PROJECT TITLE: Gromwell herbicide study in winter wheat

YEAR/PROJECT: 1990/754

PROJECT PERSONNEL: Leader - Vern R. Stewart, Todd Keener, Research Specialist, NWARC, Kalispell, MT.

OBJECTIVE: Evaluation of several herbicide and herbicide combinations for control of gromwell and blue mustard in winter wheat.

SUMMARY:

Several herbicides gave excellent control of gromwell and blue mustard in winter wheat which resulted in yields significantly higher than the check.

RESEARCH METHODS:

A herbicide study was established in a new seeding of Daws winter wheat that had a severe infestation of gromwell (Lithospermum arvense) and a moderate population of blue mustard (Chorispora tenella). Treatments were applied post emmergence using a research-type, tractor mounted sprayer. A Hege combine was used to harvest the study. Plots were 10' by 25' with four replications in a randomized complete block design. Application data and weed rating information can be seen in Table 3.

RESULTS:

Minor indications of winter wheat injury were apparent in thinned plots or reduced plant growth in the phenoxy treatments. Plant injury was sustained through the season in the Bromoxynil + DPX-R9674 treeatments. Uniform growth was observed for all other treatments at grain maturity.

Control of gromwell and blue mustard was detected soon after application with treatments of bromoxynil, and combinations with bromoxynil. The sulfonylureas, having a slower mode of action, did not effectively control gromwell and blue mustard until the last rating (5/19/90). No antagonism was observed with the bromoxynil plus sulfonylurea tank mixes. Increased activity of bromoxynil in control of gromwell and blue mustard was seen with increased rates. Clopyralid, dicamba and the phenoxies alone gave poor broadleaf control.

Effective broadleaf weed control in several treatments resulted in yields that were significantly greater than the check (table 1). Bromoxynil, the sulfonyl ureas, metribuzin and combinations of the sulfonylureas plus bromoxynil were among those treatments. The yields from plots treated with the phenoxy herbicides (2,4-D and MCPA) were depressed in most treatments, indicating possible plant injury. The low yields from clopyralid, dicamba, and imazamethabenz applications is related to the poor broadleaf weed control.

Test weights were lowest in the check as a result of weed competition. Height was greatest in the check and lower in all treated plots, an indication of plant responses to each of the herbicide treatments.

Table 1. Agronomic data for the gromwell herbicide study in winter wheat, Polson, MT. in 1990.

Treatment	Form.	Rate lb ai/A	Yield Bu/A	Test Wt lb/bu	Height Inches
Check	----	----	40.25	57.95	35.24
Bromoxynil	2 EC	.187	51.04	58.88	32.48
Bromoxynil	2 EC	.375	51.74	58.90	31.30
Bromoxynil + DPX-L5300 + S	2 EC 75 WP	.187 .008	53.27	59.45	32.58
Bromoxynil + MCPA	2 EC 2 EC	.187 .187	53.55	59.88	32.58
Bromoxynil + MCPA	2 EC 2 EC	.375 .375	47.55	59.08	31.30
Bromoxynil DPX-R9674 + S	2 EC 75 WP	.187 .008	57.49	58.22	31.79
Bromoxynil DPX-R9674 + S	2 EC 75 WP	.187 .016	52.81	59.15	31.10
DPX-R9674 + S + MCPA ester	75 WP 4 EC	.016 .24	50.37	58.78	31.10
MCPA ester	4 EC	.75	43.15	59.25	30.71
2,4-D ester	4 EC	.5	43.39	59.73	30.51
DPX-R9674 + S	75 WP	.016	54.85	59.00	33.07
DPX-L5300 + S	75 WP	.016	53.33	58.63	32.09
Clopyralid	3.0 EC	.09	37.51	58.53	31.40
Clopyralid + 2,4-D	2.38 EC	2.7 pt.form	40.98	58.92	30.61
Clopyralid + MCPA	2.77 EC	2.3 pt form	48.79	59.22	32.38
Clopyralid + dicamba	3.0 EC 4 EC	.09 .125	31.09	58.63	30.51
Dicamba	4 EC	.125	41.14	59.05	33.46
Imezamethabenz	2.5 EC	1.5	40.29	58.53	31.89
Metribuzin	75 DF	.375	53.03	59.35	32.87
OVERALL MEAN =			47.28	58.95	31.95
F-RATIO TRTS =			5.827**	1.114	1.502
CV (SE/MEAN) =			6.190	.7590	3.020
LSD(0.05 by t)=			8.288	1.267	2.733

Table 2. Agronomic data from the gromwell herbicide study in winter wheat, Polson, MT 1990.

Treatment	Form.	Rate ai/A	Crop Injury 1/ 4/23	Crop Injury 1/ 5/16	% Gromwell Control 4/23	% Gromwell Control 5/16	% Bluemst Control 4/23	% Bluemst Control 5/16
Check	----	----	.0000	.0000	.0000	.0000	.0000	.0000
Bromoxynil	2 EC	.187	.0000	.0000	62.50	77.75	55.00	89.75
Bromoxynil	2 EC	.375	.0000	.0000	46.00	96.25	47.50	98.75
Bromoxynil + DPX-L5300 + S	2 EC 75 WP	.187 .008	.1000	.1250	42.50	97.50	37.50	99.75
Bromoxynil + MCPA	2 EC 2 EC	.187 .187	.0000	.0000	52.50	85.00	52.50	93.75
Bromoxynil + MCPA	2 EC 2 EC	.375 .375	.0000	.2500	40.00	95.30	50.00	97.50
Bromoxynil DPX-R9674 + S	2 EC 75 WP	.187 .008	.0000	.0000	47.50	97.25	45.00	97.00
Bromoxynil DPX-R9674 + S	2 EC 75 WP	.187 .016	.2500	.3750	50.00	99.75	32.50	100.0
DPX-R9674 + S + MCPA ester	75 WP 4 EC	.016 .24	.0000	.1250	.0000	98.50	10.00	97.25
MCPA ester	4 EC	.75	.0000	.0000	2.500	33.25	5.000	56.25
2,4-D ester	4 EC	.5	.0000	.2500	5.000	51.25	20.00	61.25
DPX-R9674 + S	75 WP	.016	.2500	.2500	.0000	90.50	.0000	95.75
DPX-L5300 +S	75 WP	.016	.1000	.1250	.0000	98.50	.0000	97.50
Clopyralid	3.0 EC	.09	.0000	.1250	.0000	7.500	.0000	23.75
Clopyralid + 2,4-D	2.38 EC	2.7 pt.form	.2500	.1250	.0000	17.50	.0000	56.25
Clopyralid + MCPA	2.77 EC	2.3 pt form	.0000	.0000	.0000	12.50	5.000	37.50
Clopyralid + dicamba	3.0 EC 4 EC	.09 .125	.0000	.0000	2.500	12.50	2.500	18.75
Dicamba	4 EC	.125	.0000	.0000	.0000	3.750	.0000	.0000
Imezamethabenz	2.5 EC	1.5	.0000	.1250	.0000	22.50	.0000	36.25
Metribuzin	75 DF	.375	.0000	.2500	.0000	98.00	.0000	98.75
1/ Crop injury: 0-10 rating, 0 = no injury 10 = dead plant	OVERALL MEAN =		.47-01	.1063	17.55	58.81	18.13	67.79
	F-RATIO TRTS =		.7945	.8380	5.199	15.43	3.258	14.20
	CV (SE/MEAN) =		218.3	119.9	59.63	17.27	66.57	14.25
	LSD(0.05 by t)=		.3070	.3609	30.98	28.76	35.71	27.35

Table 3. Application and weed score information, gromwell herbicide study in winter wheat, Polson, MT 1990

Date planted: September 22, 1989 Harvested: August 7, 1990

Application and rating data:

Type Application: Post Date: 4/18/90
Air temp: 56 F Soil Temp: 52 F
Rel Hum: 35% Cloud cover: clear
Wind: 0-5mph, SE Soil Moisture: good
Crop stage : 4-5 leaf, 2cd tiller, 5-8" tall.
Surfactant (+ S) added to all sulfonylurea treatments at .25% v/v

Weed stages: Purple mustard, seed to 6", mostly 2-3"
Gromwell, 1-5", mostly 3"
other weeds present : wild buckwheat, sow-thistle, chickweed, and false flax.

Type sprayer: Research plot sprayer, 27.57 gpa, 8002 nozzles, 32 psi, 2.64 mph speed, 17-19" height.
Plot size 10' X 25'

Rating information:

Evaluation 1 Date: 4/23/90 By: TKK/VRS
Scale: Injury 0-10, 0 + no injury, 10 = dead plants
% control = percentage of weeds controlled
Crop stage: 5-8", fully tillered

Weed	Stage	Density
1. Blue mustard	5-8" flwring	3-5/sg ft
2. Gromwell	2-5" flwring	1-3/sq ft

Evaluation 2 Date: 5/16/90 By: TKK
Scale: Injury 0-10, 0 + no injury, 10 = dead plants
% control = percentage of weeds controlled
Crop stage: 12-15"

Weed	Stage	Density
1. Blue mustard	8-10"	15-20/sq ft
2. Gromwell	10-12"	12/ sq ft