Report to the Oregon Processed Vegetable Commission

1. Project Title: Dinoseb Grant 1990. Dan Curtis and Ray William, Horticulture Department, Oregon State University.

2. Objectives

Peas:

A: Evaluate weed control efficacy and crop tolerance of Cobra on processing peas.

B: Evaluate combinations of MCPA amine, Basagran, Poast and crop-oil for weed control efficacy and crop tolerance in processing peas.

C: Investigate the feasibility of field sampling to determine weed densities and weed species of sampled fields.

D: Follow development of black and hairy nightshade from emergence through crop harvest to determine potential for crop contamination.

Snap Beans:

A: Evaluate weed control efficacy of, and crop tolerance to Cobra, Blazer, and combinations of Blazer and Basagran.

B: Establish redidue trials and collect samples from residue trials at five sites in the United States for Cobra and Blazer. Evaluate residue samples for Cobra and Blazer.

C: Continue project examining interactions between water applications and herbicide efficacy-crop tolerance.

D: See insert.

3. Methods

Peas:

A: Two trials were established on grower-cooperator plantings south of Corvallis to evaluate Cobra for weed control in processing peas. Blazer, Basagran and MCPA amine were also included in these trials. The first trial was established 3/27/90 and harvested on 6/22/90. The second trial was established 3/28/90 and harvested on 6/25/90. Treatments are listed and results are summerized in tables 1 and 2.

B: Two trials were established on grower-cooperator plantings north of Salem evaluating MCPA amine, Basagran and Poast use in processing peas. Initial postemergence treatments were made 4/06/90 at the first site, and 4/13/90 at the second site. Neither trial was harvested. Treatments and results are summerized in tables 3 and 4.

C: A technique for taking field samples was developed based on work performed in the mid-west. Five composite samples from the plow layer (6 inches) were taken within each ten acres of a field. The five locations per ten acres were aranged in a "w" configuration. A rough map of the field was made and sampling locations recorded. The composite samples were composed of ten sub-samples taken from the perimeter of a ten foot diameter circle surrounding each sample location. Three 4 inch pots were then filled with three replicates from each composite sample and incubated in the greenhouse. Two weeks after placeing samples in the greenhouse, plant species and numbers were recorded.

D: Weed species at three sites were monitored from the time of weed emergence until crop harvest. Leaf numbers and flowering dates were noted.

Snap Beans:

A: Three trials evaluating Cobra and Blazer for crop tolerance were established on grower-cooperator plantings. Planting and harvest dates, treatments, and results are listed and summarized in tables 4 and 5.

B: Five states including Oregon cooperated in establishing 20 residue trials for Cobra and Blazer in 1990. The Agricultural Chemistry department at Oregon State University has received all the samples and is currently starting to examine the Cobra samples. Due to crop injury in Blazer trials from locations other than Oregon, the basic manufacturer wants more crop injury data before proceeding with residue analysis. A regional label might be possible with Blazer.

C: Herbicide-water interactions were studied for the third year. This trial was established at the OSU Vegetable Research Farm on 7/18/90. The trial was harvested 9/19/90. Contact herbicides were contrasted with herbicides which rely on inhibition of fatty acid production or mitotic disruption. Results are being analysed.

D: See insert.

5: Summary

Peas:

A: Processing peas were tolerant to preemergence applications of Cobra. Some injury was apparent at the highest rate at Cobra/Blazer (trial 2). Nightshade control with Cobra was superior to other treatments in these two trials. Residue trials for Cobra use in pea production should be considered. Weed control with Basagran-MCPA amine (Rhomene) was superior to Blazer, either singly, or in combination with Basagran. This could be due to a canopy effect, with the crop canopy interfering with weed contact with the contact herbicide (Blazer) thus reducing effectiveness, while the translocated herbicides (Basagran and MCPA amine) did not require as much contact with the weeds to perform adequately.

B: The two Basagran, MCPA amine, and Poast trials indicated that for the weeds and conditions (very dry) present, Basagran alone provided the best control with the least amount of crop injury. MCPA amine did cause more injury than Basagran. The combination of Basagran with MCPA amine reduces the injury of MCPA-amine alone. While in these two trials, there was no benefit to the addition of MCPA amine, grower experience has indicated that control of certain weed species (redroot pigweed) is improved with this addition. The addition of Poast and crop oil concentrate to the combination of Basagran MCPA-amine resulted in twice as much visible injury as applying Poast separately a short time after the application of Basagran-MCPA amine tank-mix.

C: Field sampling showed promise. Weed species germinating in the samples were similar to those found within the monitered field. Weed numbers appeared to correlate with populations in the fields. Future work is needed to refine the culturing technique to insure that current seasonal weed species are germinating (winter annuals versus summer annuals) in the cultured samples. Quantification methods for determining expected population densities need to be developed.

D: Nightshade plants (both black and hairy) were monitored from crop planting until crop harvest at three sites. None of the monitored plants produced berries by the time of harvest. At two sites (Cobra-Blazer pea trials 1 and 2) other nightshade plants did produce berries by harvest. The third site (Basagran-MCPA pea trial 1) had only early spring or winter annual weeds almost until the time of flowering. Just before flowering (coresponding to the the return of wet weather) hairy nightshade started to emerge. These plants developed very slowly and did not produce berries by harvest probably due to crop competition shortly after emergence the crop canopy closed.

More work is required to model nightshade developement in the Willamette valley. Differences between the competitive ablity of black versus hairy at different emergence times and under different moisture regimes need to be identified to complement a field sampling program that could fit into a integrated weed management system.

Beans

A: Both Cobra and Blazer exhibited excellent broadleaf weed control properties with acceptable crop injury levels. Cobra at 0.25 lb provided excellent hairy and black nightshade control (>95%). Directed Blazer treatments were slightly superior to broadcast treatments for nightshade control. Both materials gave extremely good pigweed control as well as groundsel and shepardspurse. Cobra was not as effective on smartweed as on the other weed species encountered. In the broadcast Blazer treatments, weeds surviving the treatments were primarily within the row, probably due to the canopy which sheltered those weeds. Directed treatments were placed so that overlap occured below the crop canopy. Initial crop injury with Blazer was severe, but plants were quick to recover. Visual damage was usually less in directed treatments in comparison to broadcast treatments. Application timing on postemergence treatments was critical to avoid yield losses. Applications must be made before the visual emergence of any flower parts.

B: Once all the samples from the Cobra residue trials are analysed, there should be enough locations for the company to label the herbicide in snap beans. Blazer will require more trial work before proceding with the labeling process.

C: Initial results from the herbicide-water interaction study appear to comfirm 1988 results; that applied water greatly influences weed germination. This was under dispute, as in 1988, the weeds were overseeded at the time of bean planting and thus were not in a natural state in the soil. This year, as well as last, no weeds were overseeded in the trial and weed pressure was all natural. This year, the only weed species present was pigweed, which was very uniformly distributed throughout the the trial.

A new phenomena were noted this year with Cobra in this trial. Cobra can volitilize (co-distillation as it was called with dinoseb) off the soil surface under extremely hot and wet conditions. This is probably because the water is displacincg the Cobra. This led to decreased weed control in treatments that received large amounts of water imediately after application. (Temperatures on the day of application were nearly 100^{o} F in the afternoon and during the following day, when water was applied.

D: See insert.

Table 1: Cobra and Blazer for Weed Control in Processing Peas Trial 1, 1990

Treatment		Rate/Type		Percent crop injury	Percent Control hairy nighshade	black nighshade	smart-weed	yield T/A
01	COBRA	.125	PRE	1	83	90	58	3.95
02	COBRA	.25	PRE	0	96	95	70	4.43
03	COBRA	.50	PRE	3	100	100	80	4.15
04	BASAGRAN	.50	POST	3	85	80	76	3.79
05	BLAZER	.125	POST	3	81	84	75	3.88
06	BASAGRAN BLAZER	.50 .125	POST POST	4	89	90	83	4.12
07	BASAGRAN RHOMENE	.50 .125	POST POST	3	86	86	81	5.12
08	CONTROL			1	0	0	0	3.66

all treatment rates lb ai/A
crop variety = Maffei Freezer #4
planting date: 3-27-90 harvest date: 6-22-90

Table 2 Cobra and Blazer for Weed Control in Processing Peas Trial 2, 1990

Treatment		Rate/Type		Percent crop injury	Percent control night-shade	yield T/A
01	COBRA	.125	PRE	1	88	2.40
02	COBRA	.25	PRE	0	100	2.49
03	COBRA	.50	PRE	9	100	1.71
04	BASAGRAN	.50	POST	0	83	2.07
05	BLAZER	.125	POST	0	74	2.53
06	BASAGRAN BLAZER	.50 .125	POST POST	3	84	1.49
07	BASAGRAN RHOMENE	.50 .125	POST POST	3	84	2.05
08	CONTROL			1	0	3.13

all treatment rates lb ai/A
crop variety =, OSU 190
planting date: 3-28-90 harvest date: 6-25-90

Table 3: Basagran, MCPA amine and Poast for Weed Control in Processing Peas, Trial 1, 1990

Treatment		Rate	type	% Crop injury	Shepherds-purse --% control--	Mayweed --% control--
01	CONTROL		POST	0	0	0
02	BASAGRAN	0.50	POST	1	81	98
03	BASAGRAN	1.00	POST	4	84	100
04	RHOMENE	.125	POST	6	58	8
05	RHOMENE	.250	POST	5	78	8
06	BASAGRAN	0.50	POST	5	78	98
	RHOMENE	.125	POST			
07	BASAGRAN	1.00	POST	1	83	99
	RHOMENE	.125	POST			
08	BASAGRAN	0.50	POST	8	79	73
	RHOMENE	.250	POST			
09	BASAGRAN	0.50	POST	9	64	96
	RHOMENE	.125	POST			
	POAST	0.28	POST			
	COC	1qt/A	POST			
10	BASAGRAN	0.50	POST	4	78	96
	RHOMENE	.125	POST			
	POAST	0.28	POST2			

all treatment rates lbs ai/A

Table 4: Basagran, MCPA amine and Poast for Weed Control in Processing Peas, Trial 2, 1990

Treatment		Rate	Type	% Crop injury	Shep-herds-purse	Chick-weed	Pine-apple-weed	Ground-sel
					--------% control-----------			
01	CONTROL		POST	0	0	0	0	0
02	BASAGRAN	0.50	POST	1	83	89	100	89
03	BASAGRAN	1.00	POST	3	88	93	100	89
04	RHOMENE	.125	POST	9	58	0	53	65
05	RHOMENE	.250	POST	9	56	3	65	56
06	BASAGRAN	0.50	POST	3	85	83	100	84
	RHOMENE	.125	POST					
07	BASAGRAN	1.00	POST	4	85	85	99	84
	RHOMENE	.125	POST					
08	BASAGRAN	0.50	POST	6	85	79	100	78
	RHOMENE	.250	POST					
09	BASAGRAN	0.50	POST	8	76	79	96	64
	RHOMENE	.125	POST					
	POAST	0.28	POST					
	COC	0.25	POST					
10	BASAGRAN	0.50	POST	5	86	84	100	81
	RHOMENE	.125	POST					
	POAST	0.28	POST2					

all treatment rates lbs ai/A

TABLE 5 COBRA AND BLAZER FOR WEED CONTROL IN SNAP BEANS 1990
TRIAL NO. 1, IRISH BEND OREGON

TREATMENT		RATE/TYPE		%CROP INJURY	PERCENT WEED CONTROL NIGHT-SHADE	PERCENT WEED CONTROL REDROOT-PIGWEED	YIELD T/A	%SIZES 1-4
01	CONTROL			0	0	0	4.61	59
02	COBRA	0.125	PRE	4	98	100	9.02	50
03	COBRA	0.25	PRE	0	99	100	9.20	50
04	COBRA	0.50	PRE	5	100	100	9.13	41
05	COBRA	0.25	PRE	3	100	100	9.38	54
	DUAL	2.00	PRE					
06	BLAZER	0.25	POST	6	95	100	9.01	56
	X-77	0.25%	V/V					
07	BLAZER	0.375	POST	10	100	100	8.35	49
	X-77	0.25%	V/V					
08	BLAZER	0.25	POSTD	4	99	100	8.38	51
	X-77	0.25%	V/V					
09	BLAZER	0.50	POSTD	6	100	100	8.29	56
	X-77	0.25%	V/V					
10	BLAZER	0.25	POSTD	6	99	100	9.06	61
	BASAGRAN	0.50	POSTD					
	X-77	0.25%	V/V					
11	BLAZER	0.50	POSTD	14	100	100	6.60	54
	BASAGRAN	0.50	POSTD					
	X-77	0.25%	V/V					
12	BLAZER	0.25	POSTD	4	98	100	8.58	52
	BASAGRAN	1.00	POSTD					
	X-77	0.25%	V/V					

PLANTED: MAY 5, 1990 HARVESTED: JULY 19, 1990
PRE= PREEMERGENCE, POST= POSTEMERGENCE BROADCAST,
POSTD= POSTEMERGENCE DIRECTED

TABLE 6: COBRA AND BLAZER FOR WEED CONTROL IN SNAP BEANS 1990
TRIAL NO. 2, HOPMERE OREGON

TREATMENT		RATE/TYPE		%CROP INJURY	PERCENT WEED CONTROL: NIGHT-SHADE	GROUND-SEL	SHEPARDS PURSE	DOG FENNEL	YIELD T/A	%SIZES 1-4
01	CONTROL			0	0	0	0	0	5.29	70
02	COBRA	0.125	PRE	0	91	100	100	100	9.72	53
03	COBRA	0.25	PRE	3	99	100	100	100	10.32	60
04	COBRA	0.50	PRE	0	100	100	100	100	9.91	53
05	COBRA DUAL	0.25 2.00	PRE PRE	0	100	100	100	100	9.16	58
06	BLAZER X-77	0.25 0.25%	POST V/V	23	93	91	86	83	6.26	66
07	BLAZER X-77	0.375 0.25%	POST V/V	24	94	99	88	92	6.39	64
08	BLAZER X-77	0.25 0.25%	POSTD V/V	15	90	95	88	85	5.35	73
09	BLAZER X-77	0.50 0.25%	POSTD V/V	20	100	100	95	96	6.33	60
10	BLAZER BASAGRAN X-77	0.25 0.50 0.25%	POSTD POSTD V/V	16	93	94	86	94	8.05	59
11	BLAZER BASAGRAN X-77	0.50 0.50 0.25%	POSTD POSTD V/V	40	97	100	95	98	5.77	59
12	BLAZER BASAGRAN X-77	0.25 1.00 0.25%	POSTD POSTD V/V	14	97	96	91	96	6.42	56

PLANTED: MAY 17, 1990 HARVESTED: JULY 26, 1990
PRE= PREEMERGENCE, POST= POSTEMERGENCE BROADCAST,
POSTD= POSTEMERGENCE DIRECTED

TABLE 7 COBRA AND BLAZER FOR WEED CONTROL IN SNAP BEANS 1990
TRIAL NO. 3, MONROE OREGON

TREATMENT		RATE/TYPE		%CROP INJURY	PERCENT WEED CONTROL LAMBS-QUARTER	SMART-WEED	YIELD T/A	%SIZES 1-4
01	CONTROL			10	21	18	8.69	47.0
02	COBRA	0.125	PRE	0	93	92	8.95	55.3
03	COBRA	0.25	PRE	3	98	69	11.27	39.1
04	COBRA	0.50	PRE	13	100	95	8.66	46.0
05	COBRA	0.25	PRE	8	99	97	11.79	44.4
	DUAL	2.00	PRE					
06	BLAZER	0.25	POST	14	98	100	9.04	41.2
	X-77	0.25%	V/V					
07	BLAZER	0.375	POST	21	100	100	8.67	47.0
	X-77	0.25%	V/V					
08	BLAZER	0.25	POSTD	14	100	100	9.98	50.1
	X-77	0.25%	V/V					
09	BLAZER	0.50	POSTD	39	100	100	6.50	59.6
	X-77	0.25%	V/V					
10	BLAZER	0.25	POSTD	24	100	100	8.80	46.5
	BASAGRAN	0.50	POSTD					
	X-77	0.25%	V/V					
11	BLAZER	0.50	POSTD	23	100	100	8.16	44.8
	BASAGRAN	0.50	POSTD					
	X-77	0.25%	V/V					
12	BLAZER	0.25	POSTD	11	98	100	9.69	49.9
	BASAGRAN	1.00	POSTD					
	X-77	0.25%	V/V					

PLANTED: JUNE 12, 1990 HARVESTED: AUGUST 8, 1990
PRE= PREEMERGENCE, POST= POSTEMERGENCE BROADCAST,
POSTD= POSTEMERGENCE DIRECTED

Snap Beans Project (insert)

Steve Eskelsen, Siyuan Tan, Dan McGrath, Dan Curtis and Garvin Crabtree. Department of Horticulture, Oregon State University and Marion County Extension Service.

Objectives:

D: To measure the effect of row spacing and weed management on snap bean production.

Methods:

D: A trial was established at the OSU vegetable research farm to determine what effects row spacing has on crop yield, whole plant yield, and weed control in snap beans. The trial was planted on 6/13/90 and harvested on 8/9/90 and 8/10/90. Treatments are listed in table 8.

Table 8. The levels of row spacing and weed interference used to determine the treatments used in the trial. "T" symbolizes treatment and the number following is the treatment number (T1 is treatment number 1).

Weed Interference Levels	Row Spacing Levels (in.) 8	16	24	32
Weed removal through harvest	T1	T5	T9	T13
Weed removal first 3 weeks following bean emergence	T2	T6	T10	T14
Weed removal initiated 3 weeks after bean emergence	T3	T7	T11	T15
No Weed removal	T4	T8	T12	T16

Summary:

Snap Bean Yield. The different row spacing and weed interference levels were independent of each other in the trial with respect to snap bean yield (no interaction). There was a trend towards increasing yields with increasing row spacing (Table 9). Treatments that were weeded, yielded more than treatments which did not receive weeding. There was no yield differences between treatments kept weed-free through harvest and treatments which were weeded either during the first 3 weeks or for the time following the first three weeks of the trial. Therefore, if the first flush of weeds were removed within the first 3 weeks, weeds did not compete with the beans (Table 10).

Table 9. Snap bean yields with respect to row spacing.

Row Spacing (inches)	Bean Yield (Tons/Acre)
8	5.3
16	6.3
24	6.3
32	7.4

Table 10. Snap Bean yields in respect to level of weed interference.

Weed Interference Levels	Bean Yield (Tons/Acre)
Weed removal through harvest	7.1
Weed removal first 3 weeks following bean emergence	6.5
Weed removal initiated 3 weeks after bean emergence	6.6
No Weed removal	5.0

Entire Bean Plant Yield Row spacing and weed interference had no effect on each other with respect to bean plant biomass (no interaction). There was a trend indicating that as row spacing increases, bean plant biomass decreases (Table 10). Weeded treatments had greater bean plant biomass than the treatments which received no weeding. There was no difference in bean plant biomass between treatments weeded through harvest and those treatments which were weeded partially through the trial. Therefore, as with bean yield, as long as the first flush of weeds were removed within 3 weeks time, weeds did not interfere with bean plant biomass (Table 12).

Table 10. Bean plant biomass with respect to row spacing.

Row Spacing (inches)	Entire Bean Plant Yield (Tons/Acre)
8	9.0
16	8.3
24	6.8
32	6.9

Table 11. Bean plant biomass with respect to level of weed interference.

Weed Interference Levels	Bean Yield Tons/Acre)
Weed removal through harvest	8.4
Weed removal first 3 weeks following bean emergence	7.9
Weed removal initiated 3 weeks after bean emergence	8.1
No Weed removal	6.6

Weed Fresh Weight Row spacing and weed interference level did have a small influence on weed biomass production (small interaction). Treatments with no weeds removed produced the greatest weed biomass. Intermediate row spacings in general had less weed biomass production than lower or higher levels of weed mamagement. The results are shown in table 12.

Table 12. Weed biomass (Tons/Acre) with respect to weed interfence level and row spacing.

Weed Interference Levels	Row Spacing Levels (in.) 8	16	24	32
Weed removal through harvest	0.14	0.08	0.04	0.13
Weed removal first 3 weeks following bean emergence	0.36	0.40	0.20	0.22
Weed removal initiated 3 weeks after bean emergence	0.22	0.20	0.22	0.22
No Weed removal	6.62	1.22	4.32	5.05