Report to Oregon Processed Vegetable Commission
1992

Title: Alternatives to Dinoseb in Snap Beans

Project Leader: Ray William, OSU Extension Horticultural Weed Specialist, and Deby Boquist, Research Assistant

Project Status: Terminating 2/1/92

Funding:
Funding Requested for 1992-93 $6000.00
(salaries and wages: $2625.00 - travel, services and supplies: $3375.00)

Objectives:

1) Complete analysis and summary of line source trials 1987-1991.

2) Continue bean tolerance and weed control efficacy evaluations of lactofen (Cobra), acifluorfen (Blazer), and several numbered compounds.

3) Continue evaluation of weed suppression potential with decreasing row spacing.

4) Study critical period of nightshade contamination.

5) Screen and evaluate the potential for use of cover crops in snap bean planting systems.

Progress Report and Summaries:

Dr. Bill Braunworth (originator of the line source trial) returned from overseas in October and is currently analyzing the line source project.

Trials were established in the Willamette valley on grower-cooperater plantings to evaluate weed control efficacy and crop tolerance to Cobra (lactofen), Blazer (acifluorfen) and several numbered compounds (table). Sites were chosen for range of soil types as well as seasonal timing.

Field trials provided evaluation of snap bean tolerance to lactofen at 0.25 lbs ai/A and 0.125 lbs ai/A. Comparable weed control was achieved at both rates. Prior trials (1990 and 1991) indicated possible injury to heavily irrigated beans planted in low organic matter soils with high sand content. Comparison of phtytotoxicity and harvest measurements show significant injury only in those trials planted to low organic matter (1.25%) and high sand content. (69%). All trials received 3/4" or more of irrigation or precipitation following herbicide application.

> Cobra significantly injured peas in several spring trials and was rejected for possible registration in peas. Excessive moisture coupled with warm temperatures are suspect as well as soil particle movement with puddling around emerging seedlings.

Continued exploration of snap bean tolerance to acifluorfen indicates that optimum bean tolerance and weed control is achieved with directed applications (established in 1990 and 1991 trials), and that application timing is crucial. Snap bean injury from broadcast applications in 1992 trials allowed exploration of injury potential in reference to timings. With broadcast trial treatments weed control was improved with earlier applications (1st to 2nd trifoliate) before weeds are sheltered under crop canopy. Early visual crop injury (leaf speckling) is greater in early season plantings and late crop applications. The ability of the the crop to recover and produce adequate yields may be related to time available for recovery and rate of crop growth following treatment and partial injury from aciflourfen.

Three numbered compounds were screened for their potential to control nightshade and pigweed without plant injury. Only 13200 provided excellent weed control without reducing yields.

TRIAL	TREATMENT	lbs ai/A	BL WD CTRL	bean phyto	HARVEST plant biomass lbs	HARVEST bean yield T/A
SITE A loam soil 29% sand 3.4% om planted 6/23 [c]	Cobra EC 2.00 Cobra EC 2.00 HANDWEED	0.125 0.25	8.0 8.6 8.3	0 0 0	8.8 9.4 8.9	2.9 3.2 3.7
SITE B silty clay loam 13% sand 3.7% om planted 6/17 [c]	Cobra EC 2.00 Cobra EC 2.00 HANDWEED	0.125 0.25	9.0 9.0 8.5	0 0 0	12.0 13.4 11.8	2.0 3.5 3.0
SITE C silt loam 24% sand 2.4% om planted 6/11 [b]	Cobra EC 2.00 Cobra EC 2.00 HANDWEED	0.125 0.25	10.0 10.0 10.0	0 0 0	9.8 9.6 9.6	11.2 9.6 9.7
SITE D sandy loam 69% sand 1.2% om planted 5/27 [b]	Cobra EC 2.00 Cobra EC 2.00 HANDWEED	0.125 0.25	9.8 10.0 10.0	2.5 3.3 0	4.4 3.9 5.6	9.8 [a] 7.3 [a] 13.6

TRIAL	TREATMENT	lbs ai/A	BL WD CTRL	bean phyto	HARVEST plant biomass	HARVEST bean yield
SITE A [c] EARLY APP 85 a.m. LATE APP 80 a.m.	Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 HANDWEED	0.25 E 0.50 E 0.25 L 0.50 L	9.7 9.3 8.7 9.3 8.3	0 0 0 0 0	8.8 8.8 9.6 8.9 8.9	3.6 3.0 3.6 3.9 3.7
SITE B [c] EARLY APP 75 noon LATE APP 75 noon	Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 HANDWEED	0.25 E 0.50 E 0.25 L 0.50 L	9.3 8.3 9.0 9.3 8.5	0 3.3 2.7 3.0 0	13.7 11.7 13.0 12.6 11.8	2.7 1.0 [a] 1.5 [a] 1.3 [a] 3.0
SITE C [b] EARLY APP 75 a.m. LATE APP 77 a.m.	Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 HANDWEED	0.25 E 0.50 E 0.25 L 0.50 L	10 10 9.5 10 10	1.3 2.3 2.2 3.2 0	9.8 9.7 9.7 8.7 9.6	10.2 8.5 9.2 9.4 9.7
SITE D [b] EARLY APP 85 p.m. LATE APP 75 a.m.	Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 Blazer SC 2.00 HANDWEED	0.25 E 0.50 E 0.25 L 0.50 L	9.9 9.7 9.4 9.7 10.0	1.5 4.3 2.8 4.3 0	5.4 3.8 4.1 3.3 5.6	12.5 12.5 10.8 [a] 8.4 [a] 13.6
DIRECTED HANDWD	Blazer SC 2.00	0.50	9.0 0	0 0	3.7 3.7	2.8 3.0

BROADCAST

TRIAL	TREATMENT	lbs ai/A	BL WD CTRL	bean phyto	HARVEST plant biomass lbs	HARVEST bean yield T/A
SITE A [c]	13200 EC 2.00	0.20	8.7	0	9.3	3.8
loam soil	13200 EC 2.00	0.40	9.4	0	9.5	3.0
29% sand	5043 WP 60%	0.45	8.0	0	—	—
3.4% om	C4243 EC 0.83	0.03	9.4	2	—	—
planted 6/23	C4243 EC 0.83	0.06	9.9	9	—	—
	HANDWEED		8.3	0	8.9	3.7
SITE B [c]	13200 EC 2.00	0.20	8.3	0	12.0	2.5
silty clay loam	13200 EC 2.00	0.40	7.7	0	13.0	2.3
13% sand	5043 WP 60%	0.50	7.3	0	13.0	2.7
3.7% om	5043 WP 60%	0.85	9.5	0	14.0	2.6
planted 6/17	C4243 EC 0.83	0.03	9.0	0.5	—	—
	C4243 EC 0.83	0.06	9.0	0	—	—
	HANDWEED		8.5	0	11.8	3.0
SITE C [b]	13200 EC 2.00	0.20	10	0.5	9.3	10.4
silt loam	13200 EC 2.00	0.40	10	0	11.3	9.3
24% sand	C4243 EC 0.83	0.03	10	0.8	—	—
2.4% om	C4243 EC 0.83	0.06	10	3.8	—	—
planted 6/11	HANDWEED		10	0	9.6	9.7
SITE D [b]	13200 EC 2.00	0.20	8.4	0	5.8	12.6
sandy loam	13200 EC 2.00	0.40	10.0	0	5.7	10.4
69% sand	5043 WP 60%	0.45	0	0	—	—
1.2% om	5043 WP 60%	0.65	5.0	0	—	—
planted 5/27	C4243 EC 0.83	0.03	10.0	9	—	—
	C4243 EC 0.83	0.06	10.0	10	—	—
	HANDWEED		10.0	0	5.6	13.6

[1] Means are significantly different from each other at p=0.05.

[2] The yield of snapbeans was adjusted so that all yields would reflect the same stage of maturity (50% grades 1-4).

[3] Mini-bean plantings

Row spacing trial results in 1992 were similar to those of 1990 in which no effect was seen from decreased row spacing. Prior row spacing trials have established that yields are increased as row spacing is decreased. In 1992 similar weed densities in unweeded plots exagerated this trend as bean yields increased with decreasing row spacing. Strong trends in 1991 indicating increased weed suppression with decreased row spacing are still not fully understood.

Table. The effect of row spacing and weed treatments on adjusted[1] yield of snapbeans.

	Weed Control Treatments			
Row Spacing	unweeded	wd2	wd3	weeded
inches	----------Tons/Acre----------			
8	8.3 c[2]	12.0 cd	12.8 d	11.7 cd
16	6.9 b	12.1 cd	11.0 cd	12.2 cd
24	6.4 b	11.0 cd	11.0 cd	11.2 cd
32	4.0 a	10.4 c	9.8 c	10.0 c

[1]The yield of snapbeans was adjusted so that all yields would reflect the same stage of maturity (50% grades 1-4).

[2]Fisher protected least significant difference performed on logarithm transformed data. All means with the same letter are not significantly different from each other at p=0.05.

Nightshade growth and development throughout the season was surveyed by monitoring node increase, and time of flowering and berry development at bean harvest. Weeds germinating at 1,2,3, and 4 weeks after crop emergence were tagged within four separate bean plantings. In all four trials, weeds emerging within 1 and 2 weeks after crop emergence developed berries by harvest. Berry development in nightshade plants emerging 3 and 4 weeks after crop emergence exhibited varied development. Weeds emerging at 4 weeks did not produce berries by harvest in the three earlier plantings; however, in the late planting (7/8 -9/9) berries did develop by harvest.

Cover crops planted in bean row aisles at last cultivation are currently being evaluated for ground cover potential and ability to suppress late season and overwintering weeds (also potentially reducing erosion, nitrate leaching, and soil compaction). Cover crops were sown at last cultivation and not irrigated after bean harvest. Several species are providing interesting results in terms of good and rapid weed suppression. Both Wheeler rye and Juan triticale reached 16-18" by mid October and began to flop over, covering bean rows. The prostrate growth characteristic of Flora triticale enabled light but promising ground cover as well by mid-October. Growth and weed suppression will be monitored through early spring.

Signatures: Redacted for Privacy

Project Leader(s).....

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Department Head ... Redacted for Privacy