Dry Bean Weed Control in California: Past…Present…Future.

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The first dry beans commercially produced in California were limas, in the early 1900's. Today, the four major classes of dry beans grown in the state are blackeye, lima, red kidney, and garbanzo. Other types grown include black turtle, cranberry, pinto, small red and white kidney. In 2009, California produced 68,100 acres of dry beans with a value of over $78.7 million (table 1). Dry beans are legumes so add nitrogen to the soil, making them a good rotational crop. Production costs range from $300 to $500/acre, depending on variety, location, and cultural practices used. Weed control costs also vary for similar reasons. Growers spend about $35/acre for preplant herbicide treatments and another $20 to $30/acre for postemergent treatments. Cultivation and in-season hand weeding is needed in weedy fields, adding additional costs to production.

Table 1. Harvested acres of dry beans in CA

Bean Type	2007	2008	2009
Baby lima	15,600	11,700	14,600
Large lima	15,600	11,700	14,300
Blackeye	12,500	7,100	12,400
Garbanzo	6,000	6,300	14,000
Kidney	2,000	2,600	2,800
Other	6,300	12,500	10,000
Total	58,000	51,900	68,100

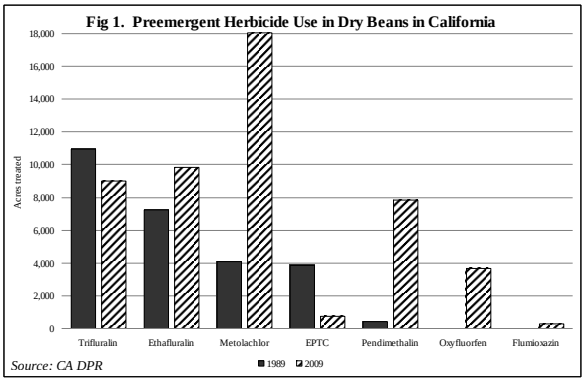
Source: USDA NASS

Problematic weeds commonly found in dry bean fields include black nightshade, prickly lettuce, barnyardgrass, volunteer cereals, annual morningglory, and nutsedge. Weeds impact bean growth and production directly by hindering stand development, delaying crop maturity, and lowering yields. Bean quality can also be impacted by the presence of weeds. For example, the juice from black nightshade berries can stain mature beans, reducing seed quality and price.

The number of herbicides labeled in dry beans in California has not changed significantly over the last 20 years (figures 1 and 2). This is, in-part, because the different bean types often exhibit different sensitivities to the same herbicides. Consequently, it has been challenging to identify herbicides that provide effective weed control without harming the different bean types. So growers continue to face similar weed problems as in past years. The herbicides currently registered for use in dry beans in California are listed in table 2. Most of the products used at the time of planting have similar modes of action, so control similar weeds. Also, post-plant preemergent herbicides are limited to garbanzo beans only. Furthermore, products used after crop establishment only provide postemergent control of grassy weeds. Unfortunately, there are no preemergent products labeled for use at lay-by before row closure. So, one to two early-season cultivations plus a mid- to late-season hand weeding is often required for complete weed control, increasing the cost of production. Late-season hand removal of weeds in dry beans is not encouraged because bean pods can be shattered. A pre-harvest desiccant is sometimes used to help control annual morningglory if it is present before harvest.

Since herbicides options are limited, growers should plant into fields with an historically low weed population. Equally important is consideration for the specific weeds that are known to be

present and whether or not the labeled herbicides are effective on those particular weeds. Efforts should be made to control weeds during the fallow period and before planting to help reduce the impact of weed competition on early crop stand development. Applying pre-irrigation water, followed by a shallow tillage operation or a postemergent herbicide treatment (usually glyphosate), can be used to kill emerged weeds and reduce the weed population before planting. Until new and effective herbicides become available, particularly for mid- to late-season applications, weed control in dry bean production will continue to be a challenge for growers.



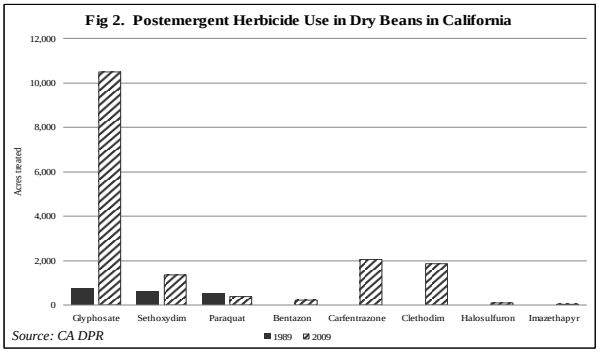


Table 2. Herbicides registered for use in dry beans in California

Herbicide	Treatment information
	Fallow ground or preformed beds
carfentrazone	up to 1 day after planting
glyphosate	up to before crop emergence
oxyfluorfen	up to 60 days before planting
paraquat	anytime before planting
pyraflufen	up to 30 days before planting
	Preplant mechanically incorporated
EPTC	not for blackeye, garbanzo, or limas
ethafluralin	crop injury if deep seed, overlaps, and stress
metribuzin, pendimethalin	garbanzos only
s-metolachlor, trifluralin	all bean types
	Post-plant before crop and weed emergence
flumioxazin, metribuzin, oxyfluorfen, pendimethalin	garbanzos only
imazethapyr	garbanzos only (up to 3 days after planting)
	Post-plant after crop and weed emergence
carfentrazone	hooded sprayer for row middles
clethodim, sethoxydim	controls only grasses; 30-day PHI
	Pre-harvest desiccant
carfentrazone	All bean types; 0-day PHI

Sources: UC IPM Guidelines and CDMS.net