

## NIGHTSHADE CONTROL IN DRY BEANS

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Black nightshade (Solanum nigrum L.) and Hairy nightshade (Solanum sarrachoides Sendtner) continue to be problems for California Dry Bean growers. In 1986 Dr. Larry Mitich reported at the 38th Annual California Weed Conference on the Economic Losses and Control of Nightshade in Dry Beans (1). Dr. Mitich reported that the nightshade complex had become a serious weed in dry bean production because: 1) A single nightshade plant produces 8000 to 178,000 seeds per plant and the seeds are efficiently dispersed by the sticky fluid in the nightshade berries. 2) The nightshades are tolerant to many chemical control methods, and they respond inconsistently even to generally recommended herbicide treatments; ultimately, they fill the voids left by the elimination of less resistant weeds, and 3) The members of the Solanum complex vary widely in their vegetative characteristics making identification for control difficult.

Black and Hairy Nightshade were also the Weed of the Year at the 40th Annual California Weed Conference and many reports were given at the general session discussing their distribution, biology and control.

In 1995 California farmers grew 137,000 acres of dry edible beans and 130,000 acres in 1996. Various varieties of Dry Beans are grown throughout California in different soil types, climate and environmental conditions on relative small acreage (Table 1).

Table 1. 1996 California Dry Beans Planted Acres by Variety

Bean Variety	1,000 Acres	Major Growing Areas
Large Lima	22.0	Stanislaus and Fresno Co.
Baby Lima	24.0	San Joaquin, Fresno and Sutter Co.
Black Eye	27.0	Fresno, Tulare and Kern Co.
Light Red Kidney	10.0	San Joaquin and Butte Co.
Dark Red Kidney	5.0	San Joaquin and Butte Co.
Pink	8.0	Yolo, Sutter and Solano Co.
Garbanzo	25.0	Fresno and Kern Co.
Small White, Navy,		
Great Northern,	10.0	Stanislaus Co. North
Small Red, Pinto		
Cranberry	3.0	Stanislaus Co. North
Black Turtle Soup	1.0	Stanislaus Co. North
Other (Misc.)	10.0	Various

Since 1986 the number of registered herbicides used in dry beans for nightshade control have remained the same. Chloramben is no longer available for use but Imazethapyr has been registered for use in kidney bean with plant back restrictions.

The UC IPM Pest Management Guidelines for Dry Beans list the registered herbicides, the bean varieties that they can be used on and any restrictions placed on the use of the herbicide (Table 2). It is essential that the user identify Hairy Nightshade and Black Nightshade correctly because of the species selectivity of the registered herbicides.

Reports from County Farm Advisors working in dry beans indicates that although early nightshade control is obtained by some herbicides, season long control usually has not been obtained. Late germinating nightshade growing after the last cultivation on the edge of the bed or furrow is causing serious problems at harvest. Even though bean yield may not be affected bean quality, an essential part of production, may be seriously reduced. The Sticky fluid that aids in spreading the nightshade seed stains the beans and reduces harvest efficiency, and the green berries are mildly toxic and presents a potential danger of poisoning.

This year a trial for Hairy and Black Nightshade control was established in blackeye beans at the UC Davis Vegetable Crops Research Farm. Over the years the use of tomato herbicides in this field has created a heavy infestation of both Hairy and Black Nightshade. The plot area was pre-irrigated 10 days before planting. Preplant incorporated herbicides were applied June 2, 1997 (Table 3.) and the beans were planted June 3, 1997. After planting 0.2 inches of rain occurred. As soon as the plot area dried a light harrowing was done to prevent soil crusting. Just prior to the first irrigation on June 23 the area was cultivated to reshape the beds that had been flattened by the rain and light harrowing. The population of Hairy and Black nightshade was reduced by these mechanical treatments compared to other areas in the same field. Lay-by soil incorporated (Table 3), Postemergence over the top of the beans and Postemergence directed spray treatments were applied to provide nightshade control late in the season (Table 4). The beans were not harvested because of a heavy Lygus infestation. Wheat was planted on the treatment area on December 23, 1997 to evaluate any herbicide residue in the soil that would carry over and affect the next season's crop.

#### Preliminary results

More research needs to be done on 1.) Timing of cultivation for control of nightshade seedlings. 2.) Further evaluation of non-registered herbicides such as Frontier, FMC-6285, Axiom, and Permit alone or in combination with currently registered herbicides. 3.) Timing and method of applying Layby herbicide treatments to extend nightshade control and insure crop safety.

Table 2. Broadleaf Herbicides Registered in California Dry Beans

Dual	Lasso
Prowl	Treflan
Eptam	Basagran
Sonalan	Pursuit

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Table 3. 1997 UC Davis Preplant or Lay-by Incorporated Herbicides

Dual	Axiom
Sonalan	Dual + Sonalan
Frontier	Dual + Frontier
FMC-6285	Sonalan + Frontier
FMC-8426	

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Table 4. 1997 UC Davis Post Emergence Herbicides

Dual	E-9636
Frontier	Resource
Sonalan	Permit
Axiom	FMC-6285

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Reference

Mitich, Larry W. and Guy B. Kyser. 1986. Economic losses and control of nightshade in dry beans. Proceeding 38<sup>th</sup> California Weed Conference. PP 128-135