DRY BEAN RESEARCH

WEED CONTROL VARIETY TRIALS 2008

SAN JOAQUIN COUNTY

Cooperative Extension University of California
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2008 DRY BEAN

RESEARCH PROGRESS REPORT

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San Joaquin County

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The 2008 dry bean research program for San Joaquin County was conducted on Baby Limas, Large Limas and Lupines. Research was conducted on variety evaluations and weed control. The cooperation and management assistance of Bill Machado, Keith Robertson, Jerry Frye, Garret Hansen, Myron Yamasakie, Steve Temple and UC Davis staff are greatly appreciated. Many thanks are extended to them for their assistance, interest and patience.

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Caution

This report is a summary of dry bean weed control and variety studies conducted in San Joaquin County. **It should not in any way be interpreted as a recommendation of the University of California but rather a guide as to the progress in finding solutions to problems.**

Herbicide trade names are used in this report, as well as the less familiar common names to familiarize the reader with the various products tested. No endorsement of products mentioned or criticism of similar products is intended.

Herbicide rates in this report are always expressed as **active ingredient (a.i.) of material per treated acre.**

Trade Name	**Common Name**	**Company**
Basagran	Bentazon	BASF
Chateau	Flumioxazin	Valent
Dual II Magnum	Metolachlor	Syngenta
FirstRate	Cloransulam	Dow
Prowl H_2O	Pendimethalin	BASF
Python	Flumetsulam	Dow
Raptor	Imazamox	BASF
Sonalan	ethalfluralin	Dow

2008 Dry Bean Weed Control and Variety Trial Results

Four weed control and two variety trials were established in San Joaquin County. Weed control trials were established to evaluate the effectiveness of candidate herbicides for controlling annual and perennial weeds in commercial bean fields. Variety trials were conducted to evaluate new strains of bush and vine baby lima beans compared to commercial varieties. Complete trial descriptions, weed control and crop tolerance ratings for each trial follow.

<u>Pre-emergent Herbicides for Weed Control in Large Lima Beans</u> Mick Canevari, Randall Wittie, Don Colbert, Scott Whitely

OBJECTIVES: Evaluate Chateau alone and combination with Dual II Magnum as a PPI treatment compared to the grower's standard PPI treatment. Evaluate Chateau alone as a pre-emergent treatment.

MATERIALS AND METHODS: Pre-plant incorporated treatments were applied to pre-formed seed beds on May 6, 2008 in a commercial bean field on Comstock Road, San Joaquin County. Plots were double incorporated to 4 inch depth within 1 hour with a Lilliston Rolling Cultivator. Large lima beans var. Dompe 95 planted on May 8, 2008. Pre-emergent treatments were applied on May 9, 2008 (Table 1). Treatments were applied in strips 6 rows wide x 100 ft. long. Treatments were applied with a CO_2 backpack sprayer operating at 35 psi using 8002VS nozzles delivering 20 gpa water. Crop tolerance and weed control evaluations were made following crop emergence.

<u>Table 1 - Treatment list</u>

Treatment	Formulation	Rate Lb AI/A	Rate Oz/A	Application
1.Untreated Check				
2.Chateau + Dual II Magnum	51% WG 7.64 EC	0.064 1.0	2.0 16.8	PPI PPI
3.Chateau	51% WG	0.064	2.0	PPI
4.Chateau	51% WG	0.064	2.0	Pre
5.Sonalan + Dual II Magnum Chateau	3 EC 7.64 EC 51% WG	1.5 1.61 0.064	64.0 27.0 2.0	PPI PPI Pre

RESULTS AND DISCUSSION: Hairy nightshade (*Solanum sarrachoides*) plants were counted in the middle 2 rows of each plot on May 21, 2008 15 and 12 days after treatment. The grower treatments of Sonalan + Dual PPI and Chateau pre were significantly the best treatments resulting in 0.07 nightshade plants per row foot. The UTC had 0.15 plants / row foot. Chateau + Dual PPI, Chateau PPI and Chateau Pre resulted in significantly more nightshade plants per row foot. All treatments were safe to the beans (Table 2).

Table 2-Nightshade control in large lima beans

Treatment	Rate Lb AI/A	Application	Nightshade Plants Per Row Foot	Phytotoxicity
1.UTC			0.15 d	0
2.Chateau + Dual II Mag	0.064 1.0	PPI PPI	0.34 b	0
3.Chateau	0.064	PPI	0.38 a	0
4.Chateau	0.064	Pre	0.27 c	0
5.Sonalan + Dual II Mag Chateau	1.5 1.61 0.064	PPI PPI Pre	0.07 e	0
CV			0.08	

Post Emergent Herbicides for Weed Control in Large Lima Beans Mick Canevari, Randall Wittie, Don Colbert, Scott Whitely

OBJECTIVES: Evaluate new herbicides for post activity on weeds and crop tolerance.

MATERIALS AND METHODS: Herbicides were applied post to beans and weeds on June 9, 2008 and post directed on June 17, 2008 to large lima beans var. Dompe 95 planted May 8, 2008 in a commercial bean field on Comstock Road, San Joaquin County (Table 1). Plots were 2-30 inch rows x 25 ft. in a randomized complete block design with three replicates. Treatments were applied with a CO_2 backpack sprayer operating at 35 psi for the post application using 8003VS nozzles delivering 30 gpa water. The post directed spray was applied after the beans were cultivated at 25 psi using 6502 nozzles delivering 30 gpa water. Bean stage for the post application was 6-8 leaf and 6-10 inch height. Hairy nightshade (*Solanum sarrachoides*) stage was 10-20 leaf and 2.5 – 5 inch height. Bean stage for the directed spray was 10-12 inch height and 1% plants with runners. Evaluations were made for weed control and crop tolerance.

Table 1 - Treatment list

Treatment	Formulation	Rate Lb AI/A	Rate Oz/A	Application
1.Basagran COC	4 WS 100% SL	0.98 1.0 qt/A	31 Fl 1.03 Qt	Post
2.First Rate No Foam A	84%WG 100% EC	0.008 0.25%V/V	0.152	Post
3.First Rate No Foam A	84% WG 100% EC	0.016 0.25%V/V	0.305	Post
4.First Rate No Foam A	84% WG 100% EC	0.02 0.25%V/V	0.38	Post Directed
5.Python No Foam A	80% WG 100% EC	0.05 0.25%V/V	1.0	Post Directed
6.Untreated Check				

RESULTS AND DISCUSSION:

Python post directed was the only treatment that was showing some crop stunting. None of the treatments caused any chlorosis or necrosis.

Nightshade plants were counted per plot at 23 days after the post application and 15 days after the directed application. The UTC averaged 8/plot while Basagran had none. First Rate post and post directed was better than the UTC but inferior to Basagran. Python gave significant control compared to the UTC but also had more nightshade than the Basagran treatment. Nightshade plants were again counted per plot just before the field was cut for harvest and results indicated that Basagran was providing the best control as no plants were found in the Basagran plots. However, the UTC averaged 1/plot while First Rate at 0.016 lb rate had 3/plot (Table 2).

Table 2 - Control of nightshade with post and post directed herbicides

				-Nightshade Plants/Plot- -Days After Treatment-	
Treatment	Rate Lb AI/A	Application	Phytotoxicity[1] % Stunting	23DA-A[2] 15DA-B[3]	85DA-A 77DA-B
1.Basagran	0.98	Post	0.0 b	0.0 c	0.0 c
2.FirstRate	0.008	Post	0.0 b	4.0 b	1.0 bc
3.FirstRate	0.016	Post	0.0 b	2.3 bc	3.0 a
4.FirstRate	0.02	Post Directed	0.0 b	1.7 bc	0.3 c
5.Python	0.05	Post Directed	3.3 a	2.0 bc	1.7 b
6.UTC			0.0 b	8.0 a	1.0 bc
LSD (P=.05)			2.29	2.38	1.15
CV			223.61	43.03	52.49

[1] Phytotoxicity = 0 none, 100 plant dead
[2] DA-A = days after post treatment applied
[3] DA-B = days after post directed treatment applied

Pre Plant Incorporated and Pre-emergent Herbicides for Weed Control in Baby Lima Beans Mick Canevari, Randall Wittie, Don Colbert, Scott Whitely

OBJECTIVES: Evaluate Chateau alone and in combination with Dual II Magnum as a PPI treatment. Evaluate Chateau alone as a pre-emergent treatment. Evaluate FirstRate alone and in combination with Dual II Magnum as a PPI treatment and FirstRate alone as a pre-emergent treatment.

METHODS AND MATERIALS: Pre-plant incorporated treatments were applied to preformed seed beds on June 4, 2008 in a commercial field near Linden, CA, San Joaquin County. Plots were incorporated with in 6 hours to a depth of 2.5 inches with a Lilliston rolling cultivator. Baby lima beans var. Luna was planted on June 5, 2008. Pre-emergent treatments were applied on June 5, 2008. (Table 1) Plots were 5 ft x 25 ft in a randomized complete block design with three replicates. Treatments were applied with a CO_2 backpack sprayer operating at 25 psi using 8003VS nozzles delivering 30 gpa water. Crop tolerance and weed control evaluations were made following crop emergence.

Table 1 - Treatment list

Treatment	Formulation	Rate Lb AI/A	Rate Oz/A	Application
1.Chateau	51% WG	0.094	3.0	PPI
2.Chateau + Dual II Magnum	51% WG 7.64 EC	0.094 1.0	3.0 16.0	PPI PPI
3.Chateau	51% WG	0.094	3.0	Pre
4.FirstRate	84% WG	0.040	0.8	PPI
5.FirstRate + Dual II Magnum	84% WG 7.64 EC	0.040 1.0	0.8 16.0	PPI PPI
6.FirstRate	84% WG	0.040	0.8	Pre
7.Untreated Check				

RESULTS AND DISCUSSION: The trial was placed in an area of the field with a severe infestation of common cocklebur, (*Xanthium strumarium*). The first evaluation was made 13 days after the PPI treatment and 12 days after the pre treatment. Cocklebur plants were counted per plot and separated as to size. The large plant category were plants 2-4" ht. and were considered to be missed by the rolling cultivator. The small plant category was plants that were 2 true leaves and 1.0-1.5 inch height. and considered to have emerged since the treatments were applied. Chateau and Chateau + Dual Magnum PPI had the least number of large plants /sq. ft. and no small plants. Chateau pre, FirstRate alone PPI, FirstRate + Dual Magnum PPI and FirstRate pre had the most large plants/sq. ft. Chateau pre, the UTC and FirstRate pre had the most small plants/sq. ft. No treatment resulted in crop injury. A cocklebur count was made 49/48 days after treatment and after cultivation to see if cocklebur had germinated and showed Chateau PPI and Chateau + Dual Magnum PPI had no cocklebur plants. There was no crop injury from Chateau PPI or pre as well as Chateau + Dual Magnum PPI at the 49/48 days after treatment evaluation (Table 2).

Table 2 - Cocklebur control with PPI and pre-emergent herbicides

Treatment	Formulation	Rate LBAI/A	Application	----------Cocklebur----------- Number/Ft^2 Lg Plants[1] 13/12 DAT[3]	Sm Plants[2] 13/12 DAT	-Lima Bean- Phyto[4] 13/12 DAT
1.Chateau	51% WG	0.094	PPI	0.01 a	0.00 c	0
2.Chateau+ Dual II Mag	51% WG 7.62 EC	0.094 1.0	PPI PPI	0.02 a	0.00 c	0
3.Chateau	51% WG	0.094	Pre	0.04 a	0.02 ab	0
4.FirstRate	84% WG	0.040	PPI	0.12 a	0.00 c	0
5.FirstRate+ Dual II Mag	84% WG 7.62 EC	0.040 1.0	PPI PPI	0.08 a	0.00 c	0
6.FirstRate	84% WG	0.040	Pre	0.08 a	0.03 a	0
7.UntreatedCheck				0.08 a	0.01 bc	0
8.Untreated Check				0.08 a	0.02 ab	0
LSD (P=.05)				0.083	0.016	
CV				74.81	86.35	

[1] Lg Plants = Large plants 2-4 inch height
[2] Sm Plants = Small plants 2 true leaves, 1.0 – 1.5 inch height
[3] Phyto = Phytotoxicity 0 none 100 crop dead

<u>Pre and Post Emergent Herbicides for Weed Control in Lupines</u> Mick Canevari, Randall Wittie, Don Colbert, Scott Whitely

OBJECTIVE: Evaluate pre and post emergent herbicides for weed control and crop tolerance in Lupines.

MATERIALS AND METHODS: The following herbicides were applied pre-emergent on November 14, 2007 to white lupines planted in Thornton twenty miles north of Stockton: (1) Untreated Control, (2) FirstRate 84%WG 0.04 lb ai/A, (3) Python 80%WG 0.05 lb ai/A, (4) Raptor 1SL 0.063 lb ai/A and (5) Prowl H_2O 3.8CS 1.5 lb ai/A. The following treatments were applied post emergence on February 19, 2008: (6) FirstRate 84%WG 0.016 lb ai/A., (7) FirstRate 84%WG 0.024 lb ai/A. No Foam A surfactant at 0.25% V/V was added to the post sprays. Plots were 10 ft by 30 ft and replicated four times in a randomized complete block design. Treatments were applied with a CO_2 backpack sprayer at 32 psi in 20 gallons water per acre. Stage of the lupine for the post spray was 10-14 leaves and 6-8 inch height. Weeds present were chickweed (*Stellaria media*) 10-15 inch diameter with flowers, desert rock purslane (*Calandrinia ciliate*) 5-6 leaf and 2-3 inch height, shepherd's purse (*Capsella bursa-pastoris*) 14-20 inch height with flowers, prickly lettuce (*Lactuca serriola*) 3-6 inch height, swine cress (*Coronopus didymus*) 8-10 inch height and groundsel (*Senecio vulgaris*) 8-17 inch height with blooms. Weed control and crop tolerance evaluations were made at various intervals only during the winter months.

RESULTS AND DISCUSSIONS:

<u>Pre-Emergent Results:</u> There were no significant differences between the treatments for emergence and stand establishment 13 days after planting. FirstRate, Python and Prowl H_2O gave excellent control of desert rock purslane, common groundsel, prickly lettuce, shepherd's purse, swine cress, chickweed and malva 63 days after treatment (DAT). Raptor provided only marginal control of chickweed 63 days after treatment. Python resulted in some slight crop stunting at 63 DAT. At 91 DAT Python resulted in severe stunting as well as leaf necrosis while FirstRate resulted in severe stunting with slight chlorosis and necrosis. Raptor and Prowl H_2O showed no injury to the lupines. FirstRate, Python and Prowl H_2O provided excellent control of chickweed, prickly lettuce, common groundsel, shepherd's purse, desert rock purslane and swine cress 91 DAT. However, Python was too phytotoxic to the lupines to be used as a pre-emergent treatment. At 118 DAT, FirstRate and Python provided unacceptable stunting with chlorosis and necrosis. Most of the plants in the Python plots were dead. The FirstRate treated plants were stunted but still set bean pods (Table 1). Plots were harvested on June 24 223 DAT. FirstRate was significantly the shortest and significantly the lowest yield (Table 3).

<u>Early Post Results:</u> Seven days after treatment (DAT) Firstrate at both rates resulted in no visual phytotoxicity or weed control. At 21 DAT there was no phytotoxicity but acceptable control of prickly lettuce, common groundsel, shepherd's purse and swine cress. There was slight stunting at 56 DAT with the 0.024 lb ai rate of FirstRate (Table

2). Plots were harvested on June 24 126 DAT. Firstrate at 0.016 lb ai had significantly the best yield of all treatments (Table 3).

Table 1 - Effect of pre-emergent herbicides on lupine and weed control

		Phytotoxicity[1] --- DAT[2] ---							Weed Control[3] --- (Average Three Evaluations)---					
Treatment	Rate Lbai/A	63	91 Chlo	91 Stunt	91 Nec	118 Chl	118 Stunt	118 Nec	Desert Rock Purslane	Groundsel	Prickly Lettuce	Shepherd's Purse	Swine Cress	Chickweed
1.Untreated check		0	0 c	0 c	0 c	0 b	0 c	0 b	0	0	0	0	0	0
2.FirstRate 84WG	0.04	0	3 b	36 b	9 b	3 b	40 b	0 b	98	99	98	99	98	95
3.Python 80WG	0.05	1	14 a	68 a	33a	33a	70 a	46a	95	92	70	98	96	94
4.Raptor 1SL	0.063	0	0 c	0 c	0 c	0 b	0 c	0 b	63	45	45	72	56	54
5.Prowl H2O 3.8CS	1.5	0	0 c	0 c	0 c	0 b	0 c	0b	98	78	98	99	98	98
	LSD		2.17	7.31	3.72	3.37	4.58	5.31						

[1] Phytotoxicity =0% no injury, 100% plant dead Chlo = chlorosis, Stunt = stunting, Nec = necrosis
[2] DAT = Days after Treatment
[3] Weed Control = 0% no control, 100% complete control

Table 2 - Effect of post emergent herbicides on lupine and weed control

		Phytotoxicity[1] --- DAT[2] ---						Weed Control[3] --- 21 DAT---					
Treatment	Rate Lbai/A	7 Chl	7 Stunt	21 Chlo	21 Stunt	56 Chlo	56 Stunt	Red Maids	Ground sel	Prickly Lettuce	Shep Purse	Swine Cress	Chick Weed
6.FirstRate 84WG	0.016	0	0	0	0	0	0	64	83	84	80	84	28
7.FirstRate 84WG	0.024	0	0	0	0	0	1	79	83	81	83	85	26

[1]Phytotoxicity = 0% no injury, 100% plants dead; Chlo = chlorosis, Stunt = stunting
[2] DAT = Days after Treatment
[3] Weed Control = 0% no control, 100% complete control

Table 3 - Effect of pre-emergent and post emergent herbicides on lupine yield

Treatment	Rate Lbai/A	Appl	Plant Ht. IN At Harvest	Yield Lb/A
1.Untreated Check			48 bc	3144 ab
2.FirstRate 84WG	0.04	Pre	32 d	2098 c
3.Python 80WG	0.05	Pre	No Harvest	No Harvest
4.Raptor 1SL	0.063	Pre	47 c	3078 ab
5.Prowl H2O 3.8CS	1.5	Pre	54 a	2998 b
6.FirstRate 84WG	0.016	Post	54 a	3361 a
7.FirstRate 84WG	0.024	Post	50 b	2984 b
LSD (P=.05)			2.35	330.74

<u>Bush Baby Lima Bean Variety Trial</u> Mick Canevari, Steve Temple, Randall Wittie, Chip Morris, Scott Whitely

OBJECTIVE: Evaluate a new bush baby lima bean variety with an established commercial variety.

MATERIAL AND METHODS: Fifteen rows of the new baby lima bean variety "302" were planted on May 19, 2008 in the middle of a commercial bean field of bush baby lima beans var. "Luna" near Tracy, San Joaquin County on a clay loam soil. The previous crop was processing tomatoes. Fertilizer rate was 75 units of N as water run UN 32. The field was cut and windrowed on September 27, 2008. Four 15 ft x 50 ft samples were thrashed per variety on October 2, 2008. The "302" variety samples were taken from the windrows on the north and south sides of the 15 rows and were taken next to the "Luna" variety sampled area. Samples were harvested with the belt thrasher from UC Davis. Samples were brought back to the UCCE Ag Center in Stockton where they were cleaned and weighed and graded for lygus stings and seed quality.

RESULTS AND DISCUSSION: Results (Table 1) indicate no big differences between the new variety and the "Luna" variety. There was a 48 lb difference between the two varieties for yield. Both varieties had less than 2% lygus stings. There was 1% more discolored and cracked seed with "302" vs "Luna". There was no difference in seed/oz between the two varieties. The Grower harvested 3 CWT more of "302" than the rest of the field which was "Luna".

<u>Table 1 - New bush lima bean variety compared to "Luna" in a commercial field</u>

Cultivar	% Lygus Damage	% Discolored And Cracked Seed	Seed Per OZ	Yield LB/Acre
"Luna"	1.4	1.4	66.8	3514
"302"	0.5	2.4	67.3	3466

Vine Baby Lima Bean Variety Trial Mick Canevari, Steve Temple, Randall Wittie, Chip Morris, Scott Whitely

OBJECTIVE: Evaluate new vine baby lima bean varieties with an established commercial variety.

MATERIAL AND METHODS: The new vine baby lima bean variety "279" was planted on May 27, 2008 in the middle of a commercial bean field planted with vine baby lima beans var. "Mezcla" near Tracy, San Joaquin County on a clay loam soil. The "279" was planted in 20 rows with "Mezcla" planted in the rest of the field. The field was cut and windrowed on October 20, 2008. Four 15 ft x 50 ft samples were thrashed per variety on November 10, 2008. The "279" variety samples were taken from the outside rows on the north and south sides and were sampled next to the samples taken from the "Mezcla" variety. Samples were harvested with the belt thrasher from UC Davis. The bean samples were brought back to the UCCE Ag Center in Stockton where they were cleaned and weighed and graded for lygus stings and seed quality.

RESULTS AND DISCUSSION: Results (Table 1) indicate no big differences between the new variety and the "279" variety. There was only 169 lbs difference between the two varieties for yield. The Mezcla had more lygus stings than the "279". There was no difference between the two varieties for discolored and cracked seed. The "279" seed were slightly larger than the Mezcla based on the number of seed/oz evaluation.

Table 1 - New vine lima bean variety compared to "Mezcla" in a commercial field

Cultivar	% Lygus Damage	% Discolored And Cracked Seed	Seed Per OZ	Yield LB/Acre
"Mezcla"	6.9	1.7	82	3074
"279"	3.8	1.7	74	3243

This is a work in progress only. The chemicals and uses contained in this publication are experimental data and should not be considered as recommendations for use.

Until the products and their uses given in this report appear on a registered pesticide label or other legal, supplementary direction for use, it is illegal to use the chemicals as described.

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