Title: **Alternatives to Dinoseb for Weed Control in Snapbeans, 1987**

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These funds were applied towards salary of Phil Diener, Research Assistant and summer labor. They were also used to pay travel and supplies associated with this project.

Objectives:

The objectives of these studies were to:

1. Obtain data on the weed control efficacy and crop safety of herbicides currently registered for use in snapbeans.
2. Identify other herbicides not currently registered in snapbeans which may serve as a substitute for dinoseb.
3. Obtain data which could be used toward the registration of suitable herbicides.
4. Develop recommendations of weed control options for growers in the Willamette Valley of Oregon.

Progress:

Five field trial were conducted in the Willamette Valley in 1987. These trials included evaluations for weed control, crop safety, and yield from applications of both registered and non-registered herbicides. Two reports are attached to this brief report. The Summary Report is an overview of the results from the five sites with a table averaging the crop safety and weed control efficacy from the five sites. The other is a full report which discusses and presents the data from each site.

Summary:

Registered Herbicides

Combinations of registered herbicides that provided good selective control in five test plots in 1987 included Treflan-Genep-Premerge

(trifluralin-EPTC-dinoseb), Treflan-Genep-Dual (trifluralin-EPTC-metolachlor), Treflan-Dual-Amiben (trifluralin-metolachlor-chloramben), and Genep-Dual-Amiben (EPTC-metolachlor-chloramben). The weeds controlled by these herbicide treatments included pigweed, hairy nightshade, common groundsel, annual ryegrass, and shepherdspurse.

It is important to note poor weed control, except pigweed, was observed when Amiben was applied alone in one of the field tests. This indicates Amiben may not have contributed much to the good weed control noted in the combination treatments listed above. In addition, there were trends and in some cases significant yield reductions from the Treflan-Dual-Amiben and Genep-Dual-Amiben herbicide combination treatments.

Treflan alone showed weakness in broadleaf weed control while Dual alone showed strong control in all species except nightshade.

The success of these registered herbicides was over a limited weed spectrum. In addition conditions were ideal for herbicide activity which included a warm spring and irrigation shortly after application of herbicides. Since favorable application conditions, suitable soil types, and a limited weed spectrum are not found commonly, the level of control of these tests cannot be assured in all locations.

Non-registered Herbicides

Non-registered herbicides that show potential for weed control in snapbeans include Sonalan (ethalfluralin), Cobra (lactofen), and Pursuit (imazethapyr).

Sonalan in combination with other herbicides resulted in adequate weed control with occasional crop injury as indicated by a high % yield in size grades 1-4. However, Sonalan applied alone was effective in control of pigweed and ryegrass only. This was similar to Treflan applied alone. Data indicates Sonalan may not be contributing much to overall weed control efficacy when in the combination treatments.

Cobra applied alone shows good broadleaf weed control with some weakness in the control of nightshade. However, when cobra was applied with other grass herbicides, excellent weed control with occasional crop injury was observed.

Pursuit when applied alone resulted in minor crop injury, good control of shepherdspurse, and variable control of other broadleaf weeds. When used in combination with Treflan-Genep or Dual, adequate weed control was observed on all weed species present. It should be recalled that Dual applied alone, resulted in good weed control with some weakness in control of nightshade. Pursuit may contribute to snapbean weed control only in combination with other more effective herbicides.

Tackle (acifluorfen), when used alone showed adequate levels of weed control of shephardspurse, and in some cases other broadleaf weeds were controlled. Tackle when used with other herbicides such as Genep-Treflan, and Dual, resulted in satisfactory weed control.

Scepter (imazaquin) and Tycor (ethiazin) were also evaluated, but the level of snapbean injury when Scepter and Tycor were used in combination with other registered herbicides was an average from 25 to 58%, levels too high for commercial snapbean production.

Candidate herbicides tested, but failing for reasons of inadequate crop tolerance and/or weed control were Goal (oxyfluorfen), Classic (chlorimuron), and Cinch (cinmethylin).

Some potential problem weed species were not present in these trials, indicating the need for further evaluations.

Recommendations

Growers and processors should not depend on being able to use dinoseb in 1988 or any time in the future. If dinoseb is available in 1988 growers should try several of the non dinoseb registered herbicide combinations on a smaller scale in order to guide which weed control program would be best suited for their conditions in the future when dinoseb is no longer available. This is very important!

Based on this and other research completed to date, the standard treatment of Treflan-Genep-Premerge (trifluralin-EPTC-dinoseb) would be expected to be the best weed control program under a variety of conditions. However, since dinoseb is not expected to be available in the future Treflan-Genep-Dual (trifluralin-EPTC-metolachlor), Treflan-Dual-Amiben (trifluralin-metolachlor-chloramben), and Genep-Dual-Amiben (EPTC-metolachlor-chloramben) represent alternatives which will work in conditions similar to those of these test sites. The combinations which include Dual and Amiben could result in yield reductions and/or a delay in maturity in comparison to the standard dinoseb treatment. Combination treatments which include Amiben are more costly and the benefits of Amiben are not clear. The high water solubility of Amiben could lead to crop injury and non-effective weed control. It should not be expected that these combination treatments will provide adequate weed control across the spectra of conditions which exist in the Willamette Valley and Western Washington.

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Alternatives to Dinoseb for Weed Control in Snapbeans, 1987
Summary Report

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The reliance on dinoseb as a major component of weed control programs by snapbean growers in Oregon and the tenuous future of this herbicide led to the search for alternative herbicides for snapbeans. Five field trials were established in western Oregon in 1987, with the fifth trial using a modified treatment list following observations of weed control and crop response in the first four trials. Generally, the most satisfactory treatments were combinations of herbicides which selectively controlled most of the broadleaf weed and grass species in the bean crop.

Registered Herbicides

Table 1 shows the average crop injury, and weed control ratings of selected treatments from the five test locations in the Willamette Valley of Oregon in 1987. Combinations of registered herbicides that provided good selective control in five test plots in 1987 included Treflan-Genep-Premerge (trifluralin-EPTC-dinoseb), Treflan-Genep-Dual (trifluralin-EPTC-metolachlor), Treflan-Dual-Amiben (trifluralin-metolachlor-chloramben), and Genep-Dual-Amiben (EPTC-metolachlor-chloramben) (nos. 2, 4, 8, 10). The weeds controlled by these herbicide treatments included pigweed, hairy nightshade, common groundsel, annual ryegrass, and shepherdspurse.

It is important to note poor weed control, except pigweed, was observed when Amiben was applied alone (no. 7) in one of the field tests. This indicates Amiben may not have contributed much to the good weed control noted in the combination treatments listed above (nos. 8, 9, 10). In addition, there were trends and in some cases significant yield reductions from the Treflan-Dual-Amiben (no. 8) and Genep-Dual-Amiben (no. 10) herbicide combination treatments.

Treflan alone (no. 1) showed weakness in broadleaf weed control while Dual alone (no. 3) showed strong control in all species except nightshade.

The success of these registered herbicides was over a limited weed spectrum. In addition conditions were ideal for herbicide activity which included a warm spring and irrigation shortly after application of herbicides. Since favorable application conditions, suitable soil types, and a limited weed spectrum are not found commonly, the level of control of these tests cannot be assured in all locations.

Non-registered Herbicides

Non-registered herbicides that show potential for weed control in snapbeans include Sonalan (ethalfluralin), Cobra (lactofen), and Pursuit (imazethapyr).

Sonalan in combination with other herbicides (nos. 6, 9) showed adequate control of weeds with occasional crop injury which delayed maturity. However, Sonalan applied alone (no. 5) was effective in control of pigweed and ryegrass only. This was similar to Treflan applied alone. Data indicates Sonalan may not be contributing much to overall weed control efficacy when in the combination treatments.

Cobra applied alone (no. 24) shows good broadleaf weed control with some weakness in the control of nightshade. However, when Cobra was applied with other grass herbicides (nos. 25, 26, 27), excellent weed control with occasional crop injury was observed.

Pursuit when applied alone (no. 11) resulted in minor crop injury, good control of shepherdspurse, and variable control of other broadleaf weeds. When used in combination with Treflan-Genep (no. 12) or Dual (no. 15), adequate weed control was observed on all weed species present. It should be recalled that Dual applied alone (no. 3), resulted in good weed control with some weakness in control of nightshade. Pursuit may contribute to snapbean weed control only in combination with other more effective herbicides.

Tackle (acifluorfen), when used alone (no. 28) showed adequate levels of weed control of shephardspurse, and in some cases other broadleaf weeds were controlled. Tackle when used with other herbicides such as Genep-Treflan (no. 29), and Dual (31), resulted in satisfactory weed control.

Scepter (imazaquin) and Tycor (ethiazin) were also evaluated, but the level of snapbean injury when Scepter and Tycor were used in combination with other registered herbicides (nos. 17 to 20, 22, 23) was an average from 25 to 58%, levels too high for commercial snapbean production.

Candidate herbicides tested, but failing for reasons of inadequate crop tolerance and/or weed control were Goal (oxyfluorfen), Classic (chlorimuron), and Cinch (cinmethylin) (all not in this table).

Some potential problem weed species were not present in these trials, indicating the need for further evaluations.

Recommendations

Growers and processors should not depend on being able to use dinoseb in 1988 or any time in the future. If dinoseb is available in 1988 growers should try several of the non dinoseb registered herbicide combinations on a smaller scale in order to guide which weed control program would be best suited for their conditions in the future when dinoseb is no longer available. This is very important!

Based on this and other research completed to date, the standard treatment of Treflan-Genep-Premerge (trifluralin-EPTC-dinoseb) (no. 2) would be expected to be the best weed control program under a variety of conditions. However, since dinoseb is not expected to be available in the future Treflan-Genep-Dual (trifluralin-EPTC-metolachlor) (no.4), Treflan-Dual-Amiben (trifluralin-metolachlor-chloramben) (no. 8), and Genep-Dual-Amiben (EPTC-metolachlor-chloramben) (no. 10) represent alternatives which will work in conditions similar to those of these test sites. The combinations which include Dual and Amiben could result in yield reductions and/or a delay in maturity in comparison to the standard dinoseb treatment. Combination treatments which include Amiben are more costly and the benefits of Amiben are not clear. The high water solubility of Amiben could lead to crop injury and non-effective weed control. It should not be expected that these combination treatments will provide adequate weed control across the spectra of conditions which exist in the Willamette Valley and Western Washington.

Table 1. Ratings of crop injury and weed control for selected treatments from up to 5 locations in the Willamette Valley, 1987.[1/]

Treatment no.	Treatment	Apply time[2/]	Apply rate	Snapbean injury	Pigweed control	Nightshade control	Groundsel control	Ryegrass control	Shepherdspurse control
			(lb ai/a)	(%)					
1	Treflan	ppi	0.75	0	96	60	29	100	25
2	Treflan +	ppi	0.75	0	99	100	100	99	100
	Genep[3/] +	ppi	3.50						
	Premerge	pre	4.50						
3	Dual	pre	2.00	0	94	80	100	99	99
4	Treflan +	ppi	0.75	0	100	98	97	100	97
	Genep +	ppi	3.50						
	Dual	pre	2.00						
5	Sonalan	ppi	1.00	0	96	68	35	100	38
6	Sonalan +	ppi	1.00	0	100	100	100	100	100
	Genep +	ppi	3.50						
	Dual	pre	2.00						
7	Amiben	pre	2.50	0	95	43	35	15	70
8	Treflan +	ppi	0.75	0	100	98	99	100	100
	Dual +	pre	2.00						
	Amiben	pre	2.50						
9	Sonalan +	ppi	1.00	4	100	100	97	100	100
	Dual +	pre	2.00						
	Amiben	pre	2.50						
10	Genep +	ppi	3.50	0	100	100	100	100	100
	Dual +	pre	2.00						
	Amiben	pre	2.50						
11	Pursuit	pre	0.062	3	77	44	30	8	100
12	Puruit +	pre	0.062	0	100	100	98	100	98
	Treflan +	ppi	0.75						
	Genep	ppi	3.50						
13	Pursuit +	pre	0.062	4	100	95	75	98	98
	Treflan	ppi	0.75						
14	Pursuit +	pre	0.062	0	99	97	75	96	100
	Genep	ppi	3.50						
15	Pursuit +	pre	0.062	0	100	100	99	100	100
	Dual	pre	2.00						

Table 1. (cont.)

Treatment no.	Treatment	Apply time[2/]	Apply rate	Snapbean injury	Pigweed control	Nightshade control	Groundsel control	Ryegrass control	Shepherdspurse control
			(lb ai/a)	(%)					
16	Scepter	pre	0.125	7	100	92	99	50	100
17	Scepter +	pre	0.125	33	100	100	100	100	100
	Treflan +	ppi	0.75						
	Genep	ppi	3.50						
18	Scepter +	ppi	0.125	35	100	94	96	95	93
	Treflan	ppi	0.75						
19	Scepter +	ppi	0.125	25	100	93	95	93	98
	Genep	ppi	3.50						
20	Scepter +	pre	0.125	33	100	100	98	100	100
	Dual	pre	2.00						
21	Tycor	pre	1.50	12	78	39	91	13	100
22	Tycor +	pre	1.50	58	100	90	99	100	100
	Dual	pre	2.00						
23	Tycor +	pre	1.50	48	100	23	94	100	100
	Treflan +	ppi	0.75						
	Eptam[3/]	ppi	3.50						
24	Cobra or	pre	0.20	3	94	89	99	9	100
	Cobra	pre	0.25						
25	Cobra +	pre	0.25	0	100	100	100	98	100
	Treflan +	ppi	0.75						
	Genep	ppi	3.50						
26	Cobra +	pre	0.25	0	100	100	100	97	100
	Genep	ppi	3.50						
27	Cobra +	pre	0.25	4	100	100	100	100	100
	Dual	pre	2.00						
28	Tackle or	split	0.125	6	86	61	63	5	100
	Tackle + oil	split							
29	Tackle +	split	0.125	9	98	100	85	97	88
	Treflan +	ppi	0.75						
	Genep	ppi	3.50						
30	Tackle +	split	0.125	6	95	88	96	85	93
	Eptam	ppi	3.50						
31	Tackle +	split	0.125	3	100	100	100	100	100
	Dual	pre	2.00						

1/ Not all these treatments were tested at all the experimental sites. Bean injury ratings were made at 5 sites; pigweed at 4 sites; groundsel at 3 sites; ryegrass and nightshade at 2 sites; shepherdspurse at 1 site.

2/ Scale: 0 = no weed control or crop injury; 100 = complete weed control or injury. pre = applied before emergence of the crop; ppi = pre-plant incorporated; split = post emergence of crop and weeds, stated rate was applied twice separated by one week.

3/ Genep and Eptam have the same active ingredient, EPTC.

Alternatives to Dinoseb for Weed Control in Snapbeans, 1987
Full Report

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INTRODUCTION

The reliance on dinoseb as a major component of weed control programs by snapbean growers in Oregon and the tenuous future of this herbicide led to the search for alternative herbicides for snapbeans. Five field trials were established in western Oregon in 1987 to screen registered and non-registered herbicides for weed control and crop injury on sites that varied in both weed spectra and soil types. This report provides the data and discussion of each of the field sites on an individual basis.

The objectives of these studies were to:

1. Obtain data on the weed control efficacy and crop safety of herbicides currently registered for use in snapbeans.
2. Identify other herbicides not currently registered in snapbeans which may serve as a substitute for dinoseb.
3. Obtain data which could be used toward the registration of suitable herbicides.
4. Develop recommendations of weed control options for growers in the Willamette Valley of Oregon.

In comparison to the standard dinoseb-Treflan-EPTC treatment, there were herbicides (registered and non-registered) applied in combination with Treflan and EPTC that provided excellent weed control. These treatments selectively controlled most of the broadleaf and grass species present in the experimental sites. The major limitation in these trials was that the weed spectrum at the five sites was limited. With this limitation it is not clear that the successful treatments in these tests would be as satisfactory if used on a wide scale over a more varied weed spectrum. This report describes the field trials and results obtained.

SUMMARY AND RECOMMENDATIONS

Registered Herbicides

Combinations of registered herbicides that provided good selective control in five test plots in 1987 included Treflan-Genep-Premerge (trifluralin-EPTC-dinoseb), Treflan-Genep-Dual (trifluralin-EPTC-metolachlor), Treflan-Dual-Amiben (trifluralin-metolachlor-chloramben), and Genep-Dual-Amiben (EPTC-metolachlor-chloramben). The weeds controlled by these herbicide treatments included pigweed, hairy nightshade, common groundsel, annual ryegrass, and shepherdspurse.

It is important to note poor weed control, except pigweed, was observed

when Amiben was applied alone in one of the field tests. This indicates Amiben may not have contributed much to the good weed control noted in the combination treatments listed above. In addition, there were trends and in some cases significant yield reductions from the Treflan-Dual-Amiben and Genep-Dual-Amiben herbicide combination treatments.

Treflan alone showed weakness in broadleaf weed control while Dual alone showed strong control in all species except nightshade.

The success of these registered herbicides was over a limited weed spectrum. In addition conditions were ideal for herbicide activity which included a warm spring and irrigation shortly after application of herbicides. Since favorable application conditions, suitable soil types, and a limited weed spectrum are not found commonly, the level of control of these tests cannot be assured in all locations.

Non-registered Herbicides

Non-registered herbicides that show potential for weed control in snapbeans include Sonalan (ethalfluralin), Cobra (lactofen), and Pursuit (imazethapyr).

Sonalan in combination with other herbicides resulted in adequate weed control with occasional crop injury as indicated by a high % yield in size grades 1-4. However, Sonalan applied alone was effective in control of pigweed and ryegrass only. This was similar to Treflan applied alone. Data indicates Sonalan may not be contributing much to overall weed control efficacy when in the combination treatments.

Cobra applied alone shows good broadleaf weed control with some weakness in the control of nightshade. However, when Cobra was applied with other grass herbicides, excellent weed control with occasional crop injury was observed.

Pursuit when applied alone resulted in minor crop injury, good control of shepherdspurse, and variable control of other broadleaf weeds. When used in combination with Treflan-Genep or Dual, adequate weed control was observed on all weed species present. It should be recalled that Dual applied alone, resulted in good weed control with some weakness in control of nightshade. Pursuit may contribute to snapbean weed control only in combination with other more effective herbicides.

Tackle (acifluorfen), when used alone showed adequate levels of weed control of shephardspurse, and in some cases other broadleaf weeds were controlled. Tackle when used with other herbicides such as Genep-Treflan, and Dual, resulted in satisfactory weed control.

Scepter (imazaquin) and Tycor (ethiazin) were also evaluated, but the level of snapbean injury when Scepter and Tycor were used in combination with other registered herbicides was an average from 25 to 58%, levels too high for commercial snapbean production.

Candidate herbicides tested, but failing for reasons of inadequate crop

tolerance and/or weed control were Goal (oxyfluorfen), Classic (chlorimuron), and Cinch (cinmethylin).

Some potential problem weed species were not present in these trials, indicating the need for further evaluations.

Recommendations

Growers and processors should not depend on being able to use dinoseb in 1988 or any time in the future. If dinoseb is available in 1988 growers should try several of the non dinoseb registered herbicide combinations on a smaller scale in order to guide which weed control program would be best suited for their conditions in the future when dinoseb is no longer available. This is very important!

Based on this and other research completed to date, the standard treatment of Treflan-Genep-Premerge (trifluralin-EPTC-dinoseb) would be expected to be the best weed control program under a variety of conditions. However, since dinoseb is not expected to be available in the future Treflan-Genep-Dual (trifluralin-EPTC-metolachlor), Treflan-Dual-Amiben (trifluralin-metolachlor-chloramben), and Genep-Dual-Amiben (EPTC-metolachlor-chloramben) represent alternatives which will work in conditions similar to those of these test sites. The combinations which include Dual and Amiben could result in yield reductions and/or a delay in maturity in comparison to the standard dinoseb treatment. Combination treatments which include Amiben are more costly and the benefits of Amiben are not clear. The high water solubility of Amiben could lead to crop injury and non-effective weed control. It should not be expected that these combination treatments will provide adequate weed control across the spectra of conditions which exist in the Willamette Valley and Western Washington.

EXPERIMENTAL METHODS

Calef farm. The first trial was established on May 13, 1987 on the Mike Calef farm located 2 miles east of Independence. The soil type was a Cloquato silt loam which has a pH of 6.5. The predominate weed species were hairy nightshade (Solanum sarachoides), redroot pigweed (Amaranthus retroflexus), and common grounsel (Senicio vulgaris). The plot site had a history of strawberries and sweetcorn. Site preparation included chiselplowing followed by two discing operations and fertilizing with 550 lbs/A of 18-23-11-5 prior to the application of the preplant incorporated treatments.

A randomized complete block experimental design was used with three replications. Plot size was 9 x 30 feet. Treatments were applied broadcast in 22.7 gallons of water per acre with a unicycle plot sprayer set at 22 psi. The preplant incorporated treatments were incorporated to a depth of 2.5 inches on the day of planting with a disc-harrow. OR-91 snapbeans were planted in 30 inch rows at a depth of 1 inch. Pre-emergence treatments were applied immediately after planting on May 13 and overhead sprinkler irrigation (1.5 inches) was supplied the day after planting. Post-emergence treatments were applied 20 days after

planting, June 9, when the snapbeans were at the first fully expanded trifoliate leaf stage. The nightshade was 1-1.5 inches tall and had 1-3 leaves, grounsel at 1-2 inches had 2-3 leaves, and redroot pigweed at 1-3 inches had 2-3 leaves. Split treatments of Tackle were applied June 19, 10 days after the first postemergence applications. Table 1 lists the herbicide treatments and the rates of application for the Calef location.

Evaluations for crop injury and weed control were taken on June 5, June 24, and July 13. Ten foot of row was harvested on July 25 for selected treatments. The beans were graded and data converted to tons/A.

Vegetable Farm I. The second field experiment was established on the Oregon State University Vegetable Research Farm in Corvallis, Oregon on May 20, 1987. The soil type was a Chehalis silty clay loam and the weed species present were redroot pigweed, common grounsel, and annual ryegrass (Lolium multiflorum). This site was previously planted to snapbeans. Site preparation included moldboard plowing and two passes with a Roterra. Six hundred lbs/A of 8-24-8-8 fertilizer was applied and 2 lbs/A of Dyfonate for symphylan control was applied prior to planting. Additional fertilizer was banded on while planting. The site was over-seeded with annual ryegrass as an indicator species for grass control. Irrigation occured within a day of planting. The remaining methods were the same as the Calef trial except the beans were planted in 36 inch rows and the preplant incorporated treatments were incorporated with a Roterra and rolling basket on May 20. Preemergence treatments were applied on the day of planting while postemergence treatments were applied on June 16, with the second application of Tackle applied June 26. Table 3 shows the herbicide treatments and rates of application for the Vegetable Farm I test.

Evaluations for weed control and crop injury were June 12 and July 7. Beans were harvested from selected treatments on July 30. These were graded and the data converted to tons/A.

Hockett Farm. The third trial was planted on May 26, 1987 on the Bob Hockett farm near Woodburn. The soil was a Woodburn silt loam soil with a pH of 5.9. The previous crop planted on this site was winter wheat which was treated with MCPA, Banner and Hoelon. Site preparation included a fall moldboard plowing, two passes with a cultipacker and roller digger harrow and finally a rotatilling prior to planting. One hundred and ten lbs/A of nitrogen was applied prior to planting, OR-91 snapbeans in 36 inch rows. Preplant-incorporated and preemergence treatments were applied the day of planting, May 26. Incorporation was with a rotatiller. Postemergence treatments were applied on June 26 and for the Tackle treatment a second treatment was applied on July 6. The remaining methods were the same as the previous two field trials. Table 5 shows the herbicide treatments and rates of application for the Hockett site.

Crop injury ratings were taken on June 26, July 10, and July 22. No weed control ratings were taken on this site because of lack of weed pressure, however, notes were taken on the few weeds present. Bean

harvest and grading of selected treatments was conducted on August 10.

Dalke Farm. The fourth field trial was planted on the Leroy Dalke farm on June 15, 1987 near Stayton. The soil type was of a Clackamas gravely loam with a pH of 5.6. The previous crop was sweetcorn which was treated with Aatrex and Dual. Site preparation included moldboard plowing, discing, field cultivation, and chiselplowing. Nitrogen was applied at 110 lbs/A, phophorus at 200 lbs/A, and Sulfur at 50 lbs/A. The preplant incorporated treatments were applied and incorporated with a rotavator on June 15. Preemergence treatments were applied June 15, while postemergence treatments were applied on July 8 with the second application of Tackle on July 20. OR-91 snapbeans were planted in 30 inch rows at a depth of 1.0 inch. The methods of treatment applications were the same as the previous field experiments.

Table 7 shows the herbicide treatments and the rates of application at the Dalke site. The treatment list of this experment was changed as a result of responses obtained from the Calef trial. The rate of Dual was reduced from 2.0 to 1.5 lbs/A. Preemergence applications of Pursuit were not applied due to lack of activity. Goal and Cobra showed injury as postemenrgence treatments and consequently were applied only as preemergence treatments at lower rates. The Cinch treatments were eliminated because no broadleaf weed control was observed with this herbicide.

Evaluations for snapbean injury and pigweed control were recorded on July 7 and July 31. Efficacy notes were also taken on isolated patches of smartweed (polygonum sp.). The beans were harvested from plots of selected treatments on August 24 and were weighed, graded, and data converted to tons/A.

Vegetable Farm II. This was the last field trial conducted in 1987 on snapbeans. It was established on July 2 at the Vegetable Research Farm in Corvallis. The soil type, field preparation, and weed spectrum were similar to the Vegetable Farm I trial. The weed species present included nightshade, shepherdspurse, pigweed, common groundsel, and annual ryegrass. The experimental design was a randomized complete block as the other sites were, but with 4 replications. Preplant incorporated treatments were applied on July 2, and preemergence treatments were applied on July 3. The postemergence treatments were applied on July 25 with the second application of the Tackle on August 5, 1987.

The treatment list (Table 9) of this trial was modified following the observations of weed control and crop response in the first four trials. The non-registered herbicides that showed potential were applied alone and in combination with registered materials. Many of the registered materials were applied alone to observe the crop injury potential and weed control characteristics of these without the effect of other herbicides.

Evaluations of weed control and crop response were recorded on July 25 and August 14. The beans from selected treatments were harvested on

September 14 and were weighed, graded and data converted to tons/A.

Plantback study, Vegetable Farm II site. A plantback study was established on the plot site in order to determine which herbicides have a potential carry-over problem, which would limit subsequent crop rotations. The experimental site was flail mowed, moldboard plowed and Roterraed twice before planting Stephens winter wheat and sugarbeets on October 5, 1987. Percent injury ratings were recorded on October 27 and November 16. Sweetcorn and radish will be planted in the spring of 1988 to quantify longer term residual effects.

RESULTS AND DISCUSSION

Calef Farm.

Weed control and snapbean injury. The registered herbicide treatments where Dual (metolachlor) and Amiben (chloramben) were used with Treflan (trifluralin) and Genep (Eptam, EPTC) as shown in Table 1, treatments 2, 4, and 6, resulted in excellent control of the hairy nightshade, pigweed, and common grounsel as did the standard dinoseb-Treflan-Genep treatment (no. 1).

Snapbean injury was caused by treatments 1 and 2. However, the beans grew out of the injury within six weeks after the herbicide application.

The excellent weed control obtained is encouraging, however there are factors affecting the use of Dual and Amiben which differ from the factors which affect dinoseb activity. Dual and Amiben applied pre-emergence require water for activation shortly after application, whereas this requirement for dinoseb is less critical. Therefore, growers will have to irrigate if rainfall does not occur shortly (about 2 days) after the application in order to activate Dual or Amiben. This is not a preferred practice because of the cool wet conditions which often exist in western Oregon in the spring months. Another possibility for limiting the rain or irrigation requirement for activation is to pre-plant-incorporate Dual applications. However, this application method was not evaluated in these tests. A further problem with the use of Amiben, is the water solubility of this product. Too much water applied, especially in a sandy soil can leach the Amiben deeper into the soil and injure snapbeans while reducing its weed control effectiveness. The above discussion pertains to the other experimental sites as well.

The limited weed spectrum associated with this plot site as well as the others was another limiting factor. There are other broadleaf problems such as the wild mustards, radishes, lambsquarters, smartweed, dogfennel, pineapple weed, etc. that were not present. It would not be reasonable to conclude that the registered treatments (2, 4, and 6) would work as effectively in other areas where the weeds present are different than in our test site. Further research needs to be conducted on a broader range of weed species, soils, and weather contitions in order to know the potentials and limitations of these treatments.

The non-registered Sonalan (ethalfluralin) treatments (nos. 3 and 5)

applied in combination with registered herbicides which resulted in excellent weed control, however, were injurious to the beans. Other non-registered herbicides that showed promising weed control and acceptable crop safety included Pursuit (imazethapyr) (nos. 7 to 10), Scepter (imazaquin) (nos. 11 to 14), and Tackle (acifluorfen) (nos. 37-39). In later experiments the weed control ratings with Pursuit applied preemergence (no. 7) were much better. Scepter exhibited good weed control and snapbeans seemed to be tolerant. However, Scepter showed signigicant snapbean injury in later experiments.

Tackle applied postemergence showed poor weed control at the 0.125 lb ai/A (no. 37) and some weed control efficacy at 0.25 lb ai/A (no. 38). Control of redroot pigweed and hairy nightshade was enhanced by applying Tackle as a split application (no. 39). This herbicide was weak on common grounsel at this site. Snapbean injury symptoms included slight stunting and curled leaves, however, yields were not affected.

Tycor (ethiazin) (nos. 15-18) was weak on hairy nightshade preemergence and injurious to the beans when applied postemergence. This herbicide also induced unacceptable injury when applied in combination with other materials in later experiments.

Cobra (lactofen) applied preemergence (no. 27 to 30) provided excellent weed control, however, showed some crop injury, although this injury did not result in a yield reduction. This herbicide applied postemergence was injurious to the beans.

The non-registered herbicides that severely injured snapbeans and/or exhibited poor weed control included Classic (chlorimuron) (nos. 23-26), Goal (oxyfluorfen) (nos. 31-36), and Cinch (cinmethylin) (19-22). Classic and Goal showed high levels of injury to the snapbeans. Cinch showed good crop safety but provided minimal weed control. Cinch is reported to have better efficacy on grasses than broadleaves and probably should be used in combination with a broadleaf type herbicide.

Snapbean Yield. Snapbean yield data are shown for the Calef experimental site in Table 2. The snapbean grades, in addition to total yield, are important since herbicide that delayed maturity can be identified by reviewing the % of 1-4 size grades of harvested beans.

The dinoseb-Treflan-EPTC treatment (no. 1) yielded the highest according to the average total yield. The yield of the standard treatment was significantly higher than registered treatment Genep-Dual-Amiben (no.6), but not significantly higher than registered treatments 2 and 4. This indicates that under conditions present at the Calef site, the registered treatment of Genep-Dual-Amiben (no. 6), may possess a higher injury potential. The yield reduction can only be partially accounted for in terms of delayed maturity as shown by only slightly lower % yield in the 1-4 size grades (53% vs. 46%). It is worth noting that the standard treatment was almost significantly higher than the Treflan-Dual-Amiben (no. 4) treatment. Trends in the data such as this which could occur over several years of testing would be of concern to producers. These trends in the data illustrate the reason that dinoseb-

Treflan-EPTC is a popular treatment for snapbeans.

The Sonalan plus other registered herbicides (nos. 3 and 5) caused a reduction in yield when compared to the standard treatment (no. 1). Two non-registered treatments which did not reduce yield in comparison to treatment 1, were Cobra and Scepter (nos. 11, 29). Scepter with a lower % yield in grades 1-4 may have delayed maturity. A later harvest of this treatment may have resulted in increased yields. The effect of no weed control on yield is shown by the untreated check which was 11% of the standard treatment (no. 1). Similarly, poor weed control of Pursuit in this trial resulted in large yield reductions. The effects of severe crop injury on yield are shown by the data of the Classic and Goal treatments (nos. 23 and 31), where the yields were less than 15% of the standard (no. 1).

Vegetable Farm I.

Weed control and snapbean injury. The results from this trial were similar to the Calef experiment because of the similar weed spectrum and soil type. Excellent control of redroot pigweed, annual ryegrass, and common grounsel was obtained from the registered treatments (nos. 2, 4 and 6) in comparison to the standard treatment (no. 1) as shown in Table 3. As with the Calef trial, early injury ratings (week 3) showed substantial injury to the snapbeans from all registered applications (nos. 2, 4, 6) and to a slightly lesser extent from the standard treatment (no. 1).

The Sonalan plus other registered herbicides (nos. 3, 5) gave excellent weed control, but snapbean injury also occured. Injury was especially high, 48% in week 3, when Sonalan was applied in combination with Dual and Amiben (no. 5).

The remaining non-registered herbicides gave good weed control except that most of these materials were weak on annual ryegrass. Pursuit performed better in this trial showing excellent control of redroot pigweed (no. 7 to 10). Pursuit was weak on common grounsel applied pre-emergence (no. 7) although it provided excellent control when applied postemergence (nos. 8 to 10). Good crop safety was observed with Pursuit.

Scepter (nos. 11 to 14) applied both pre- and postemergence gave good control of the broadleaves. However, injury increased with postemergence applications of Scepter.

Tycor (nos. 15-18) performed much better preemergence than postemergence with excellent pigweed control, good grounsel activity, and moderate grass activity. This herbicide, without 3 replications of ratings, appeared to have poor control of hairy nightshade. Snapbean injury was minimal with all the Tycor treatments.

Cobra (nos. 27 to 30) controlled both pigweed and grounsel over all applications while having good crop safety. Cobra has no activity on annual ryegrass.

Tackle (nos. 37 to 41) showed some good weed control of pigweed and grounsel, especially with the split application. Weed control and snapbean injury from Tackle increased with the addition of crop oil.

Goal (nos. 31 to 36) and Classic (nos. 23 to 26) severely injured snapbeans. In addition, Cinch (nos. 19 to 22) did not perform well on the broadleaf weeds. However, this herbicide possessed excellent ryegrass control capability. Cinch was later eliminated as a possible alternative to dinoseb because grass herbicides are currently available and broadleaf weeds are of main concern.

Snapbean yield. Snapbean yield data for the Vegetable Farm I trial are shown in Table 4. There were no registered treatments (nos. 2, 4, 6) that caused a significant yield reduction in comparison to the standard dinoseb treatment (no. 1). None of the registered treatments delayed maturity as indicated by similar % yields in the 1-4 size grades.

The Sonalan-Dual-Amiben combination (no. 5) was one non-registered treatment which resulted in a yield reduction. Other non-registered treatments selected for harvest were Pursuit (no. 7), Scepter (no. 11), Cinch (21), and Cobra (no. 29). The yield reductions shown in the Pursuit, Scepter, and Cobra treatments were primarily the result of ryegrass competition. This yield reduction would have been more uniform across treatments with a uniform stand of ryegrass. The Cobra treatment yield (2.6 tons/A) was more affected from the ryegrass than the Pursuit and Scepter treatments (4.1 and 5.1 tons/A, respectively) indicating that these plots had more ryegrass in them. Cinch controlled grasses which was evident from a high yield (5.1 tons/A). However, the yield from the Cinch treatment was likely not as high as it might have been with good broadleaf weed control.

Hockett Farm.

Yield information from a test site with little weed pressure is beneficial to determine the actual injury potential of the herbicides with out the confounding effects from weed competition. The Hockett field trial was a location with little weed pressure, providing excellent information on the injury potential of the herbicide treatments. No replicated weed control data were recorded from this trial.

Snapbean injury. The injury ratings are listed in Table 5 for each herbicide treatment. Slight snapbean injury was recorded in week 4 from registered treatment of Treflan-Dual-Amiben (no. 4). This injury was not evident by six weeks into the growing season.

As with the previous two experiments Sonalan-Dual-Amiben (no. 5) again induced snapbean injury. However, there was no injury recorded for Sonalan-Genep-Dual (no. 3). The non-registered treatments applied pre-emergence that visually appeared safe (ratings of 10% injury or less) on snapbeans included Pursuit (no. 7), Scepter (no. 11), Tycor (no. 15), Classic (no. 23), and Cobra (nos. 28 to 30). Classic showed more crop

safety at this site than other locations. This safety could be due to the heavier soil type at the Hockett site. The higher organic matter and higher clay content of the Woodburn soil may have tied up more of the herbicide so that less of it was available to injure snapbeans.

The non-registered herbicides (Pursuit, no. 10, Scepter, nos. 12 to 14, Tycor (nos. 16 to 18), Classic (nos. 24 to 26), and Cobra (no. 27) when applied postemergence caused unacceptable snapbean injury. This was in contrast to their good crop safety when applied preemergence.

Tackle (nos. 37 to 39), applied postemergence was safe on snapbeans. Leaf curling from Tackle treatments early in the season was slight.

Snapbean Yield. The lack of weed pressure at the Hockett site resulted in yield data which shows the herbicidal effects without weed competition (Table 6). Because of the lack of weed pressure, comparisons should be based on the untreated check which produced high yields since there were no competitive effects from weeds. In this trial all of the herbicides showing potential for future use in snapbeans were harvested. The Goal, Classic, and Cinch treatments were known to be of little or no use on snapbeans, and thus were not harvested.

The dinoseb standard and other registered treatments (nos. 1, 2, 6) did not result in significant yield reductions in comparison to the untreated check (no. 40). The registered treatment of Treflan-Dual-Amiben (no. 4) resulted in significantly less yield than the check plot and the standard (no. 1). This yield reduction may have been caused by a delayed maturity as shown in the 61% of the yield in 1-4 size grades for treatment 4 compared to the 54% yield in size grades 1-4 of the check plot. The yield reduction of the Treflan-Amiben-Dual treatment (no. 4) may have been less if harvest of this treatment was delayed, allowing further development of the beans.

The Sonalan-Dual-Amiben (no. 5) also showed a yield reduction compared to the check (no. 40) and standard (no. 1). The non-registered herbicides including Pursuit (no. 7), Tycor (no. 15), and Cobra (nos. 28 to 30) applied preemergence did not reduce yields significantly. Cobra at all preemergence rates did not result in reduced yields. Yield reductions were recorded with a preemergence treatment of Scepter (no. 11). These herbicides applied post emergence (nos. 8-10, 12-14, 17, 18, 27) caused visual snapbean injury, as discussed above, and resulted in a corresponding yield reductions which may have been due to a combination of plant stunting and subsequent delayed maturity.

The lack of yield reduction from Tackle (37 to 39) is encouraging, as this is the only material that has shown potential for weed control and crop safety when applied postemergence. Applications at both 0.125 and 0.25 lb ai/A and 0.125 lb ai/A split applied, resulted in high yields, indicating that snapbeans treated with Tackle grew out of the early season injury.

Dalke Farm

Weed control and snapbean injury. The standard treatment and registered treatments (nos. 1, 2, 3, 5, and 7) showed similar results to the other field trials, where good, season long weed control was obtained. However, the only weed present in sufficient populations for replicated evaluations was pigweed. This is a limitation of this experiment which restricts its application to other locations. These treatments showed statistically nonsignificant early season stunting of the snapbeans. At six weeks into the season there were no signs of injury.

The non-registered treatment results were similar to the results of other sites. The treatments which included Sonalan (nos. 4 and 6) showed excellent pigweed control with very slight crop injury. Preemergence applications of Scepter (no. 11) and Cobra (nos. 24, 25, 26) showed adequate crop safety with good weed control.

Pursuit (no. 8 to 10), Scepter (no. 12, 13, 14), and Cobra (no. 23) applied postemergence were too injurious to snapbeans to be commercially acceptable. The postemergence application of Goal (nos. 27, 28) and all Classic treatments (nos. 19 to 22) injured snapbeans significantly in this trial. Goal applied preemergence (no. 26) to the crop and weeds showed crop safety but poor weed control.

In comparison to the Calef and Vegetable Farm I trials, redroot pigweed control was very poor with both the pre- and postemergence Tycor treatments (nos. 15 to 18). This may indicate that a triazine resistant biotype of pigweed may exist at this site. However, further testing would be needed to clarify this.

Tackle applied postemergence (nos. 29, 30, 31) controlled pigweed at all application rates. Snapbean injury from these treatments was reaching unacceptable levels as shown by the early ratings. However, these injury levels were minimized by 6-10 weeks into the season.

A smartweed population was present in the southern half of the plot. Even though this population was not representative enough for replicated data, it did provide an indication of which herbicides are active on smartweed, which was the first weed encountered representing the buckwheat family.

All of the registered treatments controlled smartweed, and the treatments with Sonalan also were active on this weed. The non-registered treatments active on smartweed were Scepter, Pursuit, Classic, Goal, and Tackle. Cobra was weak on this weed. This finding is similar to Dr. Stott Howard of Washington State University who reported Cobra to be weak on weeds in the buckwheat family.

Snapbean yield. The snapbean yields for selected treatments are shown in Table 8. The high % yield in size grades 1-4 for many of the treatments indicated the harvest was too early. However, the data clearly showed differences in response to the treatments.

Reduction of the Dual application rate from 2.0 to 1.5 lb ai/A (nos. 2, 3) did not result in a yield increase or a difference in the visual

rating of crop injury. Registered treatments 2, 3, and 5 did not result in yields significantly lower than the standard dinoseb treatment (no. 1), however, there were trends towards a decrease in yield. The Genep-Dual-Amiben treatment (no. 7) reduced yields further than the other registered treatments, but the reduction was not statistically significant.

There were also some yield reductions associated with the non-registered treatments. The Sonalan treatments (treatments 4 and 6) caused a non-significant yield reduction. Pursuit (nos. 8, 9, 10), Scepter (no. 11), and Cobra (nos. 24, 25) all reduced yields significantly. Tycor (no. 15) yields were severely reduced, most likely due to competition from uncontrolled pigweed rather than just the herbicide.

Tackle applied at 0.125 lb ai/A (no. 29) did not reduce yields. When applied at 0.25 and 0.125 split Tackle yields tended to be lower.

Vegetable Farm II.

Weed control and Snapbean injury. All the registered combination treatments (nos. 1, 2, 4, 6) were safe on snapbeans and also provided excellent weed control which included annual ryegrass, redroot pigweed, hairy nightshade, common groundsel, and shepherdspurse (Table 9). Dual applied alone (no. 7) resulted in excellent control of annual ryegrass, shepherdspurse, common grounsel, and good control of redroot pigweed, but poor control of hairy nightshade. However, this level of control of broadleaf weeds is not commonly found with Dual. Extrapolation of these results to other conditions is not advisable.

Treflan applied alone (no. 9) controlled annual ryegrass and redroot pigweed, and was weak on hairy nightshade, common grounsel, and shepherdspurse. The non-registered close relative of Treflan, Sonalan (no. 8), controlled weeds similar to Treflan. However, Sonalan was a little more active on the broadleaves than Treflan. The injury shown from Sonalan in the earlier studies was not evident when Sonalan was applied alone. This indicates that the stress from applying three herbicides in combination may be conducive to snapbean injury.

Amiben, applied alone (no. 18), showed satisfactory control of pigweed, but poor control of annual ryegrass, hairy nightshade, common groundsel, and shepherdspurse. It is doubtful that Amiben provided a strong component for weed control in the Amiben combination treatments (nos. 4, 5, 6).

Pursuit applied alone (no. 10) had some activity on annual ryegrass at the higher rate, but did not adequately control common groundsel. Pursuit applied in combination with Treflan and Genep (no. 13) showed excellent control of all weeds, with good crop safety. Similar results were obtained when Pursuit was applied in combination with Dual (no. 17). When Pursuit was applied preemergence with Treflan (no. 14), control of common grounsel was not adequate, however, effective control of the other weeds was obtained. In contrast to preemergence applications, Pursuit applied preplant incorporated with Treflan (no.

15), resulted in reduced weed control.

Satisfactory weed control was evident with Scepter, when applied in combination with the other registered herbicides (nos. 19 to 23). It is evident that Scepter had more grass activity than Pursuit and weed control was not reduced as much as Pursuit with incorporation. The major drawback of Scepter was snapbean injury which was high in treatments with Scepter applied alone (24, 25, 26) and higher when Scepter was applied in combination with other herbicides (nos. 19 to 23). In contrast to the other trials Scepter injured snapbeans at a much higher level. The cause for the high levels of injury at this site are not known. It was because of this injury that Scepter will not be tested further.

Tycor was another herbicide which resulted in increased injury when applied in combination with other registered herbicides. The increased levels of injury were associated with higher herbicide application rates. When applied alone, at 1.0 lb ai/A (no. 28), Tycor was safe, and when applied at the same rate in combination with Dual (no. 30) and Treflan-EPTC (no. 48) the injury was minimal. When applied alone at 1.5 lb ai/A (no. 27), injury slightly increased. However, when applied at 1.5 lb ai/A in combination with Dual (no. 29) and Treflan-EPTC (no. 49), injury increased to 50-60% and to 18-24% when applied with Genep (EPTC) (no. 31). This indicates that if Tycor was to be used in a snapbean weed control program, lower rates would be needed, which may be too low for effective weed control. This coupled with the low safety threshold, eliminated Tycor as a possible alternative to dinoseb.

Cobra performed well in this trial, as it has throughout the season. In addtion to the fair crop safety, Cobra, when applied alone (nos. 33, 34, 35) and in combination with several of the registered materials (36 to 41), showed excellent control of weeds present in this trial. Treatment 39 did not have the grass control that would have been expected, due to an error of omitting Genep in the combination. It is important to note that Cobra (preemergence) does not always have adequate crop safety. In this trial, Cobra, at 0.5 lb ai/A resulted in a 16% injury rating early in the season. There may not be a wide margin of safety with Cobra. Further research will help determine the conditions and rates required for crop safety.

Tackle was the only herbicide applied postemergence in this trial (nos. 42 to 47). When applied alone there was good control of pigweed and shepherdspurse, but not adequate control of ryegrass, nightshade, or groundsel. Crop injury from Tackle treatments was 16% (no. 43) or less, suggesting overall crop injury from Tackle may be acceptable. When applied in combination with other registered materials (nos. 45, 46, 47) weed control efficacy increased. The best combination was the Tackle-Dual treatment (no. 47), which resulted in excellent weed control of all species present. Because of the weed control potential when applied in combination, coupled with good crop safety further study of the material is intended.

Snapbean yield. Table 10 shows the yield and grade data for selected

treatments for the Vegetable Farm II test. Of the dinoseb standard and registered treatments (nos. 1, 2, 4, 6, 7, 9, 18) only Amiben applied alone (no. 18), resulted in a yield significantly lower than the hand weeded check plot (no. 50). This was most likely due to a lack of weed control as was shown in Table 9 and discussed earlier. Yields from Treflan (no. 9) and Sonalan (no. 8), applied alone, tended to be lower than the hand weeded check, likely due to a lack of broadleaf weed control. The non-treated check plot (no. 51) had a yield which was only 14% of the hand weeded check (no. 50) indicating significant weed competition with the snapbeans in this experiment.

Since Pursuit (no. 11) and Cobra (no. 34) applied alone did not control ryegrass, yields were reduced and maturity delayed as evidenced by the high % 1-4 size grades. A high percentage of size grades 1-4 (63%) occured with the Sonalan-Dual-Amiben treatment (no. 5) which may be the result of injury from this combination.

In treatments where Pursuit (nos. 13, 14, 16, 17) and Cobra (nos. 36, 38, 40) were each applied with other registered herbicides, yields tended to be not significantly higher than the hand weeded check plot (no. 50).

Plantback Study, Vegetable Farm II.

The plantback study provided information as to which herbicides, when applied to the snapbeans, will cause carryover problems in two fall planted crops. The data in Table 11 clearly shows that sugarbeets are much more sensitive than wheat to nearly all the herbicides tested. Dual is an exception, where injury ratings on the sugarbeets were only 6 to 10%. Injury to wheat from most of the tested herbicides was not significant. However, treatments using Pursuit (no. 10), Cobra (no. 34), Cobra-Genep (no. 38), and Tackle (no. 43) resulted in injury ratings as high as 9%. Evaluation of injury to crops to be planted in the spring will identify which of these herbicides have longer term carryover problems, further restricting crop rotations.

Table 1. Percent injury of OR-91 snapbeans and percent control of several weed species evaluated three times during the season at the Mike Calef Farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE[2/]	% INJURY OF -SNAPBEAN-			% CONTROL REDROOT ----PIGWEED---			% CONTROL HAIRY -NIGHTSHADE--			% CONTROL COMMON --GROUNSEL---		
				WEEK OF SEASON[3/]											
				3	6	9	3	6	9	3	6	9	3	6	9
01	TREFLAN	0.75	PPI	10	5	0	100	100	100	100	100	100	100	100	100
	GENEP	3.5	PPI												
	PREMERGE	4.5	PRE												
02	TREFLAN	0.75	PPI	20	5	0	100	100	100	100	100	100	67	100	100
	GENEP	3.5	PPI												
	DUAL	2.0	PRE												
03	SONALAN	1.0	PPI	22	8	0	100	100	100	100	100	100	100	100	100
	GENEP	3.5	PPI												
	DUAL	2.0	PRE												
04	TREFLAN	0.75	PPI	3	5	0	100	100	100	100	100	97	100	100	98
	DUAL	2.0	PRE												
	AMIBEN	2.5	PRE												
05	SONALAN	1.0	PPI	25	22	0	100	100	100	100	100	100	95	88	88
	DUAL	2.0	PRE												
	AMIBEN	2.5	PRE												
06	GENEP	3.5	PPI	7	5	0	100	100	100	100	100	100	100	100	100
	DUAL	2.0	PRE												
	AMIBEN	2.5	PRE												
07	PURSUIT	0.06	PRE	0	0	7	0	3	33	0	0	0	0	0	13
08	PURSUIT	0.03	POST	0	5	0	0	93	50	0	95	93	0	67	0
	CROP OIL	4.0	POST												
09	PURSUIT	0.06	POST	0	12	0	13	98	97	13	97	97	0	50	12
	CROP OIL	4.0	POST												
10	PURSUIT	0.12	POST	0	20	3	0	100	100	0	100	100	0	80	30
	CROP OIL	4.0	POST												
11	SCEPTER	0.125	PRE	3	3	0	100	100	100	88	93	85	100	100	98
12	SCEPTER	0.06	POST	0	17	32	22	95	85	27	58	28	50	100	85
	CROP OIL	4.0	POST												

Table 1 (cont.). Percent injury of OR-91 snapbeans and percent control of several weed species evaluated three times during the season at the Mike Calef Farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE[2/]	% INJURY OF -SNAPBEAN-			% CONTROL REDROOT ----PIGWEED---			% CONTROL HAIRY -NIGHTSHADE--			% CONTROL COMMON --GROUNSEL---		
				WEEK OF SEASON[3/]											
				3	6	9	3	6	9	3	6	9	3	6	9
13	SCEPTER CROP OIL	0.125 4.0	POST POST	0	15	0	0	96	93	0	53	23	0	98	87
14	SCEPTER CROP OIL	0.25 4.0	POST POST	3	32	38	62	100	100	57	87	50	100	100	100
15	TYCOR	1.5	PRE	3	2	0	100	65	96	80	62	65	100	67	90
16	TYCOR	0.375	POST	7	10	3	7	42	48	13	8	12	23	13	22
17	TYCOR	0.75	POST	0	15	7	0	20	20	0	5	0	0	7	10
18	TYCOR	1.5	POST	0	30	18	0	50	60	0	48	7	0	70	47
19	CINCH	1.0	POST	0	0	0	0	0	0	0	0	0	0	0	0
20	CINCH	0.5	PRE	0	0	0	0	0	20	0	0	0	0	0	0
21	CINCH	1.0	PRE	12	0	0	17	0	10	27	0	10	50	0	13
22	CINCH	2.0	PRE	7	0	0	86	23	53	50	62	37	97	17	40
23	CLASSIC	0.03	PRE	3	5	0	85	65	75	30	72	13	100	97	97
24	CLASSIC	0.015	POST	0	75	57	0	97	73	0	67	23	0	100	100
25	CLASSIC	0.03	POST	0	65	68	0	98	85	0	82	7	0	90	100
26	CLASSIC	0.06	POST	0	72	80	0	94	97	0	70	33	0	100	100
27	COBRA	0.3	POST	0	33	8	13	100	100	17	100	95	0	100	100
28	COBRA	0.2	PRE	13	2	0	100	98	93	100	91	77	100	100	97
29	COBRA	0.3	PRE	23	20	0	100	100	99	100	99	91	100	100	100
30	COBRA	0.6	PRE	38	15	7	100	100	100	100	100	93	100	100	100

Table 1 (cont.). Percent injury of OR-91 snapbeans and percent control of several weed species evaluated three times during the season at the Mike Calef Farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE[2/]	% INJURY OF -SNAPBEAN-			% CONTROL REDROOT ----PIGWEED---			% CONTROL HAIRY -NIGHTSHADE--			% CONTROL COMMON --GROUNSEL---		
				WEEK OF SEASON[3/]											
				3	6	9	3	6	9	3	6	9	3	6	9
31	GOAL	.125	PRE	67	60	23	100	53	30	100	85	42	100	72	43
32	GOAL	0.25	PRE	85	85	78	100	87	32	100	92	83	100	83	67
33	GOAL	0.5	PRE	96	98	98	100	100	97	100	100	100	100	100	100
34	GOAL	0.06	POST	3	47	5	50	82	67	43	85	76	48	67	55
35	GOAL	0.125	POST	0	63	62	0	90	37	0	82	32	0	83	17
36	GOAL	0.25	POST	0	87	88	0	100	97	0	100	93	0	100	97
37	TACKLE	.125	POST	0	0	0	0	0	0	0	0	0	0	0	0
38	TACKLE	.25	POST	0	3	0	0	40	10	0	32	0	0	38	0
39	TACKLE	.125	SPLIT	0	7	3	0	92	52	0	90	13	0	53	0
40	CHECK			0	0	0	0	0	0	0	0	0	33	0	0
	LSD(0.05) =			13	14	26	25	29	32	28	29	36	33	32	33
	STANDARD DEVIATION =			8	8	16	15	17	19	17	17	22	20	19	20
	COEFF. OF VARIATION =			68	35	91	35	25	28	41	26	42	45	28	33

1/ Planted: May 13, 1987.
Harvested: July 25, 1987.

2/ PPI = herbicides applied preplant incorporated on May 13, 1987.
PRE = herbicides applied preemergence on May 13, 1987.
POST = herbicides applied post emergence of weeds and beans while beans were at the first fully expanded trifoliate leaf stage, on June 9, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of the POST treatment and again 10 days latter on June 19, 1987.

3/ Evaluations were recorded on June 6, for week 3; June 24, for week 6, and July 13 for week 9.

Table 2. Yield of OR-91 snapbeans in response to herbicide treatments at the Mike Calef farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb/ai/A)	APPLIC-ATION TYPE[2/]	TOTAL YIELD AVERAGE[3]	GRADES (No.) 1&2	3	4	5	6	7+	1-4	TOTAL YIELD[4/]	% YIELD GRADES 1-4
				(tons/A)									-(%)-
01	TREFLAN	0.75	PPI	5.5	.7	.8	1.0	1.0	.9	.3	2.5	4.7	53
	GENEP	3.5	PPI										
	PREMERGE	4.5	PRE										
02	TREFLAN	0.75	PPI	5.0	.6	.8	1.1	1.5	.9	.2	2.5	5.1	48
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
03	SONALAN	1.0	PPI	4.0	.4	.5	.6	1.1	1.0	.3	1.5	4.0	39
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
04	TREFLAN	0.75	PPI	4.1	.4	.6	.8	1.2	.9	.2	1.8	4.0	44
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
05	SONALAN	1.0	PPI	3.8	.4	.5	.6	.9	.8	.5	1.5	2.8	55
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
06	GENEP	3.5	PPI	3.6	.6	.5	.6	.8	.8	.2	1.6	3.5	46
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
07	PURSUIT	0.06	PRE	.3	.4	.4	0	0	0	0	.8	.9	93
11	SCEPTER	0.125	PRE	4.9	.5	.7	1.0	1.5	1.0	.4	2.2	5.3	41
15	TYCOR	1.5	PRE	3.5	.4	.5	.6	.9	.7	.2	1.5	3.3	45
23	CLASSIC	0.03	PRE	1.4	.2	.3	.3	.3	.2	0	.8	1.4	60
28	COBRA	0.2	PRE	3.8	.5	.6	.7	.9	.8	.1	1.8	3.7	48
29	COBRA	0.3	PRE	4.3	.5	.6	.8	1.1	1.0	.2	1.9	4.2	46
30	COBRA	0.6	PRE	2.2	.4	.4	.4	.6	.3	.1	1.2	2.1	55
31	GOAL	.125	PRE	.8	.2	.2	.2	.1	.1	0	.6	.9	73

Table 2 (cont.). Yield of OR-91 snapbeans in response to herbicide treatments at the Mike Calef farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb/ai/A)	APPLIC-ATION TYPE[2/]	TOTAL YIELD AVERAGE[3]	GRADES (No.) 1&2	3	4	5	6	7+	1-4	TOTAL YIELD[4/]	% YIELD GRADES 1-4
				(tons/A)									-(%)-
32	GOAL	0.25	PRE	.1	0	0	.1	.1	.1	0	.1	.3	40
39	TACKLE	.125	SPLIT	3.9	.5	.7	.9	.9	.6	.1	2.1	3.8	55
40	CHECK			.6	.1	.2	.1	.1	0	0	.5	.6	76
	LSD(0.05) =			1.5	NA	NA	NA	NA	NA	NA	NA	NA	NA
	STANDARD DEVIATION =			.9	NA	NA	NA	NA	NA	NA	NA	NA	NA
	COEFF. OF VARIABILITY =			67.3	NA	NA	NA	NA	NA	NA	NA	NA	NA

1/ Planted: May 13, 1987.
Harvested: July 25, 1987.

2/ PPI = herbicides applied preplant incorporated on May 13, 1987.
PRE = herbicides applied preemergence on May 13, 1987.
POST = herbicides applied post emergence of weeds and beans while beans were at the first fully expanded trifoliate leaf stage, on June 9, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of the POST treatment and again 10 days later on June 19, 1987.

3/ Refers to the average yield of all replications in the experiment. Each replication was harvested and weighed separately, with analysis of variance and mean separation tests conducted.

4/ Refers to the yield of all replications combined which were run through the bean grader. Since all replications were combined, the mean separation tests are not applicable.

Table 3. Percent injury of OR-91 snapbeans and percent control of pigweed, annual ryegrass, and common grounsel evaluated two times during the season at the Vegetable Farm I trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY OF SNAPBEANS		%CONTROL REDROOT PIGWEED		%CONTROL ANNUAL RYEGRASS		%CONTROL COMMON GROUNSEL
				WEEK OF SEASON [3/]						
				3	7	3	7	3	7	3
01	TREFLAN	0.75	PPI	8	3	100	98	100	98	100
	GENEP	3.5	PPI							
	PREMERGE	4.5	PRE							
02	TREFLAN	0.75	PPI	18	3	100	100	100	100	100
	GENEP	3.5	PPI							
	DUAL	2.0	PRE							
03	SONALAN	1.0	PPI	17	0	100	100	100	100	100
	GENEP	3.5	PPI							
	DUAL	2.0	PRE							
04	TREFLAN	0.75	PPI	13	0	100	100	100	100	100
	DUAL	2.0	PRE							
	AMIBEN	2.5	PRE							
05	SONALAN	1.0	PPI	48	13	100	100	100	100	100
	DUAL	2.0	PRE							
	AMIBEN	2.5	PRE							
06	GENEP	3.5	PPI	17	2	100	100	100	100	100
	DUAL	2.0	PRE							
	AMIBEN	2.5	PRE							
07	PURSUIT	0.06	PRE	7	3	100	99	0	17	28
08	PURSUIT	0.03	POST	0	2	0	97	0	13	100
	CROP OIL	4.0	POST							
09	PURSUIT	0.06	POST	0	3	27	99	0	23	97
	CROP OIL	4.0	POST							
10	PURSUIT	0.12	POST	0	7	0	100	0	13	98
	CROP OIL	4.0	POST							
11	SCEPTER	0.125	PRE	7	7	100	100	43	57	100
12	SCEPTER	0.06	POST	0	17	0	90	0	0	95
	CROP OIL	4.0	POST							

Table 3 continued. Percent injury of OR-91 snapbeans and percent control of pigweed, annual ryegrass, and common grounsel evaluated two times during the season at the Vegetable Farm I trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLI-CATION TYPE [2/]	% INJURY OF SNAPBEANS		%CONTROL REDROOT PIGWEED		%CONTROL ANNUAL RYEGRASS		%CONTROL COMMON GROUNSEL
				WEEK OF SEASON [3/]						
				3	7	3	7	3	7	3
13	SCEPTER CROP OIL	0.125 4.0	POST POST	0	23	0	93	0	8	100
14	SCEPTER CROP OIL	0.25 4.0	POST POST	0	35	0	97	0	0	100
15	TYCOR	1.5	PRE	12	0	100	98	48	23	82
16	TYCOR	0.375	POST	0	7	0	7	0	0	0
17	TYCOR	0.75	POST	0	5	0	25	0	7	17
18	TYCOR	1.5	POST	0	3	0	13	17	0	7
19	CINCH	1.0	POST	0	3	0	27	0	0	0
20	CINCH	0.5	PRE	2	0	48	0	100	95	0
21	CINCH	1.0	PRE	3	0	62	27	100	100	0
22	CINCH	2.0	PRE	0	0	78	38	100	100	70
23	CLASSIC	0.03	PRE	35	43	100	100	75	55	100
24	CLASSIC	0.015	POST	0	25	0	43	0	10	100
25	CLASSIC	0.03	POST	0	62	0	80	0	10	100
26	CLASSIC	0.06	POST	0	73	0	83	0	17	100
27	COBRA	0.3	POST	0	22	0	100	0	0	100
28	COBRA	0.2	PRE	3	0	100	94	0	18	100
29	COBRA	0.3	PRE	7	0	100	100	7	0	100
30	COBRA	0.6	PRE	20	0	100	100	5	0	100
31	GOAL	.125	PRE	10	3	100	82	45	0	98
32	GOAL	0.25	PRE	45	8	100	95	95	13	100

Table 3 continued. Percent injury of OR-91 snapbeans and percent control of pigweed, annual ryegrass, and common grounsel evaluated tow times during the season at the Vegetable Farm I trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY OF SNAPBEANS		%CONTROL REDROOT PIGWEED		%CONTROL ANNUAL RYEGRASS		%CONTROL COMMON GROUNSEL
				WEEK OF SEASON [3/]						
				3	7	3	7	3	7	3
33	GOAL	0.5	PRE	62	20	100	100	83	50	100
34	GOAL	0.06	POST	0	37	0	45	0	10	50
35	GOAL	0.125	POST	0	57	0	75	0	23	87
36	GOAL	0.25	POST	3	70	3	93	25	30	98
37	TACKLE	.125	POST	0	0	0	78	0	0	60
38	TACKLE	.25	POST	0	0	0	68	0	0	57
39	TACKLE	.125	SPLIT	0	7	0	98	0	0	83
40	TACKLE CROP OIL	.250 4.0	POST POST	0	10	0	98	0	0	100
41	TACKLE CROP OIL	.125 4.0	SPLIT POST	0	27	0	93	0	20	97
42	CHECK			0	0	0	0	0	0	0
	LSD(0.05)		=	12	18	18	30	19	29	31
	STANDARD DEVIATION		=	7	11	11	18	12	17	19
	COEFF. OF VARIATION		=	93	74	26	23	38	56	26

1/ Planted: May 20, 1987.
Harvested: July 30, 1987

2/ PPI = herbicides applied preplant incorporated on May 20, 1987.
PRE = herbicides applied preemergence on May 20, 1987.
POST = herbicides applied post emergence of weeds and beans while beans were at the first fully expanded trifoliate leaf stage, on June 16, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of the POST treatment and again 10 days latter on June 26, 1987.

3/ Evaluations were recorded on June 12, for week 3, and July 7, for week 7.

Table 4. Yield of OR-91 snapbeans in response to herbicide treatments at the Vegetable Farm I trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE [2/]	TOTAL 3 REP AVG. [3/]	GRADES (No.) 1&2	3	3	4	5	6	7+	TOTAL YIELD [4/]	% YIELD GRADES 1-4
					(tons/A)								-(%)-
01	TREFLAN	0.75	PPI	6.2	.7	.7	1.3	3.0	.6	0	2.6	6.1	42
	GENEP	3.5	PPI										
	PREMERGE	4.5	PRE										
02	TREFLAN	0.75	PPI	7.7	.6	.7	1.5	3.8	.7	.1	2.8	7.4	38
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
03	SONALAN	1.0	PPI	7.7	.6	.8	1.7	3.6	.8	0	3.1	7.6	41
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
04	TREFLAN	0.75	PPI	6.0	.6	.6	1.1	2.7	.8	.1	2.4	5.9	40
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
05	SONALAN	1.0	PPI	4.5	.8	.5	.8	1.8	.5	0	2.1	4.4	48
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
06	GENEP	3.5	PPI	6.9	.5	.5	1.4	2.9	.7	0	2.4	6.0	40
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
07	PURSUIT	0.06	PRE	4.1	.2	.5	1.0	2.0	.3	0	1.7	4.1	42
11	SCEPTER	0.125	PRE	5.1	.5	.5	1.3	2.3	.4		2.3	5.0	45
21	CINCH	1.0	PRE	5.1	.4	.7	1.5	1.8	.7	0	2.5	5.1	50

Table 4 continued. Yield of OR-91 snapbeans in response to herbicide treatments at the Vegetable Farm I trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE [2/]	TOTAL 3 REP AVG. [3/]	GRADES (No.) 1&2 (tons/A)	3	3	4	5	6	7+	TOTAL YIELD [4/]	% YIELD GRADES 1-4 (%)
29	COBRA	0.3	PRE	2.6	.3	.7	1.1	.5	.1	0	2.1	2.6	79
42	CHECK			1.8	.2	.5	.7	.4	0	0	1.4	1.8	77
	LSD(0.05) =			2.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	STANDARD DEVIATION =			1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	COEFF. OF VARIABILITY =			97.9	NA	NA	NA	NA	NA	NA	NA	NA	NA

1/ Planted May 20, 1987.
Harvested July 30, 1987.

2/ PPI = herbicides applied preplant incorporated on May 20, 1987.
PRE = herbicides applied preemergence on May 20, 1987.
POST = herbicides applied post emergence of weeds and crop when the beans were at the first fully expanded trifoliate leaf stage, on June 16, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of POST treatment and again 10 days latter on June 26, 1987.

3/ Refers to the average yield of all replications in the experiment. Each replication was harvested and weighed separately, with analysis of variance and mean separation test conducted.

4/ Refers to the yield of all replications combined which were run through the bean grader. Since all replications were combined, the mean separation test are not applicable.

Table 5. Percent injury of OR-91 snapbeans when treated with various herbicides evaluated three times during the season at the Bob Hockett Farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE[2/]	% INJURY OF SNAPBEAN ---WEEK OF SEASON[3/]-- 4	6	8
01	TREFLAN	0.75	PPI	0	0	0
	GENEP	3.5	PPI			
	PREMERGE	4.5	PRE			
02	TREFLAN	0.75	PPI	0	0	0
	GENEP	3.5	PPI			
	DUAL	2.0	PRE			
03	SONALAN	1.0	PPI	0	0	2
	GENEP	3.5	PPI			
	DUAL	2.0	PRE			
04	TREFLAN	0.75	PPI	10	0	0
	DUAL	2.0	PRE			
	AMIBEN	2.5	PRE			
05	SONALAN	1.0	PPI	15	5	2
	DUAL	2.0	PRE			
	AMIBEN	2.5	PRE			
06	GENEP	3.5	PPI	0	0	0
	DUAL	2.0	PRE			
	AMIBEN	2.5	PRE			
07	PURSUIT	0.06	PRE	8	0	3
08	PURSUIT	0.03	POST	0	0	0
	CROP OIL	4.0	POST			
09	PURSUIT	0.06	POST	0	7	2
	CROP OIL	4.0	POST			
10	PURSUIT	0.12	POST	0	27	27
	CROP OIL	4.0	POST			
11	SCEPTER	0.125	PRE	8	0	0
12	SCEPTER	0.06	POST	0	10	3
	CROP OIL	4.0	POST			
13	SCEPTER	0.125	POST	0	25	18
	CROP OIL	4.0	POST			

Table 5 continued. Percent injury of OR-91 snapbeans when treated with various herbicides evaluated three times during the season at the Bob Hockett Farm, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE [2/]	% INJURY OF SNAPBEAN --- WEEK OF SEASON [3/]		
				4	6	8
14	SCEPTER	0.25	POST	0	43	38
15	TYCOR	1.5	PRE	0	0	3
16	TYCOR	0.375	POST	0	13	12
17	TYCOR	0.75	POST	0	20	18
18	TYCOR	1.5	POST	0	17	28
19	CINCH	1.0	POST	0	3	7
20	CINCH	0.5	PRE	0	0	0
21	CINCH	1.0	PRE	3	0	0
22	CINCH	2.0	PRE	7	0	5
23	CLASSIC	0.03	PRE	7	5	3
24	CLASSIC	0.015	POST	0	60	62
25	CLASSIC	0.03	POST	0	60	85
26	CLASSIC	0.06	POST	0	60	85
27	COBRA	0.3	POST	0	25	35
28	COBRA	0.2	PRE	0	0	2
29	COBRA	0.3	PRE	8	2	7
30	COBRA	0.6	PRE	10	2	5
31	GOAL	.125	PRE	3	0	5
32	GOAL	0.25	PRE	25	53	45
33	GOAL	0.5	PRE	42	57	68
34	GOAL	0.06	POST	0	62	57

Table 5 continued. Percent injury of OR-91 snapbeans when treated with various herbicides evaluated three times during the season at the Bob Hockett Farm, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY OF SNAPBEAN WEEK OF SEASON [3/] 4	6	8
35	GOAL	0.125	POST	3	82	67
36	GOAL	0.25	POST	0	90	91
37	TACKLE	.125	POST	2	3	0
38	TACKLE	.25	POST	0	0	0
39	TACKLE	.125	SPLIT	0	0	12
40	CHECK			0	0	0
			LSD(0.05) =	9	12	11
			STANDARD DEVIATION =	5	7	7
			COEFF. OF VARIABILITY =	138	41	35

1/ Planted: May 26, 1987.
Harvested: August 10, 1987

2/ PPI = herbicides applied preplant incorporated on May 26, 1987.
PRE = herbicides applied preemergence on May 16, 1987.
POST = herbicides applied post emergence of weeds and beans while beans were at the first fully expanded trifoliate leaf stage, on June 26, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of the POST treatment and again 10 days latter on July 7, 1987.

3/ Evaluations were recorded on June 26, for week 4; July 8, for week 6, and July 22 for week 8.

Table 6. Yield of OR-91 snapbeans in response to herbicide treatments at the Bob Hockett farm, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ACTION TYPE [2/]	TOTAL YIELD AVG. [3/]	GRADES (No.) 1&2	3	4	5	6	7+	TOTAL 1-4 YIELD [4/]	% YIELD GRADES 1-4
					(tons/A)							(%)
01	TREFLAN	0.75	PPI	7.8	.7	1.3	2.0	3.1	1.5	.2	4.0	8.9	45
	GENEP	3.5	PPI										
	PREMERGE	4.5	PRE										
02	TREFLAN	0.75	PPI	7.7	.8	1.2	2.1	2.3	1.1	.1	4.2	7.6	55
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
03	SONALAN	1.0	PPI	7.5	.6	1.3	2.1	2.5	1.1	.1	3.9	7.7	51
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
04	TREFLAN	0.75	PPI	6.6	.7	1.3	2.0	2.1	2.1	0	4.0	6.5	61
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
05	SONALAN	1.0	PPI	7.0	.7	1.2	2.5	2.1	.3	.1	4.4	6.9	64
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
06	GENEP	3.5	PPI	7.7	.9	1.5	2.1	2.1	1.0	.2	4.5	7.8	57
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
07	PURSUIT	0.06	PRE	7.7	.7	1.3	1.9	2.4	1.4	.2	3.9	7.9	49
08	PURSUIT	0.03	POST	7.2	.7	1.4	2.3	2.2	.6	0	4.3	7.2	60
	CROP OIL	4.0	POST										
09	PURSUIT	0.06	POST	6.4	.9	1.4	1.6	1.7	.8	.2	3.8	6.6	58
	CROP OIL	4.0	POST										
10	PURSUIT	0.12	POST	3.1	.9	.8	.6	.4	0	0	2.3	2.8	83
	CROP OIL	4.0	POST										
11	SCEPTER	0.125	PRE	7.0	.6	1.2	2.1	2.3	.7	.1	3.9	7.0	56
12	SCEPTER	0.06	POST	5.5	1.2	1.3	1.5	1.0	1.0	0	4.0	5.3	76
	CROP OIL	4.0	POST										
13	SCEPTER	0.125	POST	2.2	1.1	.5	.3	.2	.1	0	1.9	2.2	88
	CROP OIL	4.0	POST										

Table 6 continued. Yield of OR-91 snapbeans in response to herbicide treatments at the Bob Hockett farm, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE [2/]	TOTAL YIELD AVG. [3/]	GRADES (No.) 1&2	3	4	5	6	7+	1-4	TOTAL YIELD [4/]	% YIELD GRADES 1-4
					(tons/A)								(%)
14	SCEPTER CROP OIL	0.25 4.0	POST POST	.7	.3	0	0	0	0	0	.4	.5	89
15	TYCOR	1.5	PRE	7.9	.7	1.2	1.9	2.7	1.4	.2	3.8	8.1	47
16	TYCOR	0.375	POST	7.5	.5	.9	1.7	2.7	1.5	.2	3.1	7.4	41
17	TYCOR	0.75	POST	4.8	.4	.8	1.2	1.7	.6	.1	2.3	4.8	49
18	TYCOR	1.5	POST	6.3	.3	.5	1.3	2.5	1.5	.2	2.1	6.3	26
27	COBRA	0.3	POST	5.5	.5	1.0	1.6	1.6	.7	0	3.1	5.5	57
28	COBRA	0.2	PRE	8.4	.7	1.3	2.3	3.0	1.1	.1	4.2	8.4	50
29	COBRA	0.3	PRE	7.3	.6	1.2	1.8	2.4	1.1	.2	3.6	7.4	49
30	COBRA	0.6	PRE	8.8	.7	1.1	1.9	3.4	1.6	.1	3.6	8.8	41
37	TACKLE	.125	POST	8.6	.7	1.1	1.8	3.1	1.8	.1	3.7	8.7	42
38	TACKLE	.25	POST	8.1	.6	1.1	1.8	2.9	1.6	.1	3.6	8.2	44

Table 6 continued. Yield of OR-91 snapbeans in response to herbicide treatments at the Bob Hockett farm, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ACTION TYPE [2/]	TOTAL YIELD AVG. [3/]	GRADES (No.) 1&2	3	4	5	6	7+	1-4	TOTAL YIELD [4/]	% YIELD GRADES 1-4
				(tons/A)									(%)
39	TACKLE	.125	SPLIT	8.1	.9	1.3	2.2	2.6	1.1	.1	4.4	8.2	54
40	CHECK			8.1	.7	1.3	2.4	2.7	1.1	0	4.4	8.2	53
	LSD(0.05) =			.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	STANDARD DEVIATION =			.4	NA	NA	NA	NA	NA	NA	NA	NA	NA
	COEFF. OF VARIABILITY =			19.9	NA	NA	NA	NA	NA	NA	NA	NA	NA

1/ Planted May 13, 1987.
Harvested August 13, 1987.

2/ PPI = herbicides applied preplant incorporated.
PRE = herbicides applied preemergence.
POST = herbicides applied post emergence of weeds and crop when the beans were
SPLIT = two herbicide applications each applied at the stated rate on the date of POST treatment and again 10 days latter on

3/ Refers to the average yield of all replications in the experiment. Each replication was harvested and weighed separately, with analysis of variance and mean separation test conducted.

4/ Refers to the yield of all replications combined which were run through the bean grader. Since all replications were combined, the mean separation test are not applicable.

Table 7. Percent injury of OR-91 snapbeans and percent control of redroot pigweed evaluated three times during the season at the Dalke Farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLI-CATION TYPE[2/]	% INJURY OF --SNAPBEAN-- WEEK OF SEASON 4	6	10	% CONTROL REDROOT ---PIGWEED---- [3/] 4	6	10
01	TREFLAN	0.75	PPI	5	5	0	99	99	100
	GENEP	3.5	PPI						
	PREMERGE	4.5	PRE						
02	TREFLAN	0.75	PPI	7	3	5	100	100	100
	GENEP	3.5	PPI						
	DUAL	2.0	PRE						
03	TREFLAN	0.75	PPI	8	0	0	100	100	100
	GENEP	3.5	PPI						
	DUAL	1.5	PRE						
04	SONALAN	1.0	PPI	8	3	0	100	100	100
	GENEP	3.5	PPI						
	DUAL	1.5	PRE						
05	TREFLAN	0.75	PPI	0	3	0	100	100	100
	DUAL	1.5	PRE						
	AMIBEN	2.5	PRE						
06	SONALAN	1.0	PPI	10	3	2	100	100	100
	DUAL	1.5	PRE						
	AMIBEN	2.5	PRE						
07	GENEP	3.5	PPI	5	0	0	100	100	100
	DUAL	1.5	PRE						
	AMIBEN	2.5	PRE						
08	PURSUIT	0.03	POST	43	18	10	88	95	99
	CROP OIL	4.0	POST						
09	PURSUIT	.06	POST	33	25	22	87	98	100
	CROP OIL	4.00	POST						
10	PURSUIT	0.12	POST	42	52	32	88	100	100
	CROP OIL	4.0	POST						
11	SCEPTER	0.125	PRE	12	7	0	100	100	100
12	SCEPTER	0.06	POST	37	37	17	85	96	100
	CROP OIL	4.0	POST						

Table 7 continued. Percent injury of OR-91 snapbeans and percent control of redroot pigweed evaluated three times during the season at the Dalke Farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLI-CATION TYPE[2/]	% INJURY OF --SNAPBEAN-- --------WEEK OF SEASON[3/] 4	6	10	% CONTROL REDROOT ---PIGWEED---- 4	6	10
13	SCEPTER CROP OIL	0.125 4.0	POST POST	48	50	17	92	100	100
14	SCEPTER CROP OIL	0.25 4.00	POST POST	47	50	18	90	100	100
15	TYCOR	1.5	PRE	38	22	53	45	17	17
16	TYCOR	0.375	POST	13	0	17	10	0	0
17	TYCOR	0.75	POST	17	0	25	18	0	17
18	TYCOR	1.5	POST	33	15	70	15	3	0
19	CLASSIC	0.03	PRE	62	70	29	100	100	100
20	CLASSIC	0.015	POST	60	92	83	77	88	80
21	CLASSIC	0.03	POST	53	95	95	90	97	100
22	CLASSIC	0.06	POST	63	99	99	87	99	100
23	COBRA	0.3	POST	55	53	42	100	100	100
24	COBRA	.15	PRE	8	0	0	92	74	87
25	COBRA	0.2	PRE	15	8	13	95	93	89
26	GOAL	.062	PRE	2	0	8	60	43	37
27	GOAL	0.06	POST	90	82	68	100	97	96
28	GOAL	0.125	POST	92	92	88	100	100	100
29	TACKLE	.125	POST	17	0	0	100	99	100
30	TACKLE	.25	POST	27	10	10	100	100	100

Table 7 continued. Percent injury of OR-91 snapbeans and percent control of redroot pigweed evaluated three times during the season at the Dalke Farm, 1987.[1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY OF --SNAPBEAN-- WEEK OF SEASON [3/] 4	6	10	% CONTROL REDROOT ---PIGWEED--- WEEK OF SEASON [3/] 4	6	10
31	TACKLE	.125	SPLIT	20	18	3	100	100	100
32	CHECK			0	0	12	10	0	20
			LSD(0.05) =	14	13	17	15	9	18
			STANDARD DEVIATION =	8	8	10	9	6	11
			COEFF. OF VARIABILITY =	28	27	38	11	7	13

1/ Planted: June 15, 1987.
Harvested: August 23, 1987.

2/ PPI = herbicides applied preplant incorporated on June 15, 1987.
PRE = herbicides applied preemergence on June 15, 1987.
POST = herbicides applied post emergence of weeds and beans while beans were at the first fully expanded trifoliate leaf stage, on July 8, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of the POST treatment and again 10 days latter on June 20, 1987.

3/ Evaluations were recorded on July 7, for week 4; July 31, for week 6, and August 19 for week 10.

Table 8. Yield of OR-91 snapbeans in response to herbicide treatments a the Dalke farm, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE[2/]	TOTAL YIELD AVG.[3/]	GRADES (No.) 1&2	3	4	5	6	7+	1-4	TOTAL YIELD[4/]	% YIELD GRADES 1-4 -(%)-
				(tons/A)									
01	TREFLAN	0.75	PPI	7.5	1.7	2.6	2.0	.8	.1	0	6.3	7.2	88
	GENEP	3.5	PPI										
	PREMERGE	4.5	PRE										
02	TREFLAN	0.75	PPI	6.9	1.7	2.4	1.9	.6	.1	0	6.0	6.6	90
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
03	TREFLAN	0.75	PPI	6.8	1.8	2.3	1.4	.8	0	0	5.5	6.3	87
	GENEP	3.5	PPI										
	DUAL	1.5	PRE										
04	SONALAN	1.0	PPI	6.0	1.6	1.9	1.5	.6	0	0	4.9	5.6	88
	GENEP	3.5	PPI										
	DUAL	1.5	PRE										
05	TREFLAN	0.75	PPI	7.0	1.9	2.0	1.9	1.0	0	0	5.9	7.0	85
	DUAL	1.5	PRE										
	AMIBEN	2.5	PRE										
06	SONALAN	1.0	PPI	5.9	1.6	1.9	2.0	1.0	.2	0	5.5	6.7	82
	DUAL	1.5	PRE										
	AMIBEN	2.5	PRE										
07	GENEP	3.5	PPI	5.8	1.9	1.8	1.3	.5	0	0	5.0	5.5	91
	DUAL	1.5	PRE										
	AMIBEN	2.5	PRE										
08	PURSUIT	0.03	POST	4.1	1.0	1.8	.8	.2	0	0	3.5	3.7	95
	CROP OIL	4.0	POST										
09	PURSUIT	.06	POST	4.4	.9	1.6	1.3	.2	0	0	3.9	4.1	95
	CROP OIL	4.00	POST										
10	PURSUIT	0.12	POST	1.8	.5	.5	.3	.1	0	0	1.2	1.3	96
	CROP OIL	4.0	POST										
11	SCEPTER	0.125	PRE	4.8	1.3	1.8	1.0	.3	0	0	4.1	4.4	92
15	TYCOR	1.5	PRE	.5	.4	.3	.1	0	0	0	.8	.8	97
24	COBRA	.15	PRE	4.4	1.5	1.9	1.2	.7	.1	0	4.6	5.4	86

Table 8 continued. Yield of OR-91 snapbeans in response to herbicide treatments a the Dalke farm, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE[2/]	TOTAL YIELD AVG.[3/]	GRADES (No.) 1&2	3	4	5	6	7+	1-4	TOTAL YIELD[4/]	% YIELD GRADES 1-4 -(%)-
				(tons/A)									
25	COBRA	0.20	PRE	5.1	1.2	1.5	1.4	.6	.1	0	4.1	4.7	87
29	TACKLE	.125	POST	7.2	2.1	2.3	1.6	.8	.1	0	6.0	6.8	88
30	TACKLE	.25	POST	5.9	1.3	2.0	1.6	.6	.1	0	4.9	5.5	88
31	TACKLE	.125	SPLIT	5.8	1.6	2.0	1.4	.6	0	0	5.0	5.6	89
32	CHECK			3.2	1.0	1.0	.7	.2	0	0	2.7	2.9	91
	LSD(0.05) =			1.7	NA	NA	NA	NA	NA	NA	NA	NA	NA
	STANDARD DEVIATION =			1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA
	COEFF. OF VARIABILITY =			35.9	NA	NA	NA	NA	NA	NA	NA	NA	NA

1/ Planted June 15, 1987.
Harvested August 13, 1987.

2/ PPI = herbicides applied preplant incorporated on June 15, 1987.
PRE = herbicides applied preemergence on June 15, 1987.
POST = herbicides applied post emergence of weeds and beans while the beans were at the fully expanded first trifoliate leaf stage on July 8, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of POST treatment and again 10 days later on July 20, 1987.

3/ Refers to the average yield of all replications in the experiment. Each replication was harvested and weighed separately, with analysis of variance and mean separation test conducted.

4/ Refers to the yield of all replications combined which were run through the bean grader. Since all replications were combined, the mean separation tests are not applicable.

Table 9. Percent injury of OR-91 snapbeans and percent control of several weed species evaluated two times during the season at the Vegetable Farm II trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLI-CATION TYPE [2/]	% INJURY OF SNAPBEAN		% CONTROL ANNUAL RYEGRASS		REDROOT PIGWEED		HAIRY NTSHADE		COMMON GROUNSEL		SHEPHARDS PURSE
				WEEK OF SEASON [3/]										
				3	6	3	6	3	6	3	6	3	6	6
01	TREFLAN	0.75	PPI	0	0	100	100	100	97	100	100	100	100	100
	GENEP	3.5	PPI											
	PREMERGE	4.5	PRE											
02	TREFLAN	0.75	PPI	4	0	100	100	100	100	100	97	100	92	97
	GENEP	3.5	PPI											
	DUAL	2.0	PRE											
03	SONALAN	1.0	PPI	6	1	100	100	100	100	100	100	100	100	100
	GENEP	3.5	PPI											
	DUAL	2.0	PRE											
04	TREFLAN	0.75	PPI	6	3	100	100	100	99	100	100	100	99	100
	DUAL	2.0	PRE											
	AMIBEN	2.5	PRE											
	SONALAN	1.0	PPI	14	5	100	100	100	100	100	100	100	85	100
	DUAL	2.0	PRE											
	AMIBEN	2.5	PRE											
06	GENEP	3.5	PPI	9	4	100	100	100	100	98	100	100	100	100
	DUAL	2.0	PRE											
	AMIBEN	2.5	PRE											
07	DUAL	2.0	PRE	0	0	100	99	99	94	99	80	100	100	99
08	SONALAN	1.0	PPI	4	0	100	100	98	96	94	68	70	35	38
09	TREFLAN	0.75	PPI	0	0	100	100	95	96	49	60	54	29	25
10	PURSUIT	0.092	PRE	4	6	45	25	100	100	97	100	100	56	100
11	PURSUIT	0.062	PRE	0	0	10	0	99	99	97	88	70	50	100
12	PURSUIT	0.031	PRE	0	0	0	0	100	99	71	75	73	28	99
13	PURSUIT	0.062	PRE	0	0	100	100	100	100	100	100	100	98	98
	TREFLAN	0.75	PPI											
	GENEP	3.5	PPI											
14	PURSUIT	0.062	PRE	3	4	100	98	100	100	100	95	94	75	98
	TREFLAN	0.75	PPI											

Table 9 continued. Percent injury of OR-91 snapbeans and percent control of several weed species evaluated two times during the season at the Vegetable Farm II trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLI-CATION TYPE [2/]	% INJURY OF SNAPBEAN		% CONTROL ANNUAL RYEGRASS		REDROOT PIGWEED		HAIRY NTSHADE		COMMON GROUNSEL		SHEPHARDS PURSE
				WEEK OF SEASON [3/]										
				3	6	3	6	3	6	3	6	3	6	6
15	PURSUIT TREFLAN	0.062 0.75	PPI PPI	3	0	88	98	93	91	70	33	77	48	75
16	PURSUIT GENEP	0.062 3.5	PRE PPI	1	1	100	96	100	99	100	97	85	75	100
17	PURSUIT DUAL	0.062 2.0	PRE PRE	1	0	100	100	100	100	100	100	100	99	100
18	AMIBEN	2.5	PRE	0	0	60	15	100	95	92	43	80	35	70
19	SCEPTER TREFLAN GENEP	0.125 0.75 3.5	PRE PPI PPI	21	33	100	100	100	100	100	100	100	100	100
20	SCEPTER TREFLAN	0.125 0.75	PRE PPI	26	33	98	97	100	100	99	96	100	99	98
21	SCEPTER TREFLAN	0.125 0.75	PPI PPI	16	35	99	95	100	100	98	94	96	96	93
22	SCEPTER GENEP	0.125 3.5	PPI PPI	16	25	98	93	100	100	98	93	99	95	98
23	SCEPTER DUAL	0.125 2.0	PRE PRE	20	33	100	100	100	100	100	100	100	98	100
24	SCEPTER	0.062	PRE	5	18	50	0	100	100	100	95	95	98	100
25	SCEPTER	0.125	PRE	23	29	73	43	100	100	100	100	100	100	100
26	SCEPTER	0.250	PRE	28	63	91	94	100	100	100	99	100	100	100
27	TYCOR	1.5	PRE	10	3	58	66	99	99	48	13	100	100	100
28	TYCOR	1.0	PRE	6	1	48	70	96	95	50	28	100	64	100
29	TYCOR DUAL	1.5 2.0	PRE PRE	53	58	100	100	100	100	100	90	100	99	100
30	TYCOR DUAL	1.0 2.0	PRE PRE	9	0	100	99	100	100	100	74	100	98	100

Table 9 continued. Percent injury of OR-91 snapbeans and percent control of several weed species evaluated two times during the season at the Vegetable Farm II trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLI-CATION TYPE [2/]	% INJURY OF SNAPBEAN		% CONTROL ANNUAL RYEGRASS		REDROOT PIGWEED		HAIRY NTSHADE		COMMON GROUNSEL		SHEPHARDS PURSE
				WEEK OF SEASON [3/]										
				3	6	3	6	3	6	3	6	3	6	6
31	TYCOR	1.5	PRE	24	18	100	99	100	98	93	66	100	96	100
	GENEP	3.5	PPI											
32	TYCOR	1.0	PRE	23	15	98	97	99	98	75	28	98	60	100
	GENEP	3.5	PPI											
33	COBRA	0.125	PRE	1	5	13	0	97	94	100	98	100	98	100
34	COBRA	0.250	PRE	0	0	18	0	100	100	100	100	100	100	100
35	COBRA	0.500	PRE	16	10	45	13	100	100	100	100	100	100	100
36	COBRA	0.250	PRE	3	0	100	98	100	100	100	100	100	100	100
	TREFLAN	0.750	PPI											
	GENEP	3.5	PPI											
37	COBRA	0.125	PRE	3	0	99	98	100	100	78	100	100	99	100
	TREFLAN	0.750	PPI											
	GENEP	3.5	PPI											
38	COBRA	0.25	PRE	3	0	99	97	100	100	100	100	100	100	100
	GENEP	3.5	PPI											
39	COBRA	0.125	PRE	1	0	0	0	100	96	100	98	100	99	100
	GENEP	3.5	PPI											
40	COBRA	0.25	PRE	7	4	100	100	100	100	100	100	100	100	100
	DUAL	2.0	PRE											
41	COBRA	0.125	PRE	3	0	100	100	100	100	100	100	100	98	100
	DUAL	2.0	PRE											
42	TACKLE	0.25	POST	0	4	0	0	0	76	0	75	0	60	100
43	TACKLE	0.250	SPLIT	0	16	0	8	0	96	0	85	0	96	100
44	TACKLE	0.125	SPLIT	0	10	0	0	0	96	0	80	0	73	100
45	TACKLE	0.125	SPLIT	0	9	100	97	91	98	56	100	70	85	88
	TREFLAN	0.75	PPI											
	GENEP	3.5	PPI											

Table 9 continued. Percent injury of OR-91 snapbeans and percent control of several weed species evaluated two times during the season at the Vegetable Farm II trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY OF SNAPBEAN		% CONTROL ANNUAL RYEGRASS		REDROOT PIGWEED		HAIRY NTSHADE		COMMON GROUNSEL		SHEPHARDS PURSE
				WEEK OF SEASON [3/]										
				3	6	3	6	3	6	3	6	3	6	6
46	TACKLE	0.125	SPLIT	0	6	98	85	25	95	33	88	8	96	93
	GENEP	3.5	PPI											
47	TACKLE	0.125	SPLIT	1	3	100	100	99	100	100	100	100	100	100
	DUAL	2.0	PRE											
48	TYCOR	1.0	PRE	9	5	100	100	100	100	88	75	100	100	100
	TREFLAN	0.75	PPI											
	GENEP	3.5	PPI											
49	TYCOR	1.5	PRE	55	48	99	100	100	100	73	23	100	94	100
	TREFLAN	0.75	PPI											
	GENEP	3.5	PPI											
50	CHECK (hand weeded)			3	1	88	99	91	99	83	100	98	100	100
51	CHECK			0	0	0	0	0	0	0	0	0	0	0
	LSD(0.05) =			13	15	18	15	5	5	28	30	22	29	20
	STANDARD DEVIATION =			9	10	13	11	4	4	20	21	15	20	14
	COEFF. OF VARIABILITY =			103	103	17	15	4	4	24	29	18	24	15

1/ Planted: July 2, 1987.
Harvested: September 9, 1987

2/ PPI = herbicides applied preplant incorporated on July 2, 1987.
PRE = herbicides applied preemergence on July 3 1987.
POST = herbicides applied post emergence of weeds and beans while beans were at the first fully expanded trifoliate leaf stage, on July 25, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of the POST treatment and again 10 days latter on August 5, 1987.

3/ Evaluations were recorded on July 25, for week 3, and August 14, for week 6.

Table 10. Yield of OR-91 snapbeans in response to herbicide treatments at the Vegetable Farm II trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE[2/]	TOTAL YIELD AVG.[3/]	GRADES (No.) 1&2	3	4	5	6	7+	TOTAL 1-4	TOTAL YIELD[4/]	% YIELD GRADES 1-4
01	TREFLAN	0.75	PPI	8.0	1.0	1.3	2.2	3.5	.5	0	4.5	8.5	53
	GENEP	3.5	PPI										
	PREMERGE	4.5	PRE										
02	TREFLAN	0.75	PPI	8.7	.7	.9	2.0	2.8	1.1	.1	3.7	7.7	48
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
03	SONALAN	1.0	PPI	10.1	1.2	1.6	2.7	3.4	1.0	.2	5.6	10.1	55
	GENEP	3.5	PPI										
	DUAL	2.0	PRE										
04	TREFLAN	0.75	PPI	9.1	1.0	1.5	2.6	3.0	.9	.1	5.2	9.2	56
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
05	SONALAN	1.0	PPI	7.8	.9	1.5	2.5	2.2	.5	.1	5.0	7.8	63
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
06	GENEP	3.5	PPI	9.3	1.1	1.8	2.7	3.1	.8	.1	5.6	9.6	58
	DUAL	2.0	PRE										
	AMIBEN	2.5	PRE										
07	DUAL	2.0	PRE	8.0	.8	1.5	1.9	3.0	.8	0	4.2	8.4	50
08	SONALAN	1.0	PPI	7.6	1.1	1.4	2.4	2.7	.6	0	4.9	8.2	59
09	TREFLAN	0.75	PPI	7.3	.9	1.1	1.8	2.6	.5	0	3.8	7.0	54
11	PURSUIT	0.062	PRE	6.7	.8	1.1	2.8	2.1	.4	0	4.7	7.2	66
13	PURSUIT	0.062	PRE	9.2	1.3	1.4	2.1	2.9	1.2	.1	4.7	7.2	53
	TREFLAN	0.75	PPI										
	GENEP	3.5	PPI										
14	PURSUIT	0.062	PRE	9.3	.9	1.1	2.1	3.7	1.3	0	4.0	8.9	45
	TREFLAN	0.75	PPI										
16	PURSUIT	0.062	PRE	9.0	1.0	1.2	2.1	3.3	1.0	.1	4.2	8.6	49
	GENEP	3.5	PPI										
17	PURSUIT	0.062	PRE	9.9	.9	1.1	2.3	4.0	1.2	0	4.3	9.5	45
	DUAL	2.0	PRE										

Table 10 continued. Yield of OR-91 snapbeans in response to herbicide treatments at the Vegetable Farm II trial, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLIC-ATION TYPE[2/]	TOTAL YIELD AVG.[3/]	GRADES (No.) 1&2	3	4	5	6	7+	TOTAL 1-4	TOTAL YIELD[4/]	% YIELD GRADES 1-4
18	AMIBEN	2.5	PRE	6.4	.8	1.0	1.4	2.3	.5	0	3.2	6.0	53
19	SCEPTER	0.125	PRE	7.8	.9	1.0	1.8	2.0	.3	0	3.7	6.0	61
	TREFLAN	0.75	PPI										
	GENEP	3.5	PPI										
31	TYCOR	1.5	PRE	8.8	.8	1.2	2.1	3.2	1.0	0	4.2	8.4	50
	GENEP	3.5	PPI										
34	COBRA	0.250	PRE	5.8	.8	1.1	1.7	1.8	.1	0	3.6	5.4	66
36	COBRA	0.250	PRE	10.0	.9	1.2	2.4	3.9	1.1	0	4.5	9.5	48
	TREFLAN	0.750	PPI										
	GENEP	3.5	PPI										
38	COBRA	0.25	PRE	8.4	.8	1.0	1.9	3.3	1.0	0	3.7	8.0	46
	GENEP	3.5	PPI										
40	COBRA	0.25	PRE	8.8	.8	1.3	2.5	3.0	.8	0	4.6	8.4	5[illegible]
	DUAL	2.0	PRE										
44	TACKLE	0.125	SPLIT	8.3	.7	1.0	1.7	3.7	1.4	0	3.4	8.4	40
50	CHECK (hand weeded)			8.6	.5	.7	1.7	3.8	1.6	0	2.9	8.3	35
51	CHECK			1.2	.2	.1	.2	.2	0	0	.5	.7	66
	LSD(0.05) =			1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
	STANDARD DEVIATION =			1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
	COEFF. OF VARIABILITY =			29.9	NA	NA	NA	NA	NA	NA	NA	NA	NA

1/ Planted May 13, 1987.
Harvested August 13, 1987.

2/ PPI = herbicides applied preplant incorporated on May 13, 1987.
PRE = herbicides applied preemergence on May 13, 1987.
POST = herbicides applied post emergence of weeds and crop when the beans were at the first fully expanded trifoliate leaf stage, on July 25, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of POST treatment and again 10 days latter on August 5, 1987.

3/ Refers to the average yield of all replications in the experiment. Each replication was harvested and weighed separately, with analysis of variance and mean separation test conducted.

4/ Refers to the yield of all replications combined which were run through the bean grader. Since all replications were combined, the mean separation test are not applicable.

Table 11. Percent injury of sugar beets and wheat when planted into the Vegetable Farm II plot site, identifying with the potential injury from residual herbicides, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 3	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 6	% INJURY WINTER WHEAT [3/] WEEKS AFTER PLANTING 3	% INJURY WINTER WHEAT [3/] WEEKS AFTER PLANTING 6
01	TREFLAN	0.75	PPI	43	30	0	0
	GENEP	3.5	PPI				
	PREMERGE	4.5	PRE				
02	TREFLAN	0.75	PPI	70	41	0	5
	GENEP	3.5	PPI				
	DUAL	2.0	PRE				
03	SONALAN	1.0	PPI	89	84	0	0
	GENEP	3.5	PPI				
	DUAL	2.0	PRE				
04	TREFLAN	0.75	PPI	70	55	0	1
	DUAL	2.0	PRE				
	AMIBEN	2.5	PRE				
05	SONALAN	1.0	PPI	56	41	0	0
	DUAL	2.0	PRE				
	AMIBEN	2.5	PRE				
06	GENEP	3.5	PPI	38	14	0	0
	DUAL	2.0	PRE				
	AMIBEN	2.5	PRE				
07	DUAL	2.0	PRE	6	10	0	1
08	SONALAN	1.0	PPI	66	58	0	0
09	TREFLAN	0.75	PPI	55	48	0	0
10	PURSUIT	0.092	PRE	75	100	0	9
11	PURSUIT	0.062	PRE	73	99	0	0
12	PURSUIT	0.031	PRE	89	94	0	1
13	PURSUIT	0.062	PRE	94	98	0	0
	TREFLAN	0.75	PPI				
	GENEP	3.5	PPI				
14	PURSUIT	0.062	PRE	95	100	0	0
	TREFLAN	0.75	PPI				

Table 11 continued. Percent injury of sugar beets and wheat when planted into the Vegetable Farm II plot site, identifying with the potential injury from residual herbicides, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLI-CATION TYPE [2/]	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 3	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 6	% INJURY WINTER WHEAT [3/] WEEKS AFTER PLANTING 3	% INJURY WINTER WHEAT [3/] WEEKS AFTER PLANTING 6
15	PURSUIT TREFLAN	0.062 0.75	PPI PPI	97	99	0	3
16	PURSUIT GENEP	0.062 3.5	PRE PPI	96	100	0	4
17	PURSUIT DUAL	0.062 2.0	PRE PRE	99	100	0	1
18	AMIBEN	2.5	PRE	31	18	0	4
19	SCEPTER TREFLAN GENEP	0.125 0.75 3.5	PRE PPI PPI	92	97	0	0
20	SCEPTER TREFLAN	0.125 0.75	PRE PPI	95	98	0	0
21	SCEPTER TREFLAN	0.125 0.75	PPI PPI	99	100	0	1
22	SCEPTER GENEP	0.125 3.5	PPI PPI	95	98	0	1
23	SCEPTER DUAL	0.125 2.0	PRE PRE	98	99	0	0
24	SCEPTER	0.062	PRE	97	99	0	3
25	SCEPTER	0.125	PRE	77	100	0	3
26	SCEPTER	0.250	PRE	98	99	0	3
27	TYCOR	1.5	PRE	75	63	0	3
28	TYCOR	1.0	PRE	50	36	0	0
29	TYCOR DUAL	1.5 2.0	PRE PRE	53	54	0	0

Table 11 continued. Percent injury of sugar beets and wheat when planted into the Vegetable Farm II plot site, identifying with the potential injury from residual herbicides, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 3	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 6	% INJURY WINTER WHEAT [3/] WEEKS AFTER PLANTING 3	% INJURY WINTER WHEAT [3/] WEEKS AFTER PLANTING 6
30	TYCOR	1.0	PRE	36	26	0	0
	DUAL	2.0	PRE				
31	TYCOR	1.5	PRE	76	68	0	0
	GENEP	3.5	PPI				
32	TYCOR	1.0	PRE	36	24	0	4
	GENEP	3.5	PPI				
33	COBRA	0.125	PRE	24	14	0	0
34	COBRA	0.250	PRE	46	40	0	5
35	COBRA	0.500	PRE	25	28	0	0
36	COBRA	0.250	PRE	59	50	0	3
	TREFLAN	0.750	PPI				
	GENEP	3.5	PPI				
37	COBRA	0.125	PRE	64	50	0	0
	TREFLAN	0.750	PPI				
	GENEP	3.5	PPI				
38	COBRA	0.25	PRE	10	13	0	5
	GENEP	3.5	PPI				
39	COBRA	0.125	PRE	15	11	0	0
	GENEP	3.5	PPI				
40	COBRA	0.25	PRE	26	11	0	0
	DUAL	2.0	PRE				
41	COBRA	0.125	PRE	35	31	0	0
	DUAL	2.0	PRE				
42	TACKLE	0.25	POST	26	29	0	4
43	TACKLE	0.250	SPLIT	46	35	0	6
44	TACKLE	0.125	SPLIT	29	29	0	0

Table 11 continued. Percent injury of sugar beets and wheat when planted into the Vegetable Farm II plot site, identifying with the potential injury from residual herbicides, 1987. [1/]

TRT. NO.	TRADE NAME	RATE (lb ai/A)	APPLICATION TYPE [2/]	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 3	% INJURY SUGAR BEETS WEEKS AFTER PLANTING 6	% INJURY WINTER WHEAT [3/] 3	% INJURY WINTER WHEAT [3/] 6
45	TACKLE	0.125	SPLIT	59	55	0	0
	TREFLAN	0.75	PPI				
	GENEP	3.5	PPI				
46	TACKLE	0.125	SPLIT	13	11	0	0
	EPTC	3.5	PPI				
47	TACKLE	0.125	SPLIT	11	11	0	0
	DUAL	2.0	PRE				
48	TYCOR	1.0	PRE	74	94	0	0
	TREFLAN	0.75	PPI				
	EPTC	3.5	PPI				
49	TYCOR	1.5	PRE	60	58	0	0
	TREFLAN	0.75	PPI				
	EPTC	3.5	PPI				
50	CHECK (hand weeded)			21	21	0	0
51	CHECK			3	3	0	0
	LSD(0.05) =			31	27	NA	5
	STANDARD DEVIATION =			22	19	NA	3
	COEFF. OF VARIABILITY =			37	34	NA	264

1/ Planted October 6, 1987.

2/ PPI = herbicides applied preplant incorporated on July 2, 1987.
PRE = herbicides applied preemergence on July 3, 1987.
POST = herbicides applied post emergence of weeds and beans while beans were at the first fully expanded trifoliate leaf stage, on July 25, 1987.
SPLIT = two herbicide applications each applied at the stated rate on the date of the POST treatment and again 10 days latter on August 5, 1987

3/ Evaluations were recorded on October 26, for week 3, and November 16 for week 6.