PROJECT TITLE: Resistant Weed Management Study

YEAR/PROJECT: 1989/754

PROJECT PERSONNEL: Leader - Vern R. Stewart, Todd K. Keener - Research Specialist. NWARC - Kalispell
Chemical cooperators of Dow Chemical Company

OBJECTIVE: To evaluate the combination of various herbicides with sulfonylureas for preventing the development of resistant weed species.

SUMMARY:

All broadleaf herbicides alone and in the various combinations provided excellent control of wild buckwheat, fanweed, lambsquarter, nightflowering catchfly, and henbit. Yields, test weights, and plant heights were not reduced due to the treatments.

RESEARCH METHODS:

Herbicides were applied post emergence to Newana spring wheat using a tractor-mounted, research-type sprayer. Plots were 10' X 12 ' with plots being replicated four times in a randomized complete block design. A spray volume of 24.85 gpa was applied using 8002 nozzles at 32 psi.

Planting data:

Crop: Newana spring wheat seeded April 21, 1989 at 60#/A.
Seedbed preparation: Fall plow and disc, spring disc and cultivate. Brillion packer to complete seedbed
Previous crop: spring barley
Type of planting: Press-type drill, 7" spacing, seeding depth of 1 1/2"
Maintenance spray of .75# ai/A of Hoelon May 10, 1989
Surfactant: .25% V/V for trtmt #1-2, .125% V/V on all others

Application data:

Date: May 17, 1989 Air temp: 64 F Soil temp: 60 F
Rel Humid. 30% Wind 0-2 mph Cloud cover: clear
Soil moisture: topsoil: fair subsoil: very good
Crop and weed stages at application:
Wild buckwheat (Polygonum convolvulus) 6-8 lvs
Fanweed (Thlaspi arvense) 6-10 lvs
Lambsquarter (Chenopodium album) 4-6 lvs
Night flowering catchfly (Silene noctiflora) 4 lvs
Henbit (Lamium amplexicauli) 4-6 lvs

RESULTS:

Broadleaf weed control was excellent for all of the treatments tested as well as the combination of treatments (except for 2,4-D alone). No crop injury was observed on the spring wheat. Yields and test weights were not significantly reduced due to treatments. The 2,4-D treatments resulted in a significantly lower test weight while a high test weight that was significant was recorded in the Curtail plot (.44 lb ai/A). Table 1 and 2.

FUTURE PLANS:

The development of resistant species to herbicides is not a new problem. We plan to continue this study, if funds are available.

Table 1. Agronomic data from the Resistant Weed Management Study. Northwestern Agricultural Research Center, Kalispell, MT 1989. Field R-9

Date planted: April 21, 1989 Date harvested: September 11, 1989

#	Treatment	Rate ai/A	----- Percent Broadleaf Control 7-5-89 1/----- BUCK	FNWD	LMQTR	NFC	HNBT
1.	Express	.125 oz	85.25	100.0	100.0	100.0	96.75
2.	Harmony Extra	.187 oz	94.25	100.0	100.0	99.50	100.0
3.	Banvel	.125 lb	95.75	93.50	100.0	97.50	97.75
4.	Curtail	.44 lb	98.75	98.75	100.0	94.25	91.25
5.	Bromoxynil	.375 lb	95.25	100.0	100.0	96.75	89.75
6.	2,4-D	.375 lb	.0000	25.00	12.50	25.00	.0000
7.	Express + Banvel	.125 oz + .125 lb	97.50	100.0	100.0	100.0	99.00
8.	Harmony Extra + Banvel	.187 oz + .125 lb	100.0	100.0	100.0	99.50	100.0
9.	Express + Curtail	.125 oz + .44 lb	99.00	100.0	100.0	99.50	96.00
10.	Harmony Extra + Curtail	.187 oz + .44 lb	100.0	100.0	100.0	100.0	97.50
11.	Express + Bromox	.125 oz + .375 lb	99.00	100.0	100.0	100.0	99.00
12.	Harmony Extra + Bromox	.187 oz + .375 lb	98.75	100.0	100.0	100.0	100.0
13.	Express + 2,4-D	.125 oz + .375 lb	88.75	100.0	97.75	98.75	98.25
14.	Harmony Extra + 2,4-D	.187 oz + .375 lb	95.25	100.0	98.00	100.0	80.25
15.	Bronate	.375 lb	99.50	100.0	100.0	100.0	94.50
16.	Check	----	.0000	.0000	.0000	.0000	.0000
	Mean		84.19	88.58	88.02	88.17	83.75
	F ratio		433.2**	22.45**	102.9**	22.54**	49.40**
	P-value		.0000	.0000	.0000	.0000	.0000
	C.V.		1.890	7.169	3.585	7.150	5.621
	L.S.D. (.05)		4.532	18.09	8.987	17.96	13.41

1/ Percent weed control by ocular rating. Number of weeds/sq ft in check follows weed common name: BUCK = wild buckwheat 1.5 (Polygonum convolvulus) FNWD = fanweed 7.5 (Thlaspi arvense) LMQTR = lambsquarter .4 (Chenopodium album) NFC = night flowering catchfly 1.0 (Silene noctiflora), HNBT = henbit 1.0 (Lamium amplexicauli)

Table 2. Agronomic data from the Resistant Weed Management Study. Northwestern Agricultural Research Center, Kalispell, MT 1989. Field R-9. Yield data.

Date planted: April 21, 1989 Date harvested: September 11, 1989

#	Treatment	Rate ai/A	Yield Bu/A	Test Wt. Lb/Bu	Height Inches
1.	Express	.125 oz	72.1	59.5	32.6
2.	Harmony Extra	.187 oz	72.1	59.7	32.4
3.	Banvel	.125 lb	74.7	59.9	32.6
4.	Curtail	.44 lb	69.5	60.1a	32.2
5.	Bromoxynil	.375 lb	77.4	59.8	32.8
6.	2,4-D	.375 lb	64.7	58.7b	32.8
7.	Express + Banvel	.125 oz + .125 lb	75.8	59.9	32.4
8.	Harmony Extra + Banvel	.187 oz + .125 lb	73.8	59.9	32.9
9.	Express + Curtail	.125 oz + .44 lb	72.3	59.7	32.4
10.	Harmony Extra + Curtail	.187 oz + .44 lb	68.8	59.9	32.4
11.	Express + Bromox	.125 oz + .375 lb	70.8	60.0	32.4
12.	Harmony Extra + Bromox	.187 oz + .375 lb	67.4	59.9	32.4
13.	Express + 2,4-D	.125 oz + .125 lb	73.3	59.4	32.3
14.	Harmony Extra + 2,4-D	.187 oz + .125 lb	67.5	59.8	32.0
15.	Bronate	.375 lb	70.3	59.6	32.4
16.	Check	----	61.6	59.4	32.4
		Mean	70.15	59.68	32.47
		F ratio	1.562	2.039*	.7458
		P-value	.1201	.0310	.7335
		C.V.	4.668	.3910	.7992
		L.S.D. (.05)	9.405	.6647	.7390

Uniform application of .75 lb ai/A of Hoelon on June 1, 1989