	33.74	5
Titan	7055	58.47	19.30	23.70	29.45	32.75	7
Frontier	7155	——	15.40	16.63	29.90	20.64	9
Flush	6095	64.39	13.08	19.63	42.55	34.91	4
Canada Hybrid	3951-1356	60.80	15.05	21.93	35.68	33.37	6
Velvon 11	7088	——	20.15	23.05	31.25	24.82	8
Gem	7243	74.17	18.60	25.50	26.60	36.22	2
Harlan	7008	68.83	17.05	21.73	35.68	35.82	3
B. C. 4 - 15	7558	79.47	12.63	21.28	33.25	36.66	1

Registered and Certified Grains

One and one-half acres of Pilot wheat was produced on the station in 1952 for Certified seed. 1952 yields- 60 bushel per acre.

Approximately one-half an acre of Bridger oats was grown for Registered seed. Approximate yield per acre was 60 bushel.

Titan barley was grown for Registered seed of which there was about one-half of an acre. Approximate yield 65 bushel per acre.

WINTER GRAIN IMPROVEMENT
(Winter Wheat)

One winter wheat nursery containing sixteen varieties was seeded October 11, 1952. Using Wasatch as a check several varieties were found to be significantly higher in yield. The variety significantly higher in yield which has bunt resistance was Yogo x Wasatch-8. Table LX.

Table LXI gives a summary of work done in Northwestern Montana 1950-1952. Only four varieties have been tested all three years, of these four Yogo was the highest yielding with 38.40 bushels per acre.

(Winter Barley)

One winter barley nursery was seeded October 11, 1952. This nursery contained sixteen varieties. The mean yield was 35.22 bushels per acre. Purdue 1101 Sel. and Bez. CC10-242 were significantly less in yield when compared with Winter Club. Table LXII. Table LXIII shows the two year average of work done on varieties at the Creston Station. Based on a two year average Purdue 1101 Sel. is the highest yielding of the eleven varieties test for the two year period.

Table LX. Agronomic data from interstate winter wheat nursery, grown under dryland conditions in three row plots three replications at, Creston, Montana in 1951-1952.

Date planted, October 11, 1951 Date harvested, August 7, 1952 Size of plot 16 feet

Variety or Cross	C. I. or N No.	Heading date	Heading Height Inches	Stand %	Lodging %	Test wt.	Yield per plot bu/a I	II	III	Total	Average Bushels Per acre
Yogo x Wasatch-6		6-14	42	85	-	-	18.4	22.7	26.2	67.3	22.43
Newturk		6-15	40	92	-	-	30.5	34.0	32.6	97.1	32.37*
Turkey x Oro-221		6-15	44	88	2	-	20.6	23.4	32.6	76.6	25.53
Yogo x Wasatch-9		6-19	47	78	8	-	17.7	32.6	31.2	81.5	27.17
Minter		6-15	44	93	10	-	24.8	25.5	41.1	91.4	30.47*
Comanche		6-10	36	97	-	-	24.1	29.1	32.6	85.8	28.60
Cheyenne		6-16	41	82	-	-	34.0	29.8	33.3	97.1	32.37*
Yogo x Wasatch-8		6-15	47	93	7	64	26.2	36.9	40.4	103.5	34.50**
Nebred		6-14	39	90	-	-	29.1	25.5	36.1	90.7	32.56*
Kharkof	1442	6-17	44	83	52	63	26.9	31.9	41.8	100.6	33.53**
Yogo x Wasatch-3		6-14	42	92	-	-	20.6	27.6	30.5	78.7	26.23
Wasatch		6-14	44	95	-	-	17.7	24.8	28.3	70.8	23.60
Rio/Rex x Cheyenne	472361	6-12	39	95	-	-	19.1	25.5	26.2	70.8	23.60
Karmont		6-19	43	80	53	-	22.7	31.9	40.4	95.0	31.67*
Tenmark		6-13	42	83	-	-	26.9	28.3	20.6	75.8	25.27
Yogo		6-16	44	92	-	-	23.4	29.1	28.3	80.8	26.93

Note: Wasatch is considered the check in this nursery.
No evidence of drawf bunt in this nursery.
* Varieties yielding significantly more than Wasatch (5%).
** Varieties yielding significantly more than Wasatch (1%).

Mean Yield 28.41
S. E. $\bar{x}$ 2.33
L.S.D. (P= .05) 6.73
L.S.D. (P= .01) 9.08
C. V. 8.22%

Table LXI. Summary of winter wheat work done in Northwestern Montana. 1950-1952, Dryland conditions.

Variety or Cross		1950	1951	1952	Creston 1950-52 3 yr. av.	Stillwater 1951 1 year	Average	Number Trials
Yogo		60.93	38.50	31.67	43.70	33.10	38.40	4
Yogo x Wasatch-6		———	———	22.43	22.43[1]	———	22.43	1
Karmont		59.53	39.90	31.67	49.71[2]	26.70	38.20	3
Yogo x Wasatch-8		———	———	34.50	34.50[1]	———	34.50	1
Yogo x Wasatch-3		———	———	26.23	26.23[1]	———	26.23	1
Cache		59.03	———	———	59.03[1]	27.00	43.02	2
Rio/Rex x Cheyenne (472361)		———	———	23.60	23.60[1]	———	23.60	1
Wasatch		63.80	29.00	23.60	38.80	25.50	32.15	4
Newturk		60.73	34.50	32.37	42.53[1]	28.30	35.43	4
Turkey x Oro	205	———	32.40	———	32.40[1]	———	34.40	1
Turkey x Oro	216	———	40.10	———	40.10[1]	———	40.10	1
Turkey x Oro	221	58.83	34.00	25.53	39.12	22.40	35.76	4
Karakof		———	44.20	33.53	38.87[2]	———	38.87	2
Nebred		———	48.70	32.56	40.63[2]	———	40.63	2
Comanche		———	40.40	28.60	34.50[2]	———	34.50	2
Cheyenne		———	35.00	32.37	33.68[2]	———	33.68	2
Tenmark		———	29.50	25.27	27.38[2]	———	27.38	2
Minter		———	24.50	30.47	27.48[2]	———	27.48	2
Huntley 44		———	44.40	———	44.40[1]	———	44.40	1
Yogo x Wasatch-9		———	35.20	27.17	31.19[2]	———	31.19	2
Yogo x Wasatch-11		———	32.30	———	32.30[1]	———	32.30	1
Forty Fold		———	39.00	———	39.00[1]	23.10	36.05	2

[1]One year average.
[2]Two year average.

Table LXII. Agronomic data from dryland winter barley nurseries, Creston, Montana, 1952. Triplicate three row plots in a triple-lattice design.

Date Planted 10-11-51 Date Harvested 7-28-52 Size of plot 16 feet

Variety or Cross	C. I. or N No.	Heading Date	Heading Height	Stand %	Test wt.	Yield per plot bu/a I	II	III	Total Bushels	Average Bushels /acre
Ohio Winter 1	7072	5-30	31	71.7	44	34.6	22.2	31.9	88.7	29.57
Winter Club	592	6-14	29	78.3	48	25.7	54.9	43.4	124.0	41.33
Composite Cross X	6625	6-8	35	85.0	47	33.7	38.1	28.4	100.2	33.40
Purdue 1101 Sel	7523	6-12	35	81.7	47	40.8	40.8	47.0	128.6	42.87
W. Va. CC10-1-45-22	7580	5-29	33	86.7	-	16.0	17.7	14.2	47.9	15.97**
Nebraska 412490	7580	6-1	31	61.7	-	34.6	28.4	23.0	86.0	28.67
Pubelo	8070	5-31	31	83.3	45	33.7	31.9	32.8	98.4	32.80
Boz. CC10-242	-	6-7	32	83.3	-	25.7	16.8	20.4	62.9	20.97**
Boz. CC10-272	-	64	33	81.7	50	42.5	31.9	37.2	111.6	37.20
Boz. CC10-284	-	6-13	35	60.0	40	26.6	52.3	42.5	121.4	40.47
Boz. CC10-220	-	6-11	35	71.7	46	40.8	40.8	37.2	118.8	39.60
Boz. CC10-349	-	6-10	34	71.7	51	48.7	40.8	36.3	125.8	41.93
Boz. CC10-311	-	6-18	38	65.0	49	56.7	29.2	34.6	120.5	40.17
Boz. CC10-222	-	6-12	38	71.7	45	44.3	40.8	36.3	121.4	40.47
Boz. CC10-343	-	6-1	35	83.3	47	44.3	17.7	37.2	99.2	33.07
From Sweden	7189	6-1	35	75.0	47	50.9	31.9	52.3	135.1	45.03

** Varieties yielding significantly less than Winter Club (1%).

Mean Yield 35.22
S. E. $\bar{X}$ 4.88
L.S.D. (P= .05) .. 14.09
L.S.D. (P= .01) .. 18.99
C. V. 13.87%

Table LXIII. Summary of work done in Northwestern Montana on winter barley 1951-1952.

Variety or Cross	C. I. or N No.	Year 1951	1952	Average Bushels Per Acre
Ohio Winter 1	7072	43.60	29.57	36.59
Winter Club	592	44.75	41.33	48.04
Composite Cross x	6625	53.13	33.40	43.27
Purdue 1101 Sel.	7523	71.39	42.87	57.13
W. Va. CC10-1-45-22	7582	41.60	15.97	28.79
Nebraska 412490	7580	34.50	28.67	31.09
Pubelo	8070	48.40	32.80	40.60
Boz. CC10-242	——	55.75	20.97	38.36
Boz. CC10-272	——	51.33	37.20	44.27
Boz. CC10-284	——	54.00	40.47	47.24
Boz. CC10-220	——	54.58	39.60	47.09
Boz. CC10-349	——		41.93	41.93
Boz. CC10-311	——		40.17	40.17
Boz. CC10-222	——		40.47	40.47
Boz. CC10-343	——		33.07	33.07
From Sweden	7189		45.03	45.03

IRRIGATION STUDIES

Effect of Irrigation Rates and Frequencies

In the study of irrigation rates and frequencies this season, only slight differences in yield were obtained that can be attributed to irrigation, except in the case of the potato crop.

Not all scheduled irrigations were made. The maturity of the crop made additional scheduled irrigations impractical for the hay and potato crops. Barley grew so rank without irrigation that none was given. The yield without irrigation was 93 bushels per acre.

In the case of the lamb gains on the pastures it is possible that the weights were too largely influenced by varied fills to indicate accurately what the comparative forage production was.

Table LXIV. Number and rate of irrigations for four crops and calculated gain per acre, 1952.

Crop	No. of Irri-gations	Amount of Irrigation	Total Amount	Yield Per Acre
Pasture	5	2 in.	10	490 lbs. lamb gain
Pasture	6	2 in.	12	365 lbs. lamb gain
Pasture	5	3 in.	15	525 lbs. lamb gain
Alfalfa	3	2 in.	6	2.99 tons
Alfalfa	3	2 in.	6	3.30 tons
Alfalfa	3	3 in.	9	3.40 tons
Mix Hay				
Grass-Legume	3	2 in.	6	2.54 tons
Grass-Legume	3	2 in.	6	2.24 tons
Grass-Legume	3	3 in.	9	2.49 tons
Potatoes	3	2 in.	6	283 Cwt.
Potatoes	3	2 in.	6	283 Cwt.
Potatoes	3	2½ in.	7½	337 Cwt.

DRYLAND
Irrigated yield Comparisons

Yields without irrigation have been quite high on the Creston Station, and irrigation has not in all cases made economic yield improvement. Soil and sub-surface moisture conditions vary considerably in short distances so irrigation data, to be comparable, must be obtained in plots carefully located in similar situations.

Some 1952 yields are available which are considered comparable for the reason that they were grown side by side on similar soils with similar treatment except for the one variation, irrigation.

Table LXV. Dryland-Irrigation comparison of yield of crops grown on similar soils with similar treatment-1952.*

Crop	Soil Type	Dryland (Mean Yield)	Irrigated (Mean Yield)
Western Regional White Wheat nursery(12 varieties)	Creston Silt loam	65.21 bu/A	61.21 bu/A
Gem potatoes (No fertilizer)	Flathead very fine sandy loam	121.9 Cwt/A	199.4 Cwt/A
Gem potatoes (200# T.S.P.)	Flathead very fine sandy loam	129.9 Cwt/A	267.2 Cwt/A
Gem potatoes (200# 6-30-0)	Flathead very fine sandy loam	150.4 Cwt/A	295.5 Cwt/A

*See precipitation data in the weather section.

Study of Subsurface Moisture Levels

Finding it difficult to explain yields from various parts of the farm; ie for example four tons of alfalfa without irrigation in plot E-1 and 1½ tons of alfalfa with irrigation in C-8, a study of sub-surface moisture levels was decided upon.

Aid in the study was secured from E. C. Neilson of the Soil Conservation Service, Kalispell, who put down four, four inch water table wells to a depth of 13½ feet or to free water, cased them with galvanised down spout and logged the wells.

Well No.	Location	Water Table 8/11	11/17	12/2
1	Corner D-4&5	95 ins.		95 ins.
2	South edge C-9	84 ins.		89 ins.
3	East edge B-4	72 ins.		89 ins.
4	Center E-1		132 ins.	145 ins.

Log of Wells Table LXVI. Well One.

Thickness	Color	Texture	Structure	Permeability	Miscellaneous
0-12"	Dark brown	Loam	Weak Crumb	Moderate	Non Calcarous
12-30"	Light Grayish brown	Silt Loam	Weak Fragmental	Moderate	Strongly Calcarous
30-36"	Grayish White	Silty Clay	Weakly Lamenated	Slow	Slightly Mottled Strongly Calcarous
36-56"	Light yellow-ish brown	Silty Clay	Weak Fragmental	Slow	Strongly Mottled Calcarous
56-72"	Light yellow-ish brown	Silty Clay Loam	Massive	Moderate Slow	Strongly Mottled Calcarous
72-84"	Light yellow-ish brown	Very fine Sandy loam-silt	Stratified	Moderate	Strongly Mottled Soil Saturated
84-108"	Grayish Brown	Loamy Loam Fine Sand	Massive	Moderate Rapid	Super Saturated Water Table 96"

Total Length Pipe 126" - above ground 10".

Log of Wells Table LXVII. Well Two.

Thickness	Color	Texture	Structure	Permeability	Miscellaneous
0-14"	Dark Brown	Silty Clay loam	Coarse Granular	Moderate Slow	Non Calcarous
14"-30"	Yellowish Brown	Very fine Sandy loam	Weak Fragmental	Moderate	Weakly Calcarous
30-40"	Yellowish Brown	Fine Sandy Loam	Massive	Moderate Rapid	Lightly Mottled Strongly Calcarous
40-46"	Light Yellow-ish brown	Silty Clay loam	Weakly Lamenated	Moderate Slow	Lightly Mottled Strongly Calcarous
46-84"	Strong yellow-ish brown	Sandy loam	Massive	Moderate Rapid	Saturated below 60"
84-108"	Light yellow-ish brown	Fine sandy loam Silt loam	Stratified	Moderate Moderate slow	

Saturated with free water in sandy loam strata.
Total Length Pipe 107" Pipe Flush with Ground.
Water Table 84".

Log of Wells Table LXVIII. Well Three.

Thickness	Color	Texture	Structure	Permeability	Miscellaneous
0-30"	Dark Brown	Loam	Crumb	Moderate	Non Calcarous
30-36"	Light yellow Brown	Silt loam	Fine granular	Moderate	Non Calcarous
36-54"	Light yellow Brown	Silty Clay loam	Soft granular	Moderate Slow	Slightly Mottled Strongly Calcarous
54-90"	Light yellow Brown	Silty Clay loam	Slightly Lamenated	Moderate Slow	Calcarous Strongly Mottled
90-94"	Light yellow Brown	Fine Sandy loam	Massive	Moderate Rapid	Saturated
94-108"	Light yellow Brown	Loamy sand	Massive	Rapid	Free water

Length of pipe 120". Pipe above ground 12".
Water Table 72".

Log of Wells. Table LXIX. Well Three.

Thickness	Color	Texture	Structure	Permeability	Miscellaneous
0-24"	Dark Brown	Fine Silt loam	Single Grain	Moderate Rapid	Non Calcareous
24-60"	Brown	Loamy Fine Sand	Single Grain	Moderate Rapid	Calcareous 30"
60-72"	Light Brown	Fine Sand	Single Grain	Rapid	
72-120"	Light Yellow Brown	Loamy Fine Sand	Single Grain	Moderate Rapid	Mottled and has thin strata (½") of silt
120-132"	Yellow Brown	Fine Sand	Single Grain	Rapid	Saturated at 11' Strongly Mottled
132-146"	Stratified	Fine Sand & Silt	Laminated	Moderate Slow	Saturated
146-160"	Saturated	Fine Sand	Single Grain		Saturated

The thin strata in the 72-120" layer was mostly silt loam and they occured at the 84" and 96" depth. I don't believe there is much doubt about the alfalfa receiving much benefit from the free water table at 11 ft.

SOILS RESEARCH

Fertilizer Trials on Agronomy Crops 1952

Beginning this season a study of the amounts of nitrogen and phosphate needed by several crops to produce optimum yields was started in small replicated plots so that this work could be carefully done on the Station.

Crops selected for the work were: Oats, Seed Peas, Alfalfa Hay, Red clover, Russian wild rye seed.[1]

The method selected was patterened after varietal nurseries; each plot consisting of 3-5 row plots, 18-24 feet long, rows spaced 1-2 feet, plots randomized and replicated. Seeding is done with a belt seeder. Fertilizer application is also made with a belt seeder, adapted to the job by a divider and two shoes which distributes weighed amounts evenly in bands on each side of the row. Yield samples are taken from center rows after trimming.

All crops were seeded in the spring of 1952. Alfalfa, red clover and Russian wild rye plots are well established. Yields of annual crops, oats and peas, were obtained this season, and will require reseeding each season for the duration of the test.

[1]Nitrogen only will be used on this crop.

Fertilizer Study by Crops
Oats 1952

Three row plots 18 feet, rows spaced one foot. Fertilizer applied in bands near crop after seeding. Sixteen feet of center row harvest when ripe for yield. Plots randomized. Four replications.

Table LXX shows the fertilizers used, plot yields of grain in ounces and in bushels, and four plot average yields in bushels per acre.

From this data it will be seen that even with check yields above 100 bushels per acre that some treatments have increased yields.

Table LXX. Agronomic data from fertilizer trials on Mission oats under dryland conditions, Creston, Montana, 1952.

D-1

Fertilizer and Rate	Height (Inches)	Yield per plot bushels per acre I	II	III	IV	Total	Average
Check	49	111.72	121.03	98.42	86.45	417.62	104.40
15 N	52	109.06	133.00	98.42	99.75	440.23	110.06
30 N	52	107.73	125.02	83.79	90.44	406.98	101.75
30 P_2O_5	53	110.39	129.01	101.08	105.07	445.55	111.39
60 P_2O_5	53	125.02	148.90	102.74	91.77	468.43	117.11*
15 N - 30 P_2O_5	53	127.68	129.01	106.41	94.43	457.53	114.38*
15 N - 60 P_2O_5	53	110.39	134.33	93.10	101.08	438.90	109.73
30 N - 30 P_2O_5	52	123.36	133.00	95.76	98.24[1]	450.36	112.59
30 N - 60 P_2O_5	53	133.00	139.65	102.41	105.07	480.13	120.03**

[1]Calculated by missing plot formula.
*Significantly higher than check plot - 5%.
**Significantly higher than check plot - 1%.

Mean Yield 111.92
S. E. $\bar{x}$ 2.62
L.S.D. (P= .05) 8.51
L.S.D. (P= .01) 11.54
C. V. 2.62%

Seed Peas 1952

Seed peas, Teton, from Associated seed growers were seeded in five row plots, 20 feet long, rows spaced one foot, Four replications. Fertilizers were applied in bands near the row after seeding. Outside rows were pulled prior to harvest leaving three rows for seed yield data.

The amounts of fertilizer used, plot yields and four plot average yields per acre are shown in Table LXXI. Little seems to have been gained from this seasons work with this crop.

Table LXXI. Agronomic data from fertilizer trials on peas under dryland conditions, Creston, Montana 1952.

D-1

Pounds per acre and Fertilizer	Plot yield in ounces I	II	III	IV	Total Ounces	Average Ounces	Bushels per Acre
Check	23.00	44.00	49.50	40.00	156.50	39.12	29.57
10 N	48.50	48.20	44.00	48.50	189.20	47.30	35.76
20 N	50.00	40.00	46.00	48.50	184.50	46.38	35.06
30 P_2O_5	51.00	48.50	59.00	40.50	199.00	49.75	36.10
60 P_2O_5	46.50	42.50	46.00	48.50	183.50	45.87	34.68
10 N-30 P_2O_5	45.25	47.10	48.50	44.00	184.85	46.21	34.95
10 N-60 P_2O_5	45.00	55.00	46.50	42.00	188.50	47.13	35.63
20 N-30 P_2O_5	47.00	60.50	42.50	42.50	192.50	48.13	36.38
20 N-60 P_2O_5	50.00	33.50	42.00	40.50	166.00	41.50	31.37

Mean Yields 34.53
S. E. $\bar{x}$ 2.62
L.S.D. (P= .05) ..... N. S.
C. V. 7.60%

Fall v.s. Spring Fertilizer Application on Winter Wheat

When, or wheather commercial fertilizer should be used on the winter wheat crop in Northwestern Montana is a question asked by many farmers. The first attempt to find the answer on the Station was made in the fall of 1951. Wasatch winter wheat seeded at one bushel per acre rate on September 21, 1951 was staked off in nine plots, 14 ft, to permit three replicates of no treatment and fall and spring application of 6-30-0 at 200# per acre. Fall application was made September 21, spring application on April 19, 1952. Three 16 ft. row samples were taken in each plot for yield determination. Yields thus determined show no increase due to fertilizer. See Table LXXII.

Table LXXII. Agronomic data from commercial fertilizer application on winter wheat. N. W. Montana Branch Station 1951-1952.

E-4

Commercial Fertilizer	Date	Rate Lb/a	Plot Yields in Bushels per Acre I	II	III	Total	Average Bushel Per Acre
6-30-0	Fall	200#	20.3	22.7	18.6	61.6	20.53
6-30-0	Spring	200#	22.9	20.3	21.3	64.5	21.50
Check			19.4	19.8	20.0	59.2	19.73

Mean Yield 20.59
S. E. M 1.61
L.S.D. (P= .05) .... N.S.
C. V. 8.80%

Alfalfa and Kenland Red Clover

These crops were seeded in plot D-1, May 15, 1952, in five row plots 20 feet long, rows spaced one foot, two feet between plots, five feet between sections, four replications. Fertilizer applicatication will begin in 1953. Three center rows will be harvested for yield.

The planting plan nd schedule of annual fertilizer application is as follows:

East
Alfalfa

Replication 1	Plots 1-9
Replication 2	Plots10-18
Replication 3	Plots 19-27
Replication 4	Plots 28-36

Kenland Red Clover

	Replication 1	Plots 1-9
	Replication 2	Plots 10-18
	Replication 3	Plots 19-27
North	Replication 4	Plots 28-36

Annual Fertilizer Application

Treat. No.	Plot Numbers				N Lbs/a	P_2O_5
1	1	18	23	31	0	0
2	2	16	24	33	10	0
3	3	17	26	32	20	0
4	4	13	21	35	0	40
5	5	12	20	29	0	80
6	6	15	22	28	10	40
7	7	11	19	30	10	80
8	8	10	25	36	20	40
9	9	14	27	34	20	80

Planting Plans and Scheduled Rates Per Acre
For Perennial Crops.

Russian Wild Rye

This crop was seeded April 17, 1952 in Plot F-3 using twenty pounds of seed per acre. Three row plots 18 feet long, rows spaced two feet. Eighty plots are required for the scheduled study, but additional plots have been planted to occupy all of plot F-3, which will permit additional treatments if thought desirable.

Planting Plan

North

Section 1	Plots	1-7
Section 2	Plots	8-14
Section 3	Plots	15-21
Section 4	Plots	22-28
Section 5	Plots	29-35
Section 6	Plots	36-42
Section 7	Plots	43-49
Section 8	Plots	50-56
Section 9	Plots	57-63
Section 10	Plots	64-70
Section 11	Plots	71-77
Section 12	Plots	78-80

East

Schedule of Treatments

		Year and rate of Nitrogen application												Treatment	Plot Numbers			
		1952				1953				1954								
		0	50	100	200	0	50	100	200	0	50	100	200	No.				
1	No treatment	x				x				x				1	6	25	54	72
2	50 lbs. N each year		x				x				x			2	20	39	41	65
3	100 lbs. N each year			x				x				x		3	16	22	46	67
4	200 lbs. N each year				x				x				x	4	15	31	55	70
5	50 lbs. N 2nd. & 3rd. years	x					x				x			5	4	21	48	80
6	100 lbs. N 2nd. & 3rd. years	x						x				x		6	10	24	52	63
7	200 lbs. N 2nd. & 3rd. years	x							x				x	7	2	27	50	75
8	50 lbs. N 3rd. year	x				x					x			8	12	37	44	78
9	100 lbs. N 3rd. year	x				x						x		9	7	26	43	69
10	200 lbs. N 3rd. year	x				x							x	10	11	34	59	76
11	50 lbs. N 1st. year		x			x				x				11	19	36	49	64
12	100 lbs. N 1st. year			x		x				x				12	17	33	42	73
13	200 lbs. N 1st. year				x	x				x				13	5	38	58	62
14	50 lbs. N 1st. & 2nd. year		x				x			x				14	1	28	60	71
15	100 lbs. N 1st. & 2nd. year			x				x		x				15	14	40	57	61
16	200 lbs. N 1st. & 2nd. year				x				x	x				16	9	23	56	77
17	50 lbs. N 2nd. year	x					x			x				17	13	32	51	66
18	100 lbs. N 2nd. year	x						x		x				18	3	35	53	79
19	200 lbs. N 2nd. year	x							x	x				19	8	29	47	68
20	50 lbs. N 1st. year, 100 lbs. 2nd. & 200 lbs. 3rd.		x					x					x	20	18	30	45	74

Off-Station Fertilizer Trials 1952

Two fertilizer trials were made in 1952 off-station, neither of which show positive yield improvement by the treatments made.

One trial was on Pilot spring wheat on the John Sines farm west of Ronan. The wheat was seeded May 6, on spring prepared grass sod. The seed bed was such that poor seed cover could not be avoided. This condition, coupled with a dry spring accounted for poor stands. Fertilizer was drilled on just prior to seeding in plots 15 ft. x 100 ft. Yields were determined by random 16 ft. row samples.

Agronomic data on this trial appears in Table LXXIII.

The other trial was near Charlo on the Bill Eldridge farm. Fertilizer was drilled on 15 x 100 ft plots of alfalfa which was harvested for silage, May 9, 1952. Random samples were taken from three locations, one square yard in area in each plot prior to each of two cuttings were used to calculate seasons yields. Green weights were taken on the spot and dry weights determined by shrink samples weighed after thoroughly dry.

Agronomic data for this trial appears in Table LXXIV.

Table LXXIV Agronomic data from commercial fertilizer on spring wheat on John Seines farm Lake County, 1952.

Fertilizer	Plot Yields in Bu/a I	II	III	Total	Average
P_2O_5 60	25.5	25.5	22.9	73.9	24.6
P_2O_5 60 N 12	20.8	26.2	20.1	67.1	22.4
P_2O_5 60 N 30	23.9	20.8	30.7	75.4	25.1
Check	15.1	21.5	21.0	57.6	19.2

Mean Yield 22.83
S. E. $\bar{X}$ 2.23
L.S.D.(P = .05) .....N.S.
C. V. 9.77%

Table XVIII. Agronomic data from commercial feetilizers applications on alfalfa under irrigated conditions, William Eldridge farm, Charlo, Montana, in 1952.

Commercial Fertilizer	Rate in Pounds Per Acre	Plot yield in lbs/			Total	Average in Pounds	Pounds per Acre
		I	II	III			
Treble-super-Phosphate	150	69	66	67	202	67.33	5076.68
6 - 30 - 0	200	73	66	70	209	69.67	5253.12
Gypsum	300	58	61	68	187	62.33	4699.68
Check	0	67	60	53	180	60.00	4524.00

Mean Yield 4888.18
S. E. M 220.92
L.S.D. (P= .05) ..... N. S.
C. V. 4.52%

1952 HORTICULTURE OUTLINE

H-1 — ?

Potato Improvement

Influence of fertilizers under irrigation
Influence of fertilizers on dryland
Potato variety study — Prelim Early

Imports
Sugar Beet Varieties —

Sweet Corn Adaptation Study

Preliminary varietal study
Study of Uniform Varieties
Four year summary of sweet corn work

Onions

Small Fruit Studies

Raspberries
Strawberries

Landscape Plan Development

Ornamentals

Lillies
Mums

POTATO IMPROVEMENT
Influence of Fertilizers on Irrigated Potato Yields

Fertilizer work with irrigated potatoes has been continued very much as outlined in 1949. The use of barnyard manure instead of green manure as used in 1950 has been accepted as standard proceedure. In some way, not by choice, the row spacing this season turned out to average 48 inches instead of 42 inches, which did not leave room for the plots containing boron.

Prior to seeding the fertilizer attachment was carefully calibrated to make sure rates were kept very close to intended amounts.

Three irrigations were given of two inches each on July 16, August 5, and August 19. Check yields as well as fertilizer plot yields were higher this year than in past years. Responses varied somewhat from past patterns in that yields for phosphate alone and nitrogen alone were abnormally high.[1]

Yields were taken of field run potatoes in the center row of three row plots. Table H-I shows plot yields and three plot averages in hundred weights per acre.

Table H-2 shows three years average yields for each fertilizer application.

[1] Some change in responce pattern may occur due to rotation effect beginning in 1952.

Table H-1. Fertilizers on Irrigated Potatoes, Creston 1952. Plots with twelve loads manure per acre.

Treatment	Pounds field run potatoes per plot 130 ft. 48 in. row I	II	III	Total	Average	Cwt/A
Check	282	335	294	911	304.00	254.6
100# 10-20-0	383	357	330	1070	356.70*	298.8
200# 10-20-0	379	385	363	1127	375.7**	314.7
400# 10-20-0	374	379	379	1132	377.3**	316.1
100# 6-30-0	284	390	320	994	331.3	277.5
200# 6-30-0	402	392	358	1152	384.0**	321.7
400# 6-30-0	365	389	350	1104	368.0*	308.3
200# T. S. P.	412	391	380	1183	394.3**	330.3
150# Amon. Nit.	335	363	401	1099	366.3*	306.8
Check	311	327	277	915	305	255.5

* Treatments yielding significantly more than check 5%.
** Treatments yielding significantly more then check 1%.

Mean Yield 298.0
S. E. $\bar{x}$..... 12.0
L.S.D.(P= .05) 36.0
L.S.D.(P= .01) 50.0
C. V. 4.09%

Table H-1 (Continued). Fertilizers on Irrigated Potatoes, Creston 1952. Plots without Manure.

Treatment	Pounds field run potatoes per plot 130 ft. 48 in. row I	II	III	Total	Average	Cwt/A
Check	305	269	225	799	266.3	223.1
100# 10-20-0	335	312	303	950	316.7**	265.3
200# 10-20-0	330	342	352	1024	341.3**	285.9
400# 10-20-0	373	369	337	1079	359.7**	301.3
100# 6-30-0	305	320	311	936	312.0**	261.4
200# 6-30-0	376	356	326	1058	352.7*	295.5
400# 6-30-0	345	346	308	999	333.0**	278.9
200# T. S. P.	334	332	291	957	319.0**	267.2
150# Amon. Nit.	354	334	329	1017	339.0**	284.0
Check	260	231	222	713	238	199.4

* Treatments yielding significantly more than check 5%.
** Treatments yielding significantly more than check 1%.

Mean Yield 266.0
S. E. $\bar{X}$ 8.0
L.S.D. (P= .05) ..... 22 .0
L.S.D. (P= .01) 31.0
C. V. 2.82

Table H-2

Irrigated Potatoes. No Manure. Three year Average.

Treatment	1949	1951	1952	Total	Average
Check	136	168	223	527	175.6
1-10-20-	212	226	265	703	234.3
2-10-20	249	266	286	801	267.0
4-10-20	246	280	301	827	275.6
1-6-30	166	261	261	688	229.3
2-6-30	204	245	295	744	248.0
4-6-30	230	259	279	768	256.0
2 T. S. P.	158	248	267	673	224.3
150 Amon. Nit.	151	185	284	620	207.0

Table H-2 (Continued).

Irrigated Potatoes with manure. Three year Average.

Treatment	1949	1951	1952	Total	Average
Check	183	192	254	629	210
1-10-20	235	265	299	799	266
2-10-20	267	281	315	863	288
4-10-20	267	267	316	850	283
1-6-30	207	284	277	768	256
2-6-30	237	261	322	820	273
4-6-30	248	279	308	835	278
2 T. S. P.	204	275	330	809	270
150 Amon. Nit.	224	223	307	754	251

Effect on Dryland Potato Yields of Fertilizer Application

Beginning in 1951 work was started to determine fertilizer effects on dryland potato yields. This study was located on the same soil type as the irrigated trial, divided only by a 16 foot roadway.

Dates of seeding, kind of seed, row spacing, and all such factors are kept comparable except for the use of irrigation water. Four hundred pound rates have not been used on dryland but the two lower rates are the same. Samples taken on dryland are for the center row of a three row plot 792 feet in length.

1952 yields of field run potatoes from each treatment and yields in hundred weights per acre are shown in Table H-3. Again this year increases in yield for nitrogen-phosphate combinations is greater than for phosphate alone at both 100 and 200 pound rates, with little difference between the 10-20-0 and 6-30-0 fertilizers.

Table H-3. 1952 yields of field run potatoes from Dryland fertilizer plots 1/14 acre in size, and hundred weights per acre, for each treatment.

Treatment	Plot yield in pounds	Hundred weights Per Acre
Check	797	111.6
100# 10-20-0	1039	145.5
200# 10-20-0	1033	144.6
100# 6-30-0	1044	146.2
200# 6-30-0	1074	150.4
200# T.S.P.	928	129.9
Check	871	121.9

Table H-4. Two year average yields of dryland potatoes from fertilizer treatments in hundred weights per acre.

Treatment	1951	1952	Two year Average
Check	128.6	111.6	120.1
100# 10-20-0	189.3	145.5	167.4
200# 10-20-0	197.5	144.6	171.0
100# 6-30-0	184.2	146.2	165.2
200# 6-30-0	190.3	150.4	170.3
200# T.S.P.	134.7	129.9	132.3
Check	124.1	121.9	123.0

Table H-5. Comparative two year average increases over checks from fertilizers on dryland and irrigated land.

1951 -52, Two year average increase in hundred weights per acre.

Fertilizer	Dryland	Irrigated Land
100# 10-20-0	47.3	50.0
200# 10-20-0	50.9	80.5
100# 6-30-0	45.1	65.5
200# 6-30-0	50.2	74.5
200# T.S.P.	12.2	62.0

Potato Variety Study 1952

Except for new varieties the 1952 potato variety study was planted with seed grown on the Northwest Montana Branch Station in 1951. The planting was made June 2, in the Horticulture area near the farmstead, an old orchard site that had been fallowed two years following removal of the trees, for elimination of quack grass. The 1951 crop was grain.

Yields were very good, but scab was the heaviest found in the variety trials in the three year period the varieties had been grown.

Sixteen varieties were seeded in 25 ft. single row plots with three replications. Irrigation water was applied as required. Border rows eliminated weed competition and border effect. Some indication of virus infection was noted in some varieties, but this may actually have been nothing more than difference in vine character. On the whole vines were healthy throughout the growing season.

Plot yields in pounds of field run potatoes, three plot average yields in pounds per acre are shown in Table H-6, along with scab, size and type notes for each variety. Only two varieties, netted gem and B 5-15-2, were entirely free of scab.

Table H-6. 1952 Plot yields in pounds, three plot average yields in hundred weights per acre, and disease and quality notes for Potato Varieties. Plots 25 feet. 42 inch row.

Variety	Replications I	II	III	Total	Average	Cwt Per A	Scab[1]	Size[2]	Type[3]
Camus	78	85	81	244	81.33	404.9*	H	M	S
Early Rose	75	67	95	237	79.00	393.3	H	M	R
Erie	71	56	80	207	69.00	343.5	H	M	S
B 5-15-2	54	62	63	179	59.66	297.0	N	M-L	S
Netted Gem	61	68	60	189	63.00	313.6	N	M-L	S
Progress	66	64	72	202	67.33	335.2	H	S	S
Cayuga	55	67	61	183	61.00	303.6	L	S-M	S
Katahdin	68	73	48	189	63.00	313.6	H	L	S
Euclid	76	71	54	201	67.00	333.5	M-H	M	S
Soda	90	113	75	278	92.66	461.3*	V-H	L	S
White Could	60	76	85	221	73.66	366.7	H	M	S
Triumph	69	83	67	219	73.00	363.4	H	M-L	S
Yampa	66	79	61	206	68.66	341.8	M-H	L	C-R
Kasota	68	82	62	212	70.66	351.8	H	M	S
Waseca	69	82	58	209	69.6	346.8	V-H	L	S
Cherokee	79	98	83	260	86.6	431.4*	M-H	L	R-C

[1] H. Heavy, M. Moderate, L. Light, N. None, V. H. Very Heavy
[2] M. Medium, L. Large, S. Small.
[3] S. Smooth, C. Cracks, R. Rough, H. Hollow

*Varieties yielding significantly more than Netted Gem.

Mean yield.....356.3
S. E. $\bar{x}$ 28.8
L. S. D. (5%)..... 83.0
C. V..... 8.08%

Sweet Corn Adaptation Study

Two trials with sweet corn were conducted at the N. W. Montana Branch Station in 1952, a prelimenary trial of fifteen entries, and a uniform list of hybrids of twenty-one entries.

Both were hand planted in three-row plots eighteen feet long, rows spaced 42 inches on May 21, on dryland. The previous crop was grain. Soil and climactic conditions were quite favorable for our area until midsummer when some wilting indicated short soil moisture.

The preliminary trial was planted in duplicate plots. Yields were determined by snapping ears from the center row. Frequent inspection established dates of maturity. Table H-7. All varieties in this trial produced corn, some quite early.

The uniform list was planted in triplicate plots. Frequent inspection established dates of maturity for each plot. Yields were determined by harvesting the center row of the three-row plots. (Ten hills in eighteen feet of row.) Some corn was secured from all varieties, although one or two were too late to be depended upon in less favorable seasons. Table H-8.

Table H-7. Preliminary Sweet Corn Trial 1952.

Variety	Replication 1 First Ears	No.	Wt. in Pounds	Replication 2 First Ears	No.	Wt. in Pounds	Average No.	Lbs.
Earliest of All	8/14	15	5	8/14	22	7	18	6
Doriny	8/18	30	5	8/14	23	5	26	5
Sugar Prince	8/18	18	6	8/18	18	8	18	7
Altagold	8/14	20	6	8/14	18	6	19	6
Sunlite	8/22	24	12	8/18	20	9	22	10
Advance Guard	8/14	20	6	8/18	24	7	22	6½
Jefferson	8/22	23	12	8/30	20	14	21	13
Harvard	8/18	25	6	8/26	22	5	23	5½
Golden Honey	8/18	24	10	8/18	25	12	24	11
Surprise	8/14	25	10	8/14	22	10	23	10
Plymouth	8/18	26	5	8/18	25	6	25	5½
Minneature	8/18	20	6	8/18	28	8	24	7
Early Golden Cross C17-1-17-2 x C40	9/1	12	5	8/30	20	10	16	7
Charter 50825	8/14	26	7	8/14	30	8	28	7½
Sherman	9/3	13	10	9/2	2	1	7	5½

Table H-8. Uniform list of sweet corn hybrids for Branch Station Cooperative Trials, 1952.

Variety	Replication 1			Replication 2			Replication 3			Average	
	First Ears	No. Ears	Lbs.[1]	First Ears	No. Ears	Lbs.	First Ears	No. Ears	Lbs.	No.	Lbs.
Seneca 60	8/18	26	10	8/18	24	9	8/18	21	8	24	9
Seneca 60 x C 13	8/18	24	10	8/18	20	8	8/18	24	11	23	10
Sunup	8/18	25	10	8/18	24	11	8/18	27	11	25	11
Gold Mine	8/14	29	10	8/14	30	10	8/14	26	9	28	10
Imp. Spanc C 13.3	8/14	28	10	8/14	22	9	8/14	27	12	26	10
Alpine Bantam	8/14	23	8	8/14	23	8	8/14	24	8	23	8
Patrick Henry	8/18	21	9	8/18	18	8	8/18	22	11	20	9
Seneca Dawn	8/18	25	14	8/18	18	9	8/18	21	12	21	12
Marcross	8/18	16	7	8/18	18	8	8/20	15	7	17	7
Golden Jewel	8/26	23	11	8/26	15	6	8/26	26	14	21	10
Priscilla	8/18	18	10	8/18	19	7	8/18	23	10½	20	9
North Star	8/18	22	9	8/18	24	6	8/20	25	10	23	8
Our Choice	8/24	24	11	8/24	23	8	8/28	30	14	26	11
Earliest Pioneer	8/18	20	6	8/18	17	5	8/18	21	7	19	6
Golden Rocket	8/18	23	10	8/20	20	7	8/18	26	10	23	9
Imp. Carmel C 13.30	8/30	18	8	8/30	6	3	9/1	24	14	16	8
Golden Rule	8/28	20	7	8/28	15	6	8/24	21	11	19	8
Seneca Golden	8/28	21	9	8/30	21	8	8/30	16	7	19	8
Grant C 22.27	9/3	10	6	9/3	5	2	9/4	11	8	9	5
Pilgrim M-32-C-27	9/10	6	2½	9/10	3	1	9/5	10	5	6	3
Golden Bantam	8/26	23	6	8/30	19	6	8/26	18	5	20	6

[1] Weight green snapped corn (no. shown) from center row of plot, 10 hills, 18 feet of row, spaced 42 inches. Planted May 21, 1952.

Summary of Sweet Corn Studies
Northwestern Montana Branch Station 1949-52

In our four years of work with hybrid sweet corns at Creston, Montana, we have planted from 36 to 50 strains each year on dryland. Moisture has generally been adequate although supplemental moisture doubtless would have helped in the spring of 1950 and during late summer in 1949 and 1952. During this four year period we have tested 87 different hybrids for one or more years; 31 for only one year, 32 for two years, eight for three years and sixteen for four years.

Our primary interest in the corns is to find out wheather or not they will mature edible corn, and if so at what time of year. Twenty-six have failed to produce and so are considered to be too late for our area.

Corns that make in preliminary trials are given further consideration and in subsequent trials yield data is taken along with notes on the size of ear, height of stalk, etc. No particular attention is paid to quality or adaptability to freezing since these studies are being made at the Horticulture Department, M. S. C., and by the Horticultural Branch Station, Corvallis.

Of the twenty-four hybrids grown for three or more years twenty have produced each year planted which should recommend them as sure-crop varieties. The table following shows production data and varietal characteristics of the twenty sure-crop varieties.

Table H-9. Size, Number, and Date of ears taken from 20 Sweet corns grown for three or more years at Creston.

Source No.*	Variety	Ave. Date Ready	Ears per 100 ft. of row	Length (ins.)	No. Rows	Days in Production	Stalk Height	Ing
1	Alpine Bantam	8/16	108	6	10	14	48	
2	Seneca 60 x C 13	8/19	90	7	12	12	49	
2	Seneca 60	8/20	110	6½	10-12	10	51	
3	Sun-up	8/20	103	5½	12	10	52	
4	Surprise	8/21	83	6	12	10	50	
3	North Star	8/22	83	6	8-10	14	55	
5	Advance Guard	8/22	90	6	10	12	41	
6	Earliest Pioneer	8/23	83	6	8-10	10	43	
7	Priscilla	8/23	73	6	8-10	12	52	
8	Patrick Henry	8/23	70	6	12-14	11	45	
9	Golden Rocket	8/24	80	6	10-12	11	48	
4	Our Choice	8/25	83	6½	12	12	46	
2	Seneca Dawn	8/25	60	6½	14-16	12	49	
7	Harvard	8/28	83	5½	8-10	13	47	
10	Golden Jewel	9/1	58	6	12-14	11	57	
1	Hybrid Gold. Runner	9/1	Note	6½	12-14	9	58	
4	Golden Rule	9/2	52	6	8-12	8	48	
2	Seneca Golden	9/2	50	6	12	9	47	
10	Carmelcross C30. 13	9/3	36	6	12-14	7	47	
3	Northern Cross	9/3	Note	7	14	7	60	

* See Source list below.

From these data one might assume that it would be possible to secure a dependable early and midseason variety from either of 3 or 4 sources, and thus have corn from mid August until frost.

Source No. 1	Michael Leonard	Ames, Iowa
Source No. 2	Robson Seed Farms	Hall, New York
Source No. 3	Joseph Harris Co.	Rochester 11, New York
Source No. 4	Vaughan's Seed Co.	Chicago 6, Illinois
Source No. 5	F. H. Woodruff & Sons	Toledo 1, Ohio
Source No. 6	Oscar H. Will & Co.	Bismark, North Dakota
Source No. 7	Dreck's, Inc., 85 State St.	Boston 9, Mass.
Source No. 8	Chas. C. Hart Seed Co.	Westerfield 9, Conn.
Source No. 9	Northrup, King & Co.	Minneapolis, Minn.
Source No. 10	Eastern States Farmers Exchange	West Springfield, Mass.

Small Fruit Studies

Work with raspberries, that is yield studies as influenced by fertilizer, has been delayed one year by the need to secure comparable stands. Poor survival of 1951 plantings made necessary considerable resetting in 1952. This has been accomplished and treatments can be varied in 1953.

One recent strawberry selection was received and set at the Station beside gem berries secured from the Horticultural Branch Station. This was Selection 4931, supplied by Kroh Brothers Nurseries, Loveland, Colorado, who increased this selection for the Horticultural Field Station, Cheyenne. V. E. Iverson, M. S. C. was aware of the work and made the request which resulted in the plants being sent.

Twelve plants were received April 22, and set that date. All plants survived. Early bloom was picked but late bloom was allowed to produce fruit. This fruit was small, as compared to gem but very tasty.

Runners were produced profusely and allowed to produce new plants, the number, should they survive the winter may reach 100 although no actual count was made. Surviving plants will be set in a larger bed.

Landscape Plan Development

Additional work done in 1952 toward development of a plan for landscaping around Residence #1 prepared by V. E. Iverson includes making foundation plantings with evergreens secured from the Forestry School Nursery, Missoula, and setting some additional shrubs.

In the area designated as the picnic area an outdoor fireplace was built and a picnic table made, thus making the area usefull for the purpose designated.

Appearance of the yard was considerably enhanced by replacing an unsightly wooden back porch with a low cement patio surfaced with flat red stone; and by moving a service pole from near the house to a location at the edge of the lawn.

Even greater changes have been made around Res #2. The area surrounding the house was leveled and a lawn seeded which by now is well established. Evergreens were set in a simple foundation planting, and shrubs set to outline the back yard. Sidewalk was also built to both front and back doors of this residence.

Farmstead appearance was improved by removal of a row of delapidated poultry houses which bordered the highway. One 18 foot section was found to be sound and this was moved to a new location south of the large barn and built on to, to provide a shed for sheep. The remainder was wrecked.

Ornamentals

Flowers were exceptionally beautiful at the N. W. Mont. Branch Station this season. At no time were we without flowers to brighten the landscape from the blooming of tulips until heavy freezes stopped dazies, asters, and mums about November first. Pansys, lillies, phlox, foxglove, poppies, delphinium, sweet peas, gladiolas, asters, and mums each added much to the variety of color.

One of the prettiest sights was the bed of Croft Lillies. Set with twelve bulbs in the spring of 1951 this bed contained many more plants in 1952 and at peak performance contained upwards of 100 beautiful white blossoms.

A colored slide taken of a Poppy bed furnishes proof of the beauty of this hardy flower. Surviving construction, leveling, lawn seeding, excavation for the 1000 gallon fuel tank and vigorous digging for quack grass removal, this volunteer bed was one of the most attractive on the farm.

We had nearly given up having lillies from the bulbs set October 22, 1951, by the time they began to emerge. Little doubt remained after they began to show however. Height, number of blooms, and date of blooming is shown for each of the 17 below in Table H-10. All appeared to be healthy.

Table H-10. Height, Number of blossoms and date of blooming of seventeen Lillies set October 22, 1951.

Variety	Height Inches	Number Bloom	Date of Bloom
Apache	30	4	7/13
Fireflame	28	8	7/11
Goldrush	24	6	7/7
Harlequin	24	8	7/20
Serenade	28	9	7/12
Vagabond	26	5	7/15
Velencia	28	7	7/15
Campfire	22	4	7/16
Enchantment	32	7	7/16
Harmony	30	15	7/14
Pagoda	28	3	7/11
Joan Evans	28	14	7/13
Fiesta Hybrid	40	12	7/14
Hollywood Hybrid	36	6	7/3
Golden Chalice Hybrid	24	3	6/25
Talisman	46	9	6/16[1]
Olimpic Hyb. L. Centifolium	32	3	7/24

[1]This date appears in notes but may be 7/16 since I believe 6/25 to have been the date of the first blossom.

Not all of the Mums set March 24, 1951 have survived. some that sent out leaves in the Spring of 1952 had possibly been weakened by the winter and died after emergence. Several have been vigorous this season however and have produced many colorful blossoms.

Twenty three plants remain of the 35 set. Twenty are vigorous, three not too much so. Baring posibility of error in determining locations, remaining plants are of the following varieties: Lavender Lady
Golden Carpet
Chippewa
Joan Helen
Bronze Mound
Pink Surprise
Powder Puff
Olive Langland
Harbinger
Achievement
Dee Dee Shvens
Tapestry
Sunappee

Since two or three plants of the same varieties were set this list represents one or more plants of all varieties set except W. P. Snyder and Santee.

ACTIVITIES 1952

Slides

Perhaps the most effective method used in 1952 to acquaint farmer and business men with the work of the N. W. Montana Branch Station was a series of color slides, prepared with the help of County Extension Agent Walt Mauritson. This series was prepared as a pictorial "Progress Report", and included charts showing preliminary reports of certain phases of the Station work as well as actual pictures of crops, experimental plantings, and crop response to fertilizer.

Copies of this Slide Report were made available to County Agents and Extension Specialists for use in meetings. Some agents made extensive and very effective use of the slides in meetings dealing with crop improvement and soil fertility.

The slides were shown by the Station Superintendent at fifteen meetings in four counties to an estimated 1275 persons.

Assistance has been given with several meetings where slides were not shown.

Field Days

One Field Day was held in 1952 on July 23, with 150 or more in attendance. Flathead, Lake and Mineral counties were well represented, while other N. W. Montana counties had small numbers present. As in past years the group met at the Creston Hatchery for lunch and an informal program, then took part in a conducted tour of experimental plots on the Station.

Group Meeting on the Station

Several groups met at the Station in 1952 to see the experimental work or discuss various problems dealing with research. Larger groups and their purpose of meeting is as follows:

Group	Purpose
N. W. Mont. County Agents	See Station work and help with Field Day.
M. S. C. Research Staff and Branch Station Personnel	First annual Summer Conference.
N. W. Mont. Branch Station Advisory Committee	Organize and view Station projects.
Flathead County Rural teachers	Conservation Education
Central Junior High School	Conservation Field Day
Columbia Falls Cub Scouts	Outing

Fairs

Station personnel assisted with judging of crops exhibits at the Sanders County Fair, the Lake County Junior Fair, and the Charlo Community Fair.

Other Activities

Station personnel has served on the County Mobilization Committe, the Agriculture Committee of the Kalispell Chamber of Commerce, and helped with Conservation Education for Primary teachers. They represented the Experiment Station in the N. W. District Rural Progress Conference and the Montana Resource Council.

LIVESTOCK 1952

Livestock on the N. W. Montana Branch Station as of January 1, 1953 consists of 22 head of Columbia ewes and ewe lambs. Nine were born in 1950, five in 1951, and eight in 1952. Seven of the eight 1952 lambs were secured from Whites in October 1952.

These are not as yet the property of the Station, although partial payment has been made under the agreement with White's at Rollins.

Seven lambs were raised in 1952 from ten ewes. Twelve were dropped of which five were lost. One ewe also died following lambing.

Losses have been heavy in this small flock. The loss of three ewe lambs born in 1951 can be attributed to worms. One was drowned. Loss of one ewe and five lambs at lambing time is probably due to two major causes: (1) Poor condition of ewes. All were barely two years old when they dropped their second lambs. Results indicate that the roughage diet of hay and silage had not resulted in proper condition. (2) Lack of experience in lambing on the part of Station personnel.

Fleece weights when shorn February 16, 1952 varied from nine to thirteen pounds for the ewes and four and one half to seven pounds for the 1951 lambs. One- hundred and twenty-eight pounds of wool has been offered for sale through the Northwestern Montana Well Growers Association pool.

On October 25, 1952 Whites accepted six, 100 pound lambs in partial payment on the sheep purchase agreement.

I . Summary of climatic data by months for the 1951-52 crop year (September to August) and averages for the 1949-1952, at the Northwestern Montana Branch Experiment Station, Creston, Montana.

	Month												Total or Ave.
	Sept. 1951	Oct. 1951	Nov. 1951	Dec. 1951	Jan. 1952	Feb. 1952	Mar. 1952	Apr. 1952	May 1952	June 1952	July 1952	Aug. 1952	Growing Season
tation (inches)													
rrent year	1.49	5.62	1.01	3.31	1.03	.98	.97	.17	1.32	3.95	.56	.69	21.10
e. 1949 to 1951-52	1.01	2.98	1.28	2.24	1.53	1.13	1.21	1.08	1.67	2.85	1.64	1.19	19.81
mperature (°F)													
rrent year	50.6	40.8	30.8	16.9	18.0	26.6	29.3	48.8	54.0	56.7	61.8	62.8	41.2
e. 1949 to 1951-52	52.8	42.7	33.6	23.8	8.3	26.7	29.3	44.4	52.1	57.1	63.3	62.4	41.4

lling frost in spring*

52 - June 14, (32°F)

e. 1949 to 1951-52 - June 11

illing frost in fall*

52 - Sept. 8 (29°F)

e. 1949 to 1951-52 - Sept. 12

ree period

52 - 85 days

e. 1949 to 1951-52 - 94 days

summer temperature - 90° F on July 31, 1952

winter temperature - 20° F below zero on Dec. 23, 1952

is summary 32° is considered a killing frost.