

TITLE: Preliminary Investigations

PROJECT NUMBER: 5028

PERSONNEL: Leader - Vern R. Stewart
Cooperator - State Miscellaneous Crops Committee

FUNDS: State - \$ 1292.00

LOCATIONS: Northwestern Montana Branch Station in field numbers A-1c, Y-1, and Z-1

DURATION: Indefinite

OBJECTIVES:

1. To determine the agronomic adaptability and oil potential of several plant species
2. To determine the best date of seeding for yellow mustard in Northwestern Montana
3. By natural selection find a strain of safflower that will mature and produce seed in the Flathead Valley.

EXPERIMENTAL DATA:

INTRODUCTION

Work with "new crops" for western Montana was continued again this season. This area of work was expanded to study more plant species and increase some of the more promising species in field blocks.

MATERIALS AND METHODS

Two mustard nurseries were grown, both of which were identical in entries. One was grown under irrigated conditions and the other under dryland conditions. These were grown in four row plots and replicated four times. These were sprayed with DDT for control of insects once during the growing season. Ten entries were included in these nurseries.

The new crops nurseries consisting of thirteen entries were grown under both dryland and irrigated conditions. These were grown in four row plots and four replications.

Two field plots of new crops were grown, namely, Camelina sativa and Crambe abyssinica. The Camelina sativa was grown in a dryland grain hay rotation with the crop being grown in place of spring wheat. Crambe abyssinica was grown under both dryland and irrigated conditions. Included in this study were seeding rates and spacing of rows, namely, seven and fourteen inches.

A block of safflower was seeded from last year's planting which originated from a bulk of Plant Introductions. This block was harvested in bulk again this year.

RESULTS AND DISCUSSIONS

Irrigated mustard yields were higher than the dryland yields this season. In past seasons the dryland yields have been higher than irrigated. There were no significant differences in the irrigated varieties when these data were analyzed statistically. Table LIII. Using the analysis of variance significant differences were found in the dryland mustard nursery. The Oriental Yellow selections were all higher in yield than the Yellow selection, Yellow, Gisilba, and Commercial. Table LIV shows yield data from this nursery.

The high C.V. in the dryland new crop Intrastate nursery would raise a question on the reliability of these data. Using Duncan's multiple range test there were no significant differences in yields of all species except the barley entry. Stands of Lepidium campestre, L. densiflorum, and Alyssum alyssoides were obtained, but no seed was produced by these three entries. See Table LV for complete details.

Four species seeded in the irrigated nursery did not emerge. They were Lepidium campestre, L. densiflorum, Alyssum alyssoides, and pig weed. There is little difference in yields between the irrigated nursery and the dryland nursery. Barley was significantly better in yield than the other entries. There were no significant differences in yields between Camelina sativa, Cow Cackle, flax, and Crabwe abyssinica. These differences are measured using the Duncan's multiple range test. See Table LVI for other comparisons and complete agronomic data.

The field plot of Crabwe abyssinica was grown in cooperation with USDA, ARS. Yields were quite low which, no doubt, can be accounted for by the high weed population in the entire field. The report submitted to the USDA, ARS is made a part of this report. This report presents all data obtained from this study.

GRAMBE PLANTINGS

Data desired for comparing results from all locations

1. Location - Northwestern Montana Branch Station, Route Four, Kalispell, Mont
2. Size of Planting - one acre
3. Soil Type - Creston silt loam
4. Drainage - good
5. Frost Date - Last freeze in spring - May 30, 1962
First freeze in fall - September 3, 1962
6. Rainfall and temperature records - May 30 to September 3, 1962

<u>Month</u>	<u>Ave. Temperature</u>	<u>Precipitation</u>
May	51.5° F	2.59 inches
June	58.6° F	1.15 inches
July	62.1° F	.11 inch
August	62.1° F	.72 inch
TOTAL		4.57 inches

High temperature for season - 92° F on August 16, 1962

7. Irrigation - 2 inches on June 20, 1962
8. Planting Date - May 1, 1962
9. Fertilizers - none
10. Seeding Rate - six pounds per acre in seven inch rows and three pounds per acre in fourteen inch rows
11. Distance between rows - seven and fourteen inches
12. Spacing in row - not measured
13. Depth of Planting - one-half inch
14. Type of Seeding Equipment - International No. 10 grain drill
15. Time to Emergence - not recorded - approximately seven days
16. Average Height at Maturity - fifty inches - approximately - not measured
17. Date of Blooming - July 12, 1962
18. Weeds, Insects, or Disease noted and extent of damage -
 1. Weeds were a great problem, namely -
 - (a) Wild oats - Avena fatua
 - (b) Cow Cockle - Saponaria vaccaria
 - (c) Fan Weed - Thlaspi arvense

Weeds gave the crop considerable competition and, no doubt, account for the poor yields.
 2. Insects - none
 3. Disease - none evident
19. Control Measures Used - none
20. Date of Harvest - September 4, 1962
21. Color of Seed at Harvest Time - light brown
22. Type of Harvest Equipment - self propelled combine
23. Yield -

7" spacing dryland	- 571.2 pounds per acre
7" spacing irrigated	- 606.8 pounds per acre
14" spacing dryland	- 408.4 pounds per acre
14" spacing irrigated	- 528.0 pounds per acre

Yields of *Camelina sativa* in the field planting was about two-thirds of the yield obtained in the nursery planting or a yield of 765 pounds per acre. There was a little shattering of the top bolls before the lower ones were ready for harvest.

The bulk breeding plot of safflower was harvested in bulk. The probability of a line suitable for the Flathead Valley coming out of the material was much greater than last season. The reason being that summer temperatures were lower than normal and the growing season several days shorter than last season.

Table LI. Agronomic data from irrigated Intrastate mustard nursery grown at Creston, Montana in 1962. Four replications, four row plots, field number D-6 (old number).

Seeding Date: May 3, 1962 Date Harvested: August 27, 1962 Size of Plot: 16 sq. ft

Type	Selection Number	Flower- ing Date	Replications				Total Grams	Pounds per Acre
			I	II	III	IV		
Oriental Yellow Selection	49-5934-2	6-26	280	340	274	240	1134	1701
Oriental Yellow Selection	60-9233	6-24	215	270	189	350	1024	1536
Oriental Yellow Selection	60-8786	6-26	155	305	160	180	800	1200
Oriental Yellow Selection	60-9265	6-26	200	221	180	245	846	1269
Oriental Yellow Commercial	60-8093	6-26	315	330	220	215	1080	1621
Oriental Yellow Selection	60-8807	6-24	180	276	270	260	986	1480
Yellow Selection	48-6687	6-14	220	290	140	175	825	1238
Yellow	48-6729	6-16	190	365	280	255	1090	1636
Gisilba	Sunburst	6-21	295	346	270	205	1116	1675
Commercial	60-8104	6-13	310	211	169	280	970	1455

Analysis of Variance				\bar{X}	1480
				S.E. \bar{x}	154.636
				L.S.D.	NS
				C.V.	10.44%
Source	D.F.	Mean Square	F		
Replications	3	11722.825	4.41		
Varieties	9	3896.13611	1.47		
Error	27	2656.93611			
Total	39				

Table LIV. Agronomic data from dryland Intrastate mustard nursery grown at Creston, Montana in 1962. Four row plots, four replications, field number A 1-c.

Date Seeded: May 3, 1962 Date Harvested: August 23, 1962 Size of Plot: 16 sq. ft.

Type	Selection Number	Flower- ing Date	In. Ht.	Replications				Total Grams	Lbs./ Acre
				I	II	III	IV		
Oriental Yellow Sel.	49-5934-2	6-23	35	155	200	164	150	669	1003*
Oriental Yellow Sel.	60-9233	6-23	38	215	230	165	185	795	1192*
Oriental Yellow Sel.	60-8786	6-22	35	165	185	155	186	691	1037*
Oriental Yellow Sel.	60-9265	6-23	38	135	195	160	140	630	945*
Oriental Yellow Commercial	60-8093	6-23	36	220	217	160	160	757	1136*
Oriental Yellow Sel.	60-8807	6-23	37	215	200	200	140	755	1133*
Yellow Selection	48-6687	6-11	32	165	120	126	115	526	789
Yellow	48-6729	6-9	31	145	130	150	115	540	810
Gisilba	Sunburst	6-15	35	140	170	150	110	570	855
Commercial	60-8104	6-11	29	131	120	126	115	492	738

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

* Varieties yielding significantly more than the check (.05).

\bar{x}	963
S.E. \bar{x}	60.
L.S.D.	174
C.V.%.....	6.

Analysis of Variance

Source	D.F.	Mean Square	F
Replications	3	2364.025	5.80 **
Varieties	9	2894.95833	7.10 **
Error	27	407.65463	
Total	39		

Table LV. Agronomic data from dryland New Crops Intrastate nursery grown at Creston, Montana in 1962.
 Four row plots, four replications, field number A 1-c.
 Seeding Date: May 3, 1962
 Size of Plot: 16 square feet

Species	Flower- ing Date	Har- vest Date	Height in Inches	Plot yield in grams				Total Grams	Yield Lbs. per acre
				I	II	III	IV		
Barley - Unitan	6-26	8-24	29	730	735	572	457	2494	3742
Cow Cackle	6-29	8-24	16	380	345	250	235	1210	1816
Oriental Yellow Mustard	6-23	9- 5	42	240	400	265	150	1055	1583
Safflower N-10	8- 7	10-18	28	315	243	225	220	1003	1505
<u>Crambe Abyssinica</u>	7-10	9- 5	32	275	215	155	870	1305	1305
<u>E. Pervidis</u>	6-24	9- 5	38	175	265	254	100	794	1191
<u>Camelina sativa</u>	6-29	8-24	27	208	264	185	115	772	1158
<u>E. juncea P.I. 173847</u>	6-24	9- 5	38	190	270	135	155	750	1125
Flax - Redwood	6-30	8-24	22	155	195	160	135	645	968
Pigweed	---	9- 5	18	120	130	115	20	385	578

Analysis of Variance

Source	D.F.	Mean Square	F
Replications	3	3444.9	1.53
Species	9	82144.2111	3.66 **
Error	27	22449.3704	
Total	39		

\bar{x}	1497
S.E. \bar{x}	181.888
C.V.	29.23 %

Table LVI. Agronomic data from irrigated New Crop Intrastate nursery grown at Creston, Montana in 1962.
 Four row plots, four replications, field number Y-1.
 Date Seeded: May 3, 1962 Size of Plot: 16 sq. ft.

Species	Flower- ing Date	Har- vest Date	Height in Inches	Replications				Total Grams	Yield in lbs. per acre
				I	II	III	IV		
Barley - Unitan	6-21	8-24	36	705	925	638	350	2618	3928
Cow Cockle	7- 3	9- 5	22	375	335	340	335	1385	2028
<u>Camelina sativa</u>	6-29	8-24	39	290	299	270	280	1139	1709
Flax - Redwood	7- 4	9- 5	28	200	190	300	310	1000	1500
<u>Crambe abyssinica</u>	7-11	9- 5	46	326	160	224	285	995	1492
<u>E. juncea</u> P.I. 173847	6-25	9- 5	49	225	225	176	180	806	1209
<u>E. perverdis</u>	6-25	9- 5	46	180	195	110	182	667	1001
Oriental Mustard	6-24	9- 5	46	165	145	110	190	610	915
Safflower N-10	8-21	10-18	40	55	65	75	145	340	510

Analysis of Variance

Source	D.F.	Mean Square	F
Replications	3	2934.074	
Species	8	108964.8611	12.28 **
Error	23	8866.9469	
Total	34		

\bar{x}	1487
S.E. \bar{x}	282.588
C.V.	18.99%