PROJECT TITLE: Curtail/Assert Plantback Study, second year (Kalispell)

YEAR/PROJECT: 1990/754

INVESTIGATORS: Leader - Vern R. Stewart, Todd Keener - Research Specialist

OBJECTIVE: To evaluate the residual effect of both Curtail and Assert to subsequent plantings of rotational crops one year after application.

RESULTS: Eight crops were planted in strips across each of three replications that had been previously treated (on June 7, 1989) with Assert and/or Curtail. Glean was applied as a comparison residual herbicide. Barley, peas, sugar beets, alfalfa, canola, sunflower and lentils were planted with a research plot seeder on May 5. Potato plots were seeded by hand on May 31, 1991.

Crops were monitored throughout the growing season. Plant height and crop injury (by chemical residue) were recorded. Biomass assays and yields were obtained for each crop at maturity. Potato, sugar beet, pea, and sunflower yields were harvested by hand. A Hege plot combine was used to harvest barley, canola, and swathed lentils. An Almaco forage harvester was used to harvest the alfalfa plots. Harvest dates are listed below with other plot data.

Crop	Seeding Rate per acre	Harvest Date	Herbicide 1/ prod/A	Yield Sample
Barley	70 #	Sept 7	Bromox 1 pt	Grain bu/A
Canola	7 #	August 10	Stinger 2/3pt	Seed lb/A
Alfalfa	12 #	August 23	Bromox 1 pt	Hay Tons/A
Potato	2000 #	Sept 13	Lexone .76#	Potato #/A
Sugar beets	10 #	Sept 13	Stinger 2/3pt	Biomass kg
Peas	125 #	August 1	Lexone .17#	Biomass, kg
Lentil	60 #	Sept 7	Lexone .17#	Seed, lb/A
Sunflower	5 #	Sept 4	--------	Biomass, Kg Heads only

1/ For general weed control.

Yield or biomass data obtained from each of eight crops was not significantly different when comparing treated plots with the check, except where Glean had been applied and sunflowers replanted. The crop yields and biomass were lowest in the Glean plots where barley, peas, canola, and lentils had been replanted one year after treatment. Although not statistically significant potato yields were lowest in the plots previouly treated with Curtail M and Assert plus Curtail. Growing conditions (dryland) at this test site were not comparable to those in

normal potato, sugar beet or alfalfa rotations. It is necessary to weigh data accordingly and realize further testing under high moisture, or irrigated conditions is necessary to accurately detect Assert or Curtail residual effect on these crops.

Height data (Table 2) were least for all crops in plots that had been previously treated with Glean. Significant height differences were noted in lentils, peas and canola. All other treatments did not significantly alter height of the eight crops.

Crop injury ratings (Table 3) obtained July 10, 1990 showed Glean residual affecting all crops planted back into soils treated last year.

SUMMARY:

Yield, biomass data, height, and crop injury ratings indicate no adverse effects of residual Assert or Curtail on barley, peas, sugar beets, potato, alfalfa, canola, sunflower, and lentils replanted one year after treatment at normal use rates. Further plantback testing under high moisture conditions is desirable for potato, sugar beet and alfalfa.

FUTURE PLANS:

No future plans are scheduled for this test area because the effects of chemical residue to subsequent crops planted the following year were not detected.

Table 1. Yield and biomass data from the Curtail/Assert Study plantback crops seeded one year after application. N. W. Agricultural Research Center, Kalispell, MT in 1989.

Date planted: May 4, 1990 Harvested at various dates Field R-14
Biomass yields in Kilograms, other yields given as specified.

Treatment	Prod/Acre or (ai/A)	9/7 Barley Bu/A	8/1 Peas Kg/plot	9/13 S.Beets Kg/plot	9/13 Spuds lbs/A	8/23 Alfalfa T/A	8/10 Canola lbs/A	9/4 Sunfwr Kg/plot	9/7 Lentil lbs/A
Curtail	2 pt (.58#)	43.8	2.567	3.783	702.9	2.60	899.8	10.63	197.8
Curtail	2 2/3 pt (.79#)	44.7	3.917	4.483	735.8	2.51	819.7	12.37	334.1
Curtail M	1 3/4 pt (.6#)	45.8	4.000	3.433	570.9	2.40	776.6	13.10	250.7
Curtail M	2 1/3 pt (.8#)	44.0	3.150	4.033	779.3	2.74	663.5	13.05	286.8
Assert	1.2 pt (.375#)	45.3	3.300	3.433	680.5	2.45	822.9	12.33	117.1
Assert	1.5 pt (.47#)	45.2	3.600	3.567	976.9	2.64	771.6	11.62	220.2
Assert + Curtail	1.2 pt + 2 pt (.38#+.6#)	43.7	3.050	3.200	538.0	2.67	721.1	12.65	336.5
Assert + Curtail M	1.2 pt + 1 3/4 pt (.38#+.6#)	46.0	3.283	3.517	735.8	2.53	866.1	12.23	226.0
Glean + Surf(.25%)	1/3 oz. (.25oz)	41.3	2.450	3.267	823.5	2.44	702.6	8.350	113.2
Check	--------	45.2	3.133	3.267	966.4	2.26	797.3	12.53	146.2
OVERALL MEAN =		44.59	3.245	3.598	751.0	2.52	783.8	11.89	228.9
F-RATIO TRTS =		.1164	1.254	.6527	.9774	.6538	.3140	2.429	1.247
P-VALUE TRTS =		.9993	.3242	.7517	.4946	.7509	.9671	.0487	.3276
CV (SE/MEAN) =		9.160	13.92	13.79	19.52	6.945	16.71	7.745	29.28
LSD(0.05 by t)=		12.11	1.342	1.475	435.6	.5210	389.2	2.735	199.2

Table 2. Height data from the Curtail/Assert Study plantback crops seeded one year after applications. N. W. Agricultural Research Center, Kalispell, MT. in 1989.

Date planted: May 4, 1990 Harvested on various dates. Height taken 6/26/90.

Treatment	Prod/Acre or (ai/A)	Lentil	Peas	Sunflwr	S.beets	Alf	Canola	Barley	Potato
Curtail	2 pt (.58#)	23.00	22.67	34.33	17.67	19.33	24.33	22.67	21.67
Curtail	2 2/3 pt (.79#)	27.33	25.00	35.67	17.00	20.00	24.67	24.00	23.00
Curtail M	1 3/4 pt (.6#)	27.33	26.33	38.33	16.67	18.33	23.00	22.33	21.00
Curtail M	2 1/3 pt (.8#)	27.33	25.00	32.00	16.67	17.67	23.00	22.33	19.33
Assert	1.2 pt (.375#)	26.33	24.67	31.67	13.33	19.67	24.67	24.00	17.33
Assert	1.5 pt (.47#)	27.67	25.00	32.00	16.67	17.67	24.67	22.33	20.33
Assert + Curtail	1.2 pt + 2 pt (.38#+.6#)	27.33	25.00	32.00	17.00	20.00	24.67	24.00	22.33
Assert + Curtail	1.2 pt + 1 3/4 pt (.38#+.6#)	27.33	25.00	35.67	17.00	20.00	24.67	24.00	19.33
Glean + Surf(.25%)	1/3 oz. (.25oz)	19.67	16.33	22.67	13.00	16.00	16.00	21.67	16.67
Check		25.00	26.67	34.00	17.33	18.67	24.00	24.00	20.00
OVERALL MEAN =		25.83	24.17	32.83	16.23	18.73	23.37	23.13	20.10
F-RATIO TRTS =		3.702	2.791	1.663	1.370	.6560	2.547	1.170	1.623
P-VALUE TRTS =		.0077	.0280	.1671	.2694	.7491	.0405	.3702	.1783
CV (SE/MEAN) =		5.264	7.304	9.856	8.677	8.775	7.169	3.779	7.955
LSD(0.05 by t)=		4.041	5.245	9.615	4.185	4.884	4.977	2.597	4.751

Table 3. Crop injury data from the Curtail/Assert Study plantback crops seeded one year after applications. NW. Ag. Research Center, Kalispell, MT.

Date planted: May 4, 1990 Harvested at various dates
Crop injury rated on 7/10/90; 0-10 scale, 0=no injury, 10=dead plants

Treatment	Prod/Acre or (ai/A)	Lent	Pea	Sunf	Beet	Alf	Can	Bar	Pot
Curtail	2 pt (.58#)	0	0	0	0	0	0	.7	0
Curtail	2 2/3 pt (.79#)	.2	0	0	0	0	0	0	.3
Curtail M	1 3/4 pt (.6#)	0	0	0	0	0	0	0	0
Curtail M	2 1/3 pt (.8#)	0	0	0	0	0	.2	0	1.0
Assert	1.2 pt (.375#)	0	0	0	0	0	0	0	.5
Assert	1.5 pt (.47#)	0	0	0	0	0	.5	0	.5
Assert + Curtail	1.2 pt + 2 pt (.38#+.6#)	.7	0	.3	0	0	.2	.2	0
Assert + Curtail	1.2 pt + 1 3/4 pt (.38#+.6#)	.7	0	.3	1.7	0	0	0	.3
Glean + Surf(.25%	1/3 oz. (.25oz)	4.5	5.3	4.7	5.8	6.7	6.0	1.3	2.7
Check		.3	.3	.7	.3	0	.5	.5	.3
OVERALL MEAN	=	.6333	.5667	.6000	.7833	.6667	.7333	.2667	.5667
F-RATIO TRTS	=	5.740	15.73	8.396	3.421	57.14	19.76	.8774	4.617
P-VALUE TRTS	=	.0007	.0000	.0001	.0113	.0000	.0000	.5695	.0024
CV (SE/MEAN)	=	91.29	74.66	83.23	127.6	41.83	57.10	178.5	65.55
LSD(0.05 by t)	=	1.718	1.257	1.484	2.971	.8286	1.244	1.414	1.104