

**Table 1. Herbicide Registration Status and Application Timings
for Selected Dry Bean Types in California**

	Black	Blackeye	Cranberry	Garbanzo	Kidney	Lima, baby	Lima, large	Pink	Pinto	White
✓ = registered label use										
<i>Fallow ground or preformed beds before planting</i>										
carfentrazone (Shark®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
glyphosate (Roundup®, etc.)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
oxyfluorfen (Goal®, etc.)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
paraquat (Gramoxone Inteon®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Preplant - mechanically incorporated</i>										
eptc (Eptam®)					✓					
ethafluralin (Sonalan®)	✓	✓	✓		✓	✓	✓	✓	✓	✓
imazethapyr (Pursuit®)				✓						
metribuzin (Sencor®)				✓						
pendimethalin (Prowl H2O®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
pendimethalin (Prowl EC®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
s-metolachlor (Dual Magnum®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
trifluralin (Treflan®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>After planting - before crop and weed emergence</i>										
flumioxazin (Chateau®)				✓						
imazethapyr (Pursuit®)				✓						
metribuzin (Sencor®)				✓						
oxyfluorfen (Goal®, etc.)				✓						
pendimethalin (Prowl H2O®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>After planting - after crop and weed emergence</i>										
bentazon (Basagran®)	✓		✓		✓	✓	✓	✓	✓	✓
carfentrazone (Shark®) - hooded row middles	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
clethodim (Select Max®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
fluazifop (Fusilade DX®)	✓		✓	✓	✓	✓	✓	✓	✓	✓
imazethapyr (Pursuit®)					✓					
sethoxydim (Poast®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>Lay-by before weed emergence</i>										
eptc (Eptam®)					✓					
<i>Pre-harvest aid desiccant</i>										
carfentrazone (Shark®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
flumioxazin (Chateau®)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<p><i>This is not an endorsement for any of the trade names listed, nor does the omission of specific trade names reflect the view of the author. Refer to your local dealer or chemical representative for specific herbicide products available, but may not be listed here. Read and follow all label directions carefully before using any pesticide. Refer to Chart 4 for additional information on herbicide timings, rates, mode-of-actions, and use recommendations.</i></p> <p><i>Kurt Hembree, UCCE, Fresno County. http://cefresno.ucdavis.edu. September 2014.</i></p>										

Chart 1. Selectivity of Annual Broadleaf Weeds to Herbicides Registered in Dry Beans in California

	Preemergent herbicides									Postemergent herbicides								
	eptc (Eptam®)	ethafluralin (Sonalan®)	flumioxazin (Chateau®)	imazethapyr (Pursuit®)	metrinuzin (Sencor®, Metribuzin®)	oxyflurofen (Goal®, etc.)	pendimethalin (Prowl H2O®, EC®)	s-metolachlor (Dual Magnum®)	trifluralin (Treflan®)	bentazon (Basagran®)	carfentrazone (Shark®)	clethodim (Select Max®)	fluzifop (Fusilade DX®)	glyphosate (Roundup®, etc.)	oxyflurofen (Goal®, etc.)	paraquat (Gramoxone Inteon®)	sethoxydim (Poast®)	
Annual Broadleaves																		
Cheeseweed	N	P	C	C	P	C	P	P	N	--	C	N	N	P	C	P	N	
Chickweed	C	C	C	C	C	N	C	C	C	N	C	N	N	C	N	C	N	
Clovers	N	P	--	N	C	P	N	--	N	N	P	N	N	P	P	P	N	
Cocklebur	N	P	N	P	P	C	N	N	N	C	P	N	N	C	C	C	N	
Cudweed	P	P	P	P	N	N	N	N	N	N	P	N	N	C	N	N	N	
Fiddleneck	C	C	C	P	C	C	C	N	C	--	C	N	N	C	C	P	N	
Filaree spp.	P	--	P	P	C	C	N	N	P	--	C	N	N	P	C	P	N	
Goosefoot	C	C	C	P	C	C	C	P	C	N	C	N	N	C	C	C	N	
Groundcherry	C	P	C	C	P	C	N	C	P	C	C	N	N	C	C	C	N	
Groundsel, common	C	C	C	P	P	C	N	N	N	--	C	N	N	C	C	C	N	
Hairy fleabane	C	P	P	N	N	P	N	N	N	N	P	N	N	P	P	P	N	
Henbit	C	P	C	P	--	C	C	--	P	N	C	N	N	C	C	C	N	
Horseweed	C	P	C	N	N	P	N	N	N	N	P	N	N	P	P	P	N	
Knotweed, common	P	P	N	C	N	O	C	N	C	--	P	N	N	P	O	P	N	
Lambsquarters	C	C	C	P	C	C	C	P	C	C	C	N	N	C	C	C	N	
London rocket	C	N	P	C	C	C	P	N	N	P	C	N	N	C	C	C	N	
Morningglory, annual	C	--	C	P	N	P	P	N	P	P	C	N	N	P	P	P	N	
Mustard spp.	N	P	C	C	C	C	P	N	N	C	P	N	N	C	C	C	N	
Nettle	C	P	C	P	C	C	N	--	P	--	C	N	N	N	C	P	N	
Nightshade, black	C	P	C	C	N	C	N	C	N	C	C	N	N	C	C	C	N	
Nightshade, hairy	P	P	C	C	P	C	N	C	N	C	C	N	N	C	C	C	N	
Pigweed spp.	C	C	C	C	C	C	C	C	C	C	C	N	N	C	C	C	N	
Prickly lettuce	C	C	C	N	C	C	N	N	N	--	C	N	N	C	C	P	N	
Puncturevine	N	N	C	C	--	C	P	--	P	N	P	N	N	C	C	C	N	
Purslane, common	C	C	C	C	P	P	C	C	P	C	N	N	N	C	P	C	N	
Redmaids	C	C	C	C	--	C	C	--	C	N	--	N	N	C	C	C	N	
Russian thistle	P	C	C	P	C	P	P	P	P	--	P	N	N	C	P	C	N	
Shepherd's-purse	P	P	C	C	C	P	P	P	N	C	P	N	N	C	P	P	N	
Sowthistle, annual	C	C	P	N	C	C	N	P	N	--	N	N	N	C	C	P	N	
Sunflower, common	N	--	P	P	P	C	N	N	N	C	P	N	N	C	C	P	N	
Velvetleaf	P	N	--	C	P	P	N	P	N	C	C	N	N	P	P	C	N	
Wild radish	N	P	C	P	C	C	N	N	N	P	P	N	N	C	C	C	N	

C = control, P = partial control, N = no control, -- = no information

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 Kurt Hembree, UCCE, Fresno County. <http://cefresno.ucdavis.edu>. September 2014.

Chart 2. Selectivity of Annual Grass and Perennial Weeds to Herbicides Registered in Dry Beans in California

	Preemergent herbicides									Postemergent herbicides								
	eptc (Eptam®)	ethafluralin (Sonalan®)	flumioxazin (Chateau®)	imazethapyr (Pursuit®)	metrinuzin (Sencor®, Metribuzin®)	oxyflurofen (Goal®, etc.)	pendimethalin (Prowl H2O®, EC®)	s-metolachlor (Dual Magnum®)	trifluralin (Treflan®)	bentazon (Basagran®)	carfentrazone (Shark®)	clethodim (Select Max®)	fluzafop (Fusilade DX®)	glyphosate (Roundup®, etc.)	oxyflurofen (Goal®, etc.)	paraquat (Gramoxone Inteon®)	sethoxydim (Poast®)	
Annual Grasses																		
Annual bluegrass	C	C	C	N	C	P	C	C	C	N	N	C	N	C	P	P	N	
Barnyardgrass	C	C	C	P	P	P	C	C	C	N	N	C	C	C	P	P	C	
Bromegrass spp.	C	C	C	N	C	N	C	P	C	N	N	P	P	C	N	P	P	
Canarygrass	C	C	N	P	C	P	C	C	C	N	N	C	C	C	P	P	C	
Crabgrass, large	C	C	C	P	C	N	C	C	C	N	N	C	C	C	N	C	C	
Fescue spp.	C	C	N	P	--	N	C	--	C	N	N	P	P	C	N	P	P	
Foxtail spp.	C	C	C	C	P	N	C	C	C	N	N	C	C	C	N	C	C	
Junglerice	C	C	P	P	P	P	C	C	C	N	N	C	C	C	P	P	C	
Lovegrass	C	--	C	N	P	C	C	C	C	N	N	C	C	C	C	P	C	
Ryegrass, Italian	C	N	N	P	C	N	C	C	C	N	N	C	C	C	N	P	C	
Sandbur	C	--	N	P	C	N	C	C	C	N	N	C	C	C	N	P	C	
Sprangletop	C	--	N	N	N	N	C	C	C	N	N	C	C	C	N	N	C	
Wild barley	C	C	N	P	C	P	P	P	C	N	N	C	C	C	P	P	C	
Wild oat	C	C	N	P	P	P	P	N	P	N	N	C	C	C	P	P	C	
Witchgrass	C	--	N	--	--	P	C	C	C	N	N	C	C	C	P	P	C	
Perennials (seed)																		
Bermudagrass	C	--	N	P	N	P	C	N	C	N	N	C	C	C	P	P	C	
Dallisgrass	C	--	N	P	N	N	C	C	C	N	N	C	C	C	N	N	C	
Johnsongrass	C	C	N	P	N	N	C	C	C	N	N	C	C	C	N	C	C	
Field bindweed	N	N	N	--	N	N	P	N	P	P	C	N	N	C	N	P	N	
Perennials (established)																		
Bermudagrass	P	N	N	N	N	N	N	N	N	N	N	P	P	P	N	N	P	
Dallisgrass	N	N	N	N	N	N	N	N	N	N	N	P	P	P	N	N	P	
Johnsongrass	N	N	N	P	N	N	P	N	P	N	N	P	P	P	N	N	P	
Field bindweed	N	N	N	N	N	N	P	N	P	N	P	N	N	P	N	N	N	
Nutsedge, purple	P	P	N	P	N	N	N	N	N	P	N	N	N	P	N	P	N	
Nutsedge, yellow	P	P	N	P	N	N	N	C	N	P	N	N	N	P	N	P	N	

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Kurt Hembre, UCCE, Fresno County. <http://cefresno.ucdavis.edu>. September 2014.

Chart 3. Herbicide and Application Information for Selected Dry Bean Types in California

Herbicide	Use Rate/A	Mode-of-Action	PHI	Application Information
<i>Fallow ground or preformed beds before planting</i>				
carfentrazone (Shark®)	1 - 2 fl oz (6.1 fl oz/crop)	Group 14 (WSSA)	0 days	Up to 1 day after planting; ground or air; 5 to 40 gpa; surfactant required; good spray coverage; small annual broadleaf weeds.
glyphosate (Roundup®, etc.)	1 - 4 lb a.i.	Group 9 (WSSA)	0 days	Up to before crop emergence; ground or air; 3 to 30 gpa; AMS added to tank first; weeds <4"; wait 7 days to cultivate perennials; mix with oxyfluorfen for broader control.
oxyfluorfen (Goal®, etc.)	1 - 2 pt (2XL) 0.5 - 1 pt (4F)	Group 14 (WSSA)	0 days	At least 60 days before planting; ground or air; 5 to 40 gpa; mix with glyphosate for broad control; work beds 2.5" deep before planting.
paraquat (Gramoxone Inteon®)	1.5 - 4 pt	Group 22 (WSSA)	0 days	By ground or air; 5 to 40 gpa; NIS required; good spray coverage; small annual weeds; Restricted Use permit required.
<i>Preplant - mechanically incorporated</i>				
eptc (Eptam®)	3.5 - 4.5 pt (9 pt/crop)	Group 8 (WSSA)	0 days	Only in kidney beans; mechanically incorporate 2" deep; can be metered through irrigation water immediately after planting.
ethafluralin (Sonalan®)	1.5 - 4.5 pt	Group 3 (WSSA)	0 days	Don't use in garbanzos; 3 to 4.5 pt/acre if nightshade and/or groundcherry are present; at least 5 gpa; mechanically incorporate 2 to 3" deep within 24 hours of treatment.
imazethapyr (Pursuit®)	3 fl oz (1 app./crop)	Group 2 (WSSA)	60 days	Only in garbanzo up to 7 days before planting; ground or air; incorporate 1 to 2" deep; mix with pendimethalin, trifluralin, or metolachlor.
metribuzin (Sencor® or Metribuzin 75®)	0.33 - 0.5 lb	Group 5 (WSSA)	0 days	Only in garbanzos; by ground only; 10 to 40 gpa; mechanically incorporate 1 to 2" deep; crop injury can occur under rainy conditions.
pendimethalin (Prowl H2O®, Prowl 3.3 EC®)	1.5 - 3 pt (H2O) 1.8 - 3.6 pt (EC)	Group 3 (WSSA)	0 days	Up to 60 days before planting; mechanically incorporate within 7 days after treatment.
s-metolachlor (Dual Magnum®)	1 - 2 pt (2 pt/crop)	Group 15 (WSSA)	0 days	Mechanically incorporate 2 to 4" deep within 14 days of planting; don't cut for hay within 120 days of treatment; don't use for forage within 60 days of treatment; can cause crop injury of planting deep in cold, wet soil.
trifluralin (Treflan®)	1 - 2 pt	Group 3 (WSSA)	0 days	Mechanically incorporate 2 to 4" deep within 24 hours; can mix with eptc or s-metolachlor.
<i>After planting - before crop and weed emergence</i>				
flumioxazin (Chateau®)	1.5 oz (3 oz/crop)	Group 14 (WSSA)	5 days	Only in garbanzo within 2 days after planting; activated with ½" of rainfall or irrigation.
imazethapyr (Pursuit®)	3 fl oz (1 app./crop)	Group 2 (WSSA)	60 days	Only in garbanzos up to 3 days after planting; ground or air; activate with sprinkler irrigation to wet top 2"; can mix with pendimethalin.
metribuzin (Sencor® or Metribuzin 75®)	0.33 - 0.5 lb	Group 5 (WSSA)	0 days	Only in garbanzos; by ground only; 10 to 40 gpa; shallow mechanical incorporation or with <½" rainfall or sprinkler irrigation; crop injury can occur under rainy, wet conditions.
oxyfluorfen (Goal®, etc.)	1 pt (2XL) 0.5 pt (4F)	Group 14 (WSSA)	0 days	Only in garbanzos; within 2 days after planting; at least 20 gpa; activated with ½" of rainfall, sprinkler, or furrow irrigation.
pendimethalin (Prowl H2O®)	1.5 - 3 pt	Group 3 (WSSA)	0 days	Up to 2 days after planting; activate with sprinkler or furrow irrigation.

Chart 3 (continued). Herbicide and Application Information for Selected Dry Bean Types in California

Herbicide	Use Rate/A	Mode-of-Action	PHI	Application Information
<i>After planting - after crop and weed emergence</i>				
bentazon (Basagran®)	1 - 2 pt (4 pt/crop)	Group 6 (WSSA)	30 days	Beans with at least 1 fully expanded trifoliolate leaf; COC, UAN, or AMS can improve weed control, but may also increase crop injury; ground or air; 5 to 20 gpa; thorough spray coverage; weeds not stressed for moisture; does not control grasses; don't cultivate 5 days before or 7 days after treatment split treatment 10 to 14 days apart for nutsedge control.
carfentrazone (Shark®)	0.5 - 2 fl oz (6.1 fl oz/crop)	Group 14 (WSSA)	0 days	Hooded or shielded spray to row middles; at least 10 gpa; surfactant needed; keep spray off crop foliage; travel speed <5 mph; broadleaf weeds small; good spray coverage is essential.
clethodim (Select Max®)	9 - 32 fl oz (64 fl oz/crop)	Group 1 (WSSA)	30 days	Controls grasses only; AMS mixed in tank first; NIS needed; ground or air; 3 to 40 gpa; within 7 days after irrigating; repeat treatment 14 days apart; cultivate 7 to 14 days later.
fluaizifop (Fusilade DX®)	8 - 24 fl oz (48 fl oz/crop)	Group 1 (WSSA)	60 days	Not for blackeyes, controls grasses only; COC or NIS needed; 5 to 40 gpa; within 7 days after irrigating; repeat treatment at 14 days apart; cultivate 7 to 14 days later.
imazethapyr (Pursuit®)	3 fl oz (1 app./crop)	Group 2 (WSSA)	60 days	Only in kidney beans with at least 1 fully expanded trifoliolate leaf; NIS needed; cultivate within 7 to 10 days after treatment; beans that are stressed for moisture can be damaged.
sethoxydim (Poast®)	1.5 - 2.5 pt (4 pt/crop)	Group 1 (WSSA)	30 days	Controls grasses only; COC or MSO needed; ground or air; at least 10 gpa; within 7 days after an irrigating; repeat treatment 14 days apart; can mix with bentazon in kidney and lima beans; cultivate 7 to 14 days later.
<i>Lay-by before weed emergence</i>				
eptc (Eptam®)	2.25 - 4.5 pt (9 pt/crop)	Group 8 (WSSA)	0 days	Use only in kidney beans; directed application before pods form; keep off crop foliage; activate with irrigation water.
<i>Pre-harvest aid desiccant</i>				
carfentrazone (Shark®)	1 to 2 fl oz (6.1 fl oz/crop)	Group 14 (WSSA)	0 days	Ground or air; NIS, COC, or MSO needed; 15 to 30 gpa with good coverage.
flumioxazin (Chateau®)	1 - 3 oz (3 oz/crop)	Group 14 (WSSA)	5 days	Ground or air; COC or MSO needed; 15 to 30 gpa with good coverage.
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