

N.W. Mimeo. Cir. No. 108

Jan. 1959

THE  
FIRST  
10-YEARS

1958 PROGRESS REPORT  
Northwest Montana Branch Station  
Route 4, Kalispell, Montana

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Vern Stewart, Assistant in Agronomy

## INTRODUCTION

Each year a complete report is made to the Director of the Experiment Station. Each year also, a Progress Report is made to the people of the area. This report is made available to County Agents in Northwestern Counties for distribution to farm and ranch people.

This 1958 Progress Report differs slightly from preceding issues in that an attempt is made to summarize the work of the entire 10 year period, 1949 to 1958, that the Northwestern Montana Branch Station has been in operation. Hence the title, "THE FIRST 10 YEARS".

It is not our intent to recommend wholesale adoption of any practice as a result of our findings in trials limited in time or scope. Rather we wish to comply with a request that our findings be made known, so that those who wish may try them out under farm conditions.

## COOPERATORS

Work done in the field of agronomy and soils is done in cooperation with the Agronomy and Soils Department, Montana State College, work in horticulture in cooperation with the Horticulture Department, etc.

In 1958 more than usual kinds and amounts of assistance has been asked for and received from Montana State College. Help in planning, chemical analysis, statistical analysis, and with programs has involved the Departments of Chemistry, Mathematics, Animal Industry, Agricultural Engineering, Agricultural Economics and Rural Sociology and Botany and Bacteriology in addition to extension specialists and agriculture research service men in various fields. This help is gratefully acknowledged. Locally the Branch Station Advisory Committee, the county agents, U.S.D.A. Agencies, farm organizations, and numerous individuals have rendered valuable assistance.

If more information is wanted write: Northwestern Montana Branch Station, Route 4, Kalispell or call Turner 4-2411.

### GROWING WITH THE AREA WE SERVE

From a 75 acre dryland farm to a 155 acre Station, where both dry land and irrigated work is done, is the record of progress. This has been accomplished by development of an irrigation system for a portion of the farm, and by leasing an additional 80 acres.

One residence has been remodeled and another one built to provide two modern homes for Station Staff.

**Buildings:** Three modern steel grain bins have been erected. A 40 ft. by 64 ft. crops research building was constructed in 1958. An additional building is planned so that old rough lumber and log structures can be removed.

**Equipment:** With the help of a member of the Advisory Committee who has a machine shop a 4-row tractor operated belt seeder was designed and built. Flathead County Pomona Grange, Conservation District Supervisors, and others provided the Station with a 5 horse garden tractor. A forage drying facility has been built. Through surplus property channels and by regular purchase numerous necessary equipment items have been secured.

**Staff:** An Assistant in Agronomy was added to the staff in 1953. Now we are pushing hard for a Soils man to give us a three man staff.

**Better Utilities:** Service to the Station has been improved. The highway passed the Station has been oiled. The local phone company sold out to Pacific Power and we now have dial phones. REA power lines now furnish adequate electrical power. Instead of walking to the Creston Postoffice for mail, we now get it daily on Route 4, out of Kalispell.

**Research:** The end result of land, buildings, men, machines, and services, is research. During the first ten years, finding simple answers to relatively simple problems has been a large part of our work. Increasingly in more recent years, and in years to come, more factors need be considered, and their influence carefully measured. A simple answer is seldom the whole answer, and in the future our research will need to be increasingly complicated, increasingly thorough.

1958	1959	300	300	-3-	8	1958	300	300	15	1958
1959	1959	300	300		4	1958	300	300	8	1958
1958	1958	300	300		8	1958	300	300	15	1958
1958	1958	300	300		4	1958	300	300	8	1958

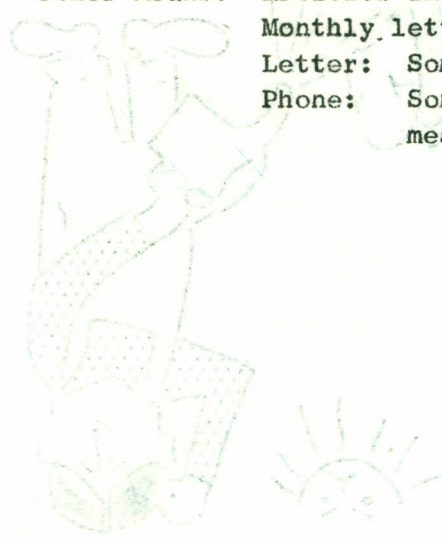
INFORMATION

This Progress Report is one means employed by the Northwestern Montana Branch Station of acquainting the people in Agriculture with the results and nature of work being done. It is not the only means used, however.

Field Day: Each year a field day is held. Every interested person is welcome. This annual event has been held each year since 1949. Responsibility for advertising this event usually rests primarily with the extension agents in the area. Ask your county agent. He will know the date, usually near July 20, and the subject of the program. During the first few years an attempt was made to tour all research projects. Recently we have thought we could do a better educational job by concentrating efforts on particular topics. In 1958 the theme was forage quality. Montana's Approved Varieties has been selected as the theme for 1959.

Meetings: Some staff member from the station will be made available, if possible, for some public meeting in each Northwestern County each year. Occasionally more than one. Meetings attended in past years include the Seed Show at Kalispell, Conservation Days in several counties, farm organization meetings, annual meetings of Cooperatives, and meetings dealing with subjects being investigated at the Station.

Other Means: Articles in farm papers.  
 Monthly letters to agents.  
 Letter: Some write for specific information.  
 Phone: Some call us. Our busy schedule makes this means of communication somewhat unsatisfactory.



INFORMATION

IRRIGATION



1951-1953 Various rates and frequencies were used during this period on several crops. As might be expected, high rates were best in dry years, low rates in wet years. We were no closer to an answer at the end than at the beginning of the period.

1954-1958 An attempt was made to relate irrigation to the moisture conditions of the particular season in which the irrigation was being done. Various amounts per day, from 0.1 of an inch to 0.2 of an inch were used, and these amounts reduced by the amount of actual rainfall.

If the sun shines and \_\_\_\_\_

0.2 of an inch a day, less rain, applied as often as reasonable amounts were needed, proved to be very effective.

An evaporation tank (B.P.I. Pan) was enstalled in 1955. This was used to indicate need for irrigation. This is a straight sided tank, 6 ft. across and 2 ft. deep, and is set in the ground to ground level.

Using 2 to 3 inches of water whenever this amount has been lost from the tank during the growth period of a particular crop, has been the most efficient method we have yet used for determining how much water is needed. See chart below: If soil is dry at the beginning of the season an early irrigation should be used, prior to starting this tank schedule.

COMPARISON OF YIELDS AND WATER USED BY TWO IRRIGATION METHODS.

Year	Crop	<u>TANK METHOD</u>		<u>.2 IN. DAY LESS RAIN</u>	
		Yield	Water Used	Yield	Water Used
1956	Aflalfa	3.8 T.	6 Ins.	3.5 T.	9.8 Ins.
1958	Aflalfa	3.6 T.	10 Ins.	3.7 T.	14.5 Ins.
1956	Barley	81.4 Bu.	3.2 Ins.	76 Bu.	6.2 Ins.
1958	Barley	96 Bu.	6 Ins.	92 Bu.	7 Ins.
1956	Corn Silage	26.3 T.	4 Ins.	27.3 T.	6.2 Ins.
1958	Corn Silage	24.2 T.	9.5 Ins.	26.9 T.	13 Ins.
1956	Potatoes	350 Cwt.	4 Ins.	312 Cwt.	8 Ins.
1958	Potatoes	346 Cwt.	8 Ins.	334 Cwt.	12 Ins.

Water is applied by a Sprinkler System.

FERTILIZERS

Fertilizers have been used in station and off-station trials every year since the station was established. Up until 1953 except on potatoes on the station, rates seldom exceeded 200 lbs. per acre of fertilizer material, and response was measured by yield. At the rates used response to Nitrogen-Phosphate combinations was usually greater and more often received than response to either Nitrogen or Phosphate used alone.

Typical of reports for the 1949-1953 period is the following, taken from the 1953 Progress Report.

YIELD PER ACRE

Crop	Location	Year	Check	P <sub>2</sub> O <sub>5</sub>	N. & P <sub>2</sub> O <sub>5</sub>
Hay	Libby	1949	2.58 T.	2.63 T.	2.97 T.
Barley	Charlo	1950	23.4 Bu.	26.0 Bu.	27.8 Bu.
Oats	Creston	1952	104.4 Bu.	117.1 Bu.	120.0 Bu.
Potatoes	Creston	4 yr. Ave.	188 Cwt.	230 Cwt.	270 Cwt.

Since 1953 the county soil labs have shown the extent and seriousness of phosphorus deficiency in the area, and helped relate fertilizer application to soil need. Also since 1953 quality factors have been receiving consideration, and effect of fertilizers on protein and phosphorus content of grains and forages has been determined by chemical analysis of numerous samples.

EFFECT OF FERTILIZER ON YIELD OF HAY

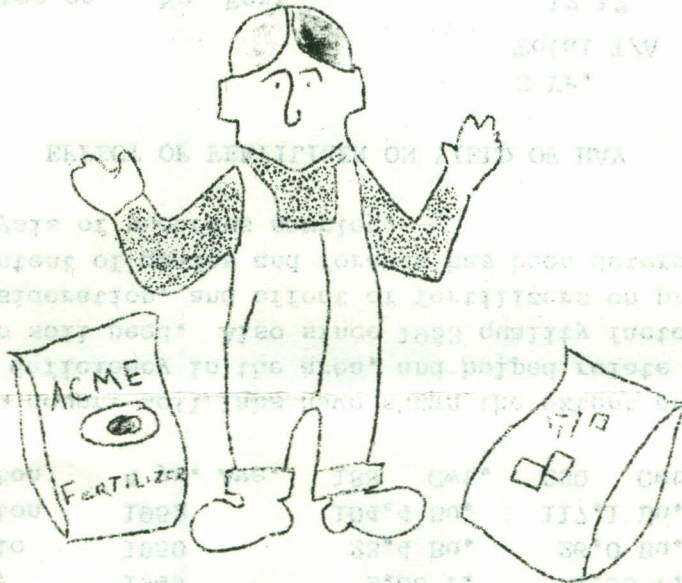
		No. Fert.	3 Yr. Total T/A	Ave./Yr.
Fertilizer rates on				
alfalfa, Creston	100 T.S.P. Annually		12.17	4.06 T.
1953-55	200 T.S.P. Annually		13.22	4.41 T.
			14.46	4.82 T.
400 lbs. T.S.P. on	Alfalfa		15.59	5.20 T.
Hay, prior to seeding	Alfalfa & Orchard		17.54	5.85 T.
Creston, 1955-57				
			T/A, 1957	
Nitrogen on Native	No Fert.		3.25	
Hay, Marion, 1957	400 lbs. N.		5.12	

EFFECT OF FERTILIZER ON PHOSPHORUS CONTENT

	No. Phos.	3 or 4 Cwt. T.S.P.
1956 Clover Hay, Creston	.10%	.20%
1957 Clover Hay, Creston	.13%	.23%
1957 Native Hay, Marion	.09%	.20%

**EFFECT OF FERTILIZER ON PROTEIN PRODUCTION**  
 TABLE OF RESULTS ON PHOSPHORUS CONTENT  
**Protein**

	No. Fert.	With Fert.	
1956 Clover Hay, Creston	1030	1450	3'88 L'
1957 Native Hay, Creston	412	577	4'30 L'
1957 Bromegrass, Polson	248	455	4'00 L'
1953-29	500 L'S'B' VUUCSTIA	14'80	4'83 L'
STATION' CLEARON	100 L'S'B' VUUCSTIA	13'85	4'41 L'
STATION' CLEARON	NO' 1902'	13'12	4'00 L'
			4'00 L'



**Decisions, decisions, too many decisions**

**FERTILIZER ON SMALL GRAINS**

A great many fertilizer trials on small grains have been put out and harvested throughout the Northwestern Montana area during this 10 year period.

The easiest way to cancel out real responses on these is to add them all together and compute average responses. Or in other words, response has varied with fertility or soil or climatic conditions.

A number of trials on high organic, low phosphate soils indicate that use of adequate amounts of phosphorus fertilizer is the best fertilizer treatment.

GRAIN PRODUCTION ON LOW PHOSPHATE HIGH ORGANIC MATTER SOILS

<u>Years</u>	<u>Location</u>	<u>Crop</u>	<u>Check</u>	<u>Bushels per Acre</u>		<u>N. &amp; Phos.</u>
				<u>Phos.</u>		
1953	Ronan	Oats	134.0	180.2		167.25
52-54	Creston	Oats	132.3	142.8		142.1
56-58	Creston	Wheat	41.3	62.6		61.1
1958	Sanders	Barley	30.2	55.9		49.6
1958	Lake	Barley	29.8	41.9		40.1

In numerous other trials where neither phosphorus or organic matter content are particularly high, grains respond to phosphorus; and Nitrogen in addition to phosphorus produces additional yield.

PRODUCTION ON SOILS LOW IN ORGANIC MATTER AND PHOSPHATE

<u>Years</u>	<u>Location</u>	<u>Crop</u>	<u>Check</u>	<u>Bushels per Acre</u>		<u>N. &amp; Phos.</u>
				<u>Phos.</u>		
1955	Arlee	Barley	27.0	33.6		40.6
1957	Flathead	W. Wheat	23.1	27.9		40.3
1958	Flathead	Barley	21.0	32.1		43.2
1958	Flathead	W. Wheat	24.9	33.1		41.4

In a few cases trials have been located on soils with adequate phosphorus content for grain, and nitrogen alone gives a good yield increase.

GRAIN PRODUCTION ON SOILS WITH HIGH PHOSPHATE, BUT LOW IN ORGANIC MATTER

<u>Year</u>	<u>Location</u>	<u>Crop</u>	<u>Check</u>	<u>Bushels per Acre</u>		
				<u>25N.</u>	<u>50N.</u>	<u>25-80</u>
1955	Flathead	Barley	16.5	24.3	40.3	25.9
1955	Frenchtown	Barley	31.5	45.1	41.5	40.3
1957	Flathead	Barley	24.8	30.5	35.7	32.9

Fertilizers sometimes increase the protein percentage of grains. However, when sizable yield increases are received, protein percentage may decrease.

If an increase in total pounds of protein is desirable, as it might be in the case of feed grains, fertilizers will in many cases accomplish this objective.



When low protein percentage is desired, as with malting barley, fertilizers that raise yields may result in lower proteins. In a fertilizer trial in Flathead County in 1958, the protein content with no fertilizer was 15%. On phosphate plots with no nitrogen 11.9% and on plots with 25 pounds of actual nitrogen and phosphate 12.0%.

Protein was increased, percentage-wise, in five fertilizer trials on grains, 1955 to 1958, by use of nitrogen; from 0.4 of one percent to 1.2% for an average of 1.0%.

Total protein per acre was increased by from 96 pounds to 111 pounds in fertilizer trials in Lake and Flathead Counties by the use of nitrogen.

FERTILIZERS FOR GRASS SEED

In production trials with grass, 1950-53, it was obvious that certain species, notably Russian Wild Rye, did not set seed readily without fertilizer. Other high producing species declined in yield rapidly without fertilizer.

In fertilizer trials on Russian Wild Rye, 1953-56, there was little agreement between plots receiving a given treatment. However, we believe that the four year average yield of 208 pounds per acre with 100 N. each year could be duplicated. Note: this particular grass is getting seed heavily on highly alkaline soils at Warden, Montana.

PRODUCTION OF FESCUE SEED WITH FERTILIZERS

In trials with fertilizers on Alta Fescue seed the use of phosphorus fertilizers seems highly beneficial.

Year	Age of Stand	Check	Nitrogen	N. & Phos.
1955	6 yrs.	230	177	290
1956	7 yrs.	123	112	177
1958	2 yrs.	283	265	569

PRODUCTION OF FESCUE SEED WITH FERTILIZERS

FERTILIZERS FOR POTATOES

Two different series of fertilizer trials on potatoes have been completed at Northwestern Branch Station. Results have been made known to growers by mimeographed Progress Reports and at meetings.

Very briefly, the 1949-52 trials were with rates of 10-20-0 and 6-30-0 compared to single rates of Treble Super Phosphate and Ammonium Nitrate, on both dryland and irrigated land. Average yields are shown in the table below. Twelve loads of barnyard manure per acre on irrigated land increased the yields shown in the table by 27.7 Cwt. per acre.

NETTED GEM POTATOES YIELDS IN FERTILIZER TRIALS

<u>Fert. per Acre</u>	<u>CWT. PER ACRE</u>	
	<u>3 yr. Ave. Dry</u>	<u>4 yr. Ave. Irr.</u>
None	127.9	188
100 lbs. 10-20-0	173.6	235
200 lbs. 10-20-0	177.4	269.75
400 lbs. 10-20-0		279.25
100 lbs. 6-30-0	171.3	237.75
200 lbs. 6-30-0	171.4	250.6
400 lbs. 6-30-0		263.75
200 lbs. 0-42-0	138.4	230.5
150 lbs. 33- 0-0	136.9	220.9

The second series involved rates of nitrogen used in addition to standard rates of phosphate; 300 lbs. T.S.P. on irrigated land, 200 lbs. on dryland.

On dryland 20 lbs. nitrogen per acre increased total yields 7.3 Cwt. per acre, sorted yields 5.7 Cwt. per acre, based on 3 year averages.

On irrigated land 20 lbs. nitrogen per acre increased total yields 13.7 Cwt. per acre, sorted yields 9.7 Cwt. per acre, based on 3 year averages.

POTATO YIELDS, 3 YEAR AVERAGE, CWT.

<u>Dryland</u>	<u>Sorted</u>	<u>Total</u>
200 lbs. T.S.P. No Nitrogen	111.7	124.1
200 lbs. T.S.P. 20 lb. Nitrogen	117.4	131.4
<u>Irrigated</u>	<u>Sorted</u>	<u>Total</u>
300 T.S.P. No Nitrogen-No Manure	236.4	250.1
300 T.S.P. No Nitrogen-Manure	251.5	265.5
300 T.S.P. 20 Nitrogen-Manure	261.2	279.2

300 1*2*2* 30 Nitrogen-Phosphate	507*3	320*3
300 1*2*2* 40 Nitrogen-Phosphate	507*2	320*2
300 1*2*2* 40 Nitrogen-40 Phosphate	506*4	320*4

-10-

300 100* 1*2*2* 30 10* Nitrogen	513*3	321*3
300 100* 1*2*2* 40 Nitrogen	511*3	321*3

**INFLUENCE OF FERTILIZER\* ON RASPBERRY PRODUCTION**

Ammonium Sulphate applied/Ave.		Sawdust**	Raspberries Flats per Acre
1956	1957		
None	None	None	446
none	none	3" - 1956-57	627
300	150	3" - 1956-57	702
300	300	3" - 1956-57	768

\* A 300 pound per acre application of Treble Superphosphate was made to all plots in 1956.

100 100* 33-0-0	530*3	330*3
100 100* 0-33-0	530*4	330*4
100 100* 0-0-33	528*32	328*32
100 100* 10-30-0	531*4	331*4
100 100* 0-30-10	531*3	331*3
100 100* 10-30-0	530*4	330*4
100 100* 0-30-10	530*3	330*3
None	531*3	331*3

\*\* Fresh sawdust from mill.

CAL\* 100\* 100\*

FERTILIZERS FOR RASPBERRIES

1956 increased the yields from 446 to 768 lbs. per acre. The increase was due to the application of 300 lbs. of ammonium sulphate and 300 lbs. of treble superphosphate. The application of 300 lbs. of ammonium sulphate alone increased the yield to 627 lbs. per acre. The application of 300 lbs. of treble superphosphate alone increased the yield to 702 lbs. per acre. The application of 300 lbs. of ammonium sulphate and 150 lbs. of treble superphosphate increased the yield to 702 lbs. per acre. The application of 300 lbs. of ammonium sulphate and 300 lbs. of treble superphosphate increased the yield to 768 lbs. per acre.

FERTILIZERS FOR RASPBERRIES

FORAGE SPECIES AND VARIETIES-DRYLAND

Harvest data has been obtained from two off-station dryland grass plantings.

<u>Species and Variety</u>	<u>LBS. PER ACRE</u>	
	<u>Eureka</u> <u>1 Yr.</u>	<u>Hot Springs</u> <u>4 Yrs. Total</u>
Standard Crested	1163	
Nordan Crested		5340
Slender Wheatgrass	1418	
Intermediate Wheatgrass	2846	3369
Pubescent Wheatgrass	1990	4483
Tall Wheatgrass		4242
Manchar Brome		3132
Lincoln Brome	1451	
Ladak Alfalfa		4795

Creeping Alfalfa failed to creep in a dryland trial on the station, containing both creeping and standard varieties. Plants of Rambler set out in 1956 seem to be taking off.

Three year average yields of Nomad were .9 T. less than Ranger, for Rhizoma - .3 T. more than Ranger in this trial.

Alfalfa produced three times as much hay as Crested Wheatgrass in one five year dryland hay trial on the station. This was due to the ability of alfalfa to range to a depth of several feet for moisture.

In a comparison of alfalfa and Milkvetch for dryland hay, alfalfa yields exceed those of either Cicer or Sickle Milkvetch by one ton per acre per year in the first two harvest years on the Creston station.

In work with annual hays, only occasionally do peas or hairy vetch increase yields of oats alone for dryland hay, although they doubtless increase the protein content. Four year average yields, 1950-53 were for oats - 1.63 T.; for oats and peas - 1.59 T.; and for oats and vetch - 1.65 T.

Corn silage on dryland at Creston has produced 13.5, 7.6 and 8.6 tons per acre in three successive years, 1956-57-58, in a rotation of corn silage and winter wheat.

FORAGE SPECIES AND VARIETIES-IRRIGATED

A number of trials involving grass and legume species and varieties have been completed on the station, others are in production. Off-station comparisons of short duration have been harvested.



Seed Catalogs only make it harder to chose.

4 Yr. Ave. Tons Per Acre Irrigated Hay 1950-53 - Station		
Alfalfa alone	6 grasses	6 grass-alfalfa mix
1.85	1.77	2.62

3 Yr. Ave. Tons Per Acre Irrigated Hay 1954-56 - Station			
Alfalfa alone	Kenland Alone	6 Grass-Alfalfa Mix	6 Grass-Clover Mix
4.01	3.79	4.37	4.12

2 Yr. Comparison of Legume Species for Hay T/A. - Station				
3 Trefoils	2 Red Clovers	2 Milkvetch	5 Alfalfas	
3.39	4.15	3.46	5.01	

One Year Yield of Grasses Seeded in Native Meadow  
From one Cutting on July 25  
Off-station

Reed Canary	Lincoln Brome	Intermed. Wheatgrass	Alta Fescue
3.69	3.44	2.40	2.11

SPECIES AND MIXTURES IN OFF-STATION TRIALS -- 1954

Species or Mixture	Tons Per Acre		
	West Ravalli 2 cuts	Eureka 2 cuts	West Sanders 1 cut
Ladak Alfalfa	4.82	---	1.79
Kenland Clover	4.54	---	2.35
Birdsfoot Trefoil	4.41	---	1.59
Brome-Alfalfa	5.03	3.14	1.48
Fescue-Alfalfa	5.83	3.23	1.36
Orchard-Alfalfa	4.00	2.93	1.50
Interm.-Alfalfa	4.71	3.45	1.40
Tall-Oats-Alfalfa	5.11	4.30	1.23
Timothy-Alfalfa	4.35	---	1.53

LBS. PER ACRE DRY CLIPPINGS FROM PASTURE MIXTURE -- 4 YR. AVE.

	1950-53	1954-57		1950-53	1954-57
Huntley Mix	2349	----	Alta Ladino	2800	4309
Brome-Alfalfa	2593	----	Alta-Trefoil	----	4034
Orchard-Ladino	2500	4183	Tall Blue-Ladino	1682	3306
Orchard-Trefoil	----	4423	Tall Blue-Trefoil	2226	3510
Brome-Ladino	2118	3808	Interm.-Ladino	----	3755
Brome-Trefoil	----	3925	Interm.-Trefoil	----	3560

4 YEAR AVERAGE GRASS SEED YIELDS - LBS. PER ACRE 1950-53

<u>Species and Variety</u>	<u>Dryland</u>	<u>Irrig.</u>	<u>Species and Variety</u>	<u>Dryland</u>	<u>Irrig.</u>
Crested Wheatgrass	746	---	Manchar Brome	501	347
Russian Wildrye	82	59	Potomac Orchard	170	278
Interm. Wheatgrass	343	320	Creeping Red Fescue	209	---
Alta Fescue	679	604	Reed Canary	61	147

VARIETY TRIALS WITH FORAGE CROPS -- RESULTS OBTAINED (1)

<u>Date-Length</u>	<u>Description</u>	<u>Results</u>
'51-4	14 Brome Varieties for Seed	Mean Yield 353.5 lbs.
'52-4	9 Orchardgrass Varieties for Hay	Potomac recommended.
'54-7	4 Species, 20 Varieties, Legumes	Ladak Alfalfa best.
'55-7	10 Trefoil Varieties for Pasture	Empire and Tana as good as any.

(1) Complete results are filed for reference.

Kenland Clover Seed production on the station started with the seeding of Breeder's Seed of Kenland in 1949. From this planting came the Foundation Seed with which Montana and Wyoming growers seeded a large acreage for Registered seed production.

Time keeping revealed that 40 hours or more of hand labor was required to weed cultivated rows of clover. Hence, the station effort to devise cheaper methods of production. Work done with chemical weed control by Herb Leighty on the N.W. Branch Station in 1951 indicated that Med. Red Clover had a certain amount of tolerance to 2-4-D, and this fact and others, has led to development of a system of seeding clover in sprayed spring grain.

A check of the practice of clipping clover and taking seed from the second crop was made in 1958. Results follow:

YIELDS OF SEED AND FORAGE FROM DATES OF CLIPPING

<u>Date Clipped</u>	<u>Lbs. per A.</u>	
	<u>Forage</u>	<u>Seed</u>
Not clipped	None	116
May 19	1024	150
May 27	1071	211
June 2	2759	306
June 9	4233	293
June 15	4066	272

Interest in annual hay crops other than oats has led to establishing yield nurseries containing nine entries.

YIELD AND PROTEIN CONTENT OF ANNUAL HAY CROPS

	<u>Yield T/A.</u>		<u>Protein % -58</u>
	<u>1957</u>	<u>1958</u>	
German Millet	3.7	5.8	9.6
Siberian Millet	3.8	5.2	8.5
Piper Sudan	2.9	5.0	6.9
Sweet Sudan	2.2	5.2	11.2
Common Sudan	2.4	6.6	10.3
Bridger Oats	4.1	5.8	8.1
Hairy Vetch	1.1	1.9	12.2
Vetch Introduction	---	2.4	16.5

CORN

Various means of improving yields and value of corn silage are being studied; varieties, seeding rates, etc., under the leadership of E.R. Hehn, M.S.C.. Two off-station variety nurseries were harvested in 1958.

CORN SILAGE YIELDS IN TONS PER ACRE 1958

Variety	Missoula Co.	Mineral Co.	Plants per Acre at (1000)		
			Northwestern Branch Station	20M	40M
Kingscrost K.F.	8.17	13.9	18.3	23.4	26.4
Idahybrid	11.8	23.2	27.1	30.5	30.9
Phister 55	8.17	24.7	27.4	25.3	28.5
Funks G. 6	9.04	25.1	24.2	28.1	27.4
Dekalb 1024	13.03	26.5	29.0	37.5	36.1
Northern King	9.09	16.0	19.9	23.4	26.8 (1)

(1) This variety at 60,000 plants per acre produced most calculated dry matter in this seasons trials, and reached dented stage.

OTHER WORK WITH VARIETIES AND INTRODUCTION

A great many potato varieties have been grown to determine scab resistance. None have been found with scab resistance equal to Netted Gem. Early Gem, also a netted potato, has sufficient scab resistance to come clean most places, most years, and is very early. A few introductions had scab resistance, but because of yellow meat or other undesirable characteristics are of value for breeding only.

90 or more sweet corn varieties, most hybrids, have been grown in a search for adapted varieties for garden use. This work supported a Horticulture Department recommendation of Sun Up for this area. We have never known of a failure with this variety.

One vetch introduction appears to have higher yield potential and a higher protein content than common vetch.

Among the 42 introduced blue grasses being grown are some that show promise for hay, pasture and lawns.

Certain hybrid lillies, hardy mums, and strawberry varieties grown in observation trials have been observed to be adapted to use in the area.

The mean yield per acre of 8 varieties of onions raised from plants was 49,982 pounds with Asgrow Y 42 leading with 66,020 pounds. (1954)



VARIETIES OF WHEAT, OATS AND BARLEY

In the ten years that Northwestern Montana Branch Station has been operating practically an entire new list of small grain varieties has been recommended. (1) This has improved the yield, quality, adaptability to local conditions, and grower acceptance of the approved grains.

Expanded facilities at Montana State College for quality testing will make it easier to be RIGHT in the future at the time a variety is released. We hope that grower and consumer acceptance of present varieties will continue, and that we will not be pressured into making new releases until really good ones are found and proven.

SUMMARY OF DRYLAND SPRING WHEAT VARIETY DATA - 12 TRIALS

<u>Variety</u>	<u>Head Date</u>	<u>Height Ins.</u>	<u>Bushels/A.</u>	<u>Lbs./Bu.</u>
Centena	7-8	37	28.52	60.1
Pilot	7-5	37	28.18	59.85
Ceres	7-5	39	28.70	61.17

SUMMARY OF IRRIGATED SPRING WHEAT DATA - 18 TRIALS

<u>Variety</u>	<u>Head Date</u>	<u>Height</u>	<u>Lodge %</u>	Leaf		<u>Bu./A</u>	<u>Lbs./Bu.</u>
				<u>Rust %</u>			
Centena	7-9	48	33	62		48.4	60.00
Pilot	7-8	46	31	52		44.2	60.5
Ceres	7-8	49	53	54		41.4	59.97

SUMMARY OF DRYLAND BARLEY VARIETY DATA - 17 TRIALS

<u>Variety</u>	<u>Head Date</u>	<u>Height</u>	<u>Lodge %</u>	<u>Bu./A.</u>	<u>Lbs./Bu.</u>
Freja	7-4	29	12	33.9	48.3
Vantage	7-1	37	16.6	32.4	44.4
Compana	6-29	30	54.3	27.9	47.0

SUMMARY OF IRRIGATED BARLEY VARIETY DATA

<u>Variety</u>	<u>Head Date</u>	<u>Height</u>	<u>Lodge %</u>	<u>Bu./A.</u>	<u>Lbs./Bu.</u>
Freja	6-6	32	58	64.9	51.1
Vantage	7-11	42	28	66.5	49.1
Comapna	7-4	32	77	49.1	48.2

(1) The Northwestern Montana Branch Station does not recommend varieties, but does the research work upon which recommendations are based. Agronomists from the main station and all branch stations in annual meetings with extension agronomist, review data and recommend a variety to Montana Seed Growers Association for approval.

SUMMARY IRRIGATED OAT DATA -- SAME LOCATIONS AND YEARS

Dates	PARK		BRIDGER	
	Bu./A.	Lb./Bu.	Bu./A.	Lb./Bu.
49-55	69.08		72.82	
56-58	80.6	36.4	85.2	37.2

SUMMARY DRYLAND OAT DATA -- SAME LOCATION AND YEARS

Dates	PARK		BRIDGER		GOPHER	
	Bu./A.	Lb./Bu.	Bu./A.	Lb./A.	Bu./A.	Lb./A.
49-55	44.64		43.24		40.34	
56-58	56.3	35.4	59.3	37.2	37.8	33.0

WINTER WHEAT

Some very fine reports are coming in about Westmont, from quality tests and from producers. We need to produce it in quantity in this area, and organize to let its virtues be known among buyers of wheat.

In 1958 trials Westmont led all varieties in ratio of grain to straw and in yield in a short straw nursery. Westmont produced 34.1 bushels per acre compared to 33.9 for Itana in a large strip test in Ravalli County. Itana led Westmont in yield in small off-station nurseries.

SUMMARY OF WINTER WHEAT DATA --1954-1957

Variety	Head Date	Height	Stand %	Lodge %	Bu./A.	Lb./Bu.
Westmont	6-10	28.9	83	—	28.3	60.9
Itana	6-15	31.2	83.2	—	26.5	61.2
Wasatch	6-13	33.5	78.1	7.8	25.2	60.7
Cheyenne	6-13	30.4	87.0	7.3	26.8	61.0

SEEDING DATES - RATES - METHODS

In a four year study of seeding dates for spring grain best dates were: April 15 for oats; May 5 for wheat and barley.

Two successive years May 25 was better than earlier or later for corn.

In a two year study September 27 was better than earlier or later for seeding winter wheat.

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30 pounds per acre of winter wheat in 14 inch rows produced more than 60 lbs. in 7 inch rows, or 20 in 21 inch rows, in a two year trial.

90 pounds of oats produced more hay than 180 pounds in 1953.

Some corn varieties lodged when seeded at rates of 80,000 plants per acre, some at 60,000, in 1958 population studies. Average yields per acre from 8 varieties was greatest for the highest rate. 4 of 8 varieties produced most at highest rates.

GREEN TONS PER ACRE -- 8 VARIETIES - 1958

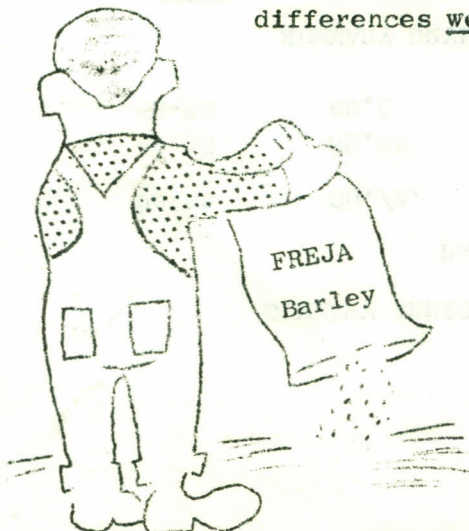
	Plants per Acre			
	20,000	40,000	60,000	80,000
	24.5	27.98	29.74	31.30

Seeded at the same rate per row in 6 inch, 12 inch, and 24 inch rows, i.e. (at 4 times the rate per acre in 6 as in 24 in. rows) three hay mixtures produced practically the same total tonage over a 4 year harvest period.

FOUR YEAR TOTAL YIELDS - TONS PER ACRE

In rows spaced:	6 Inches	12 Inches	24 Inches
Alfalfa	21.58	20.49	18.72
Alfalfa-Brome	20.73	20.42	21.64
Alfalfa-Orchard	19.92	21.81	20.74

Note: When seeded at the same rate per acre in 6, 12 and 24 inch rows, differences were even less.



In a 4 year study of seed piece size and hill spacings for potatoes, large (2½) ounce seed pieces favored heavy set and production of small tubers. Close hill spacing favored small size, wide hill spacing favored large size. Little total yield difference was obtained by use of large seed.

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Seeding Kenland Clover in early planted spring grain after spraying the grain with not to exceed ½ lb. of 2-4-D acid per acre for weed control, has resulted in cleaner seed fields with less effort than other methods used.

WORK WITH WEEDS AND CHEMICALS

Lake Co. 6 lbs. 2-4-D acid. Partial control of Russian Knapweed.  
 Sanders Co. 2 lbs. 2-4-D ester in 1 gal. fuel oil and .6 lb. baking  
 soda controled Spotted Knapweed and left the grass.

Above 1 lb. 2-4-D per acre at jointing reduced yield of barley slightly,  
 of oats drastically.

1950 '49 treatments of Buck Brush (*Symphocarpus*) with 2,4, and 6 lbs.  
 2-4-D in fuel oil were effective in station trials. Off-station  
 trials without fuel oil were not effective.

1951 Legumes exhibited varied tolerance to 2-4-D applied to seedlings,  
 Med. Red Clover more tolerance than Alfalfa or Sweet Clover.

1953 Work started on wild oat control. TCA, CMU, CIPC, IPC and Maleic  
 Hydrazide used. CIPC at 6 lb. per acre produced best control,  
 with little reduction in yield of peas.

CMU at 20 lbs. per acre controled Quackgrass. Sterilized soil.

1954 Maleic Hydrazide at 3 and 6 lbs. gave significant reduction in  
 wild oat populations, not complete control. CMU at 1,2 and 4 lbs,  
 and Calcium Cyanamide at 100, 200, and 300 lb rates produced no  
 effective control.

3 lbs. IPC per A. as pre-seeding treatment gave fair wild oat  
 control in field peas.

1955 3 lbs. IPC less effective than in '54 on peas. Some reduction in  
 wild oats in clover seedings.

1956 CMU at 2, 3 and 4 lbs. and IPC at from 3 to 12 lbs. reduced wild  
 oats stands in some instances but produced no effective control.

CMU at 20 lbs., Weedazol at 6 lbs., in combination with tillage  
 eliminated quack grass. 60 lbs. TCA and tillage reduced quack  
 stands to estimated 5% of original.

1957 6 chemicals were used for weed control in clover seedlings. Pre-  
 merge at 1 to 4 lbs. appeared not to harm clover, controled small  
 succulent weeds. Neburon at 2 to 6 lb. rates killes weeds, harmed  
 clover. Other materials used were not effective.

In off-station trial for control of wheat thief (*Lithospermum*  
*arvense*) in winter wheat only partial control was obtained. The  
 only treatment to reduce weed population 50% or more reduced  
 yields of wheat by 50%.

1958 '58 readings of prior chemical applications to quack plots at  
 Flathead Co. airport shows Ureabor and CMU effective in rates  
 that sterilize soil.

EPTC at rates of 2½ to 10 lbs., and IPC at 4 and 6 lbs. as pre-  
 planting treatments on land seeded to corn and potatoes reduced  
 wild oat population, without obviously damaging corn or reducing  
 yield of potatoes.

### FARM FLOCK RECORDS

10 yearling Columbia ewes were secured from Ernest White, Rollins, in 1951. Two were registered. On hand Dec. 31, 1958 are 40 ewes, 1 year or over; 9 ewe lambs and 2 registered rams. Poorer producers have been culled.

Individual records of wool and lamb production are kept. These tell us, for example that F-7681 raised 10 lambs in 5 successive years while shearing 52 pounds of 3/8 wool.

#### Our Goals:

1. Improve the flock by breeding and selection.
2. Raise more twins than singles
3. Have whether lambs fat when weaned.
4. Raise a few choice rams for improvement of area flocks.

For the four years, 1954-57, based on ewes 2 years or over, the lamb crop averaged 136.7%. The gross annual return per ewe was \$29.15. Our estimate of lambs fat when weaned, 50%

Will  
it  
pay  
to  
herd  
one  
sheep?



#### STATION WEATHER RECORD

Inches precipitation current year.	Sept. 57 through Aug. 58	-- 17.41
Average 1949 to 1958		18.09
Mean Temperature Current Year		55.55
Average 1949 to 1958		42.96
Last killing frost -- 1958	May 14	
Average 1949 to 1958	June 3	
First frost in fall of '58	Sept. 27	
Average first frost 1949-58	Sept. 11	
Frost free period 1958	136 days	
Average 1949-58	100 days	
Maximum Temperature 1958	94 on August 11	
Minimum Temperature 1958	2 above Jan. 1	