

Weed Control Options for Corn Production

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Introduction

In California, 640,000 acres of corn was grown in 2011, two-thirds of it planted for silage. The acreage grown for grain is very price dependent. The majority of the corn was planted in the Central Valley. No single weed control regime is effective for all growing conditions. An integrated weed management program utilizes a combination of cultural, mechanical, and chemical methods for consistent, effective weed control. It also helps prevent the development of weed resistance to herbicides and the emergence of a few dominant weeds. Some of the major weeds include pigweeds, tall and Wrights annual morningglory, common and horse purslane, barnyardgrass, and purple and yellow nutsedge. The major grass weeds include barnyardgrass, sprangletop, Johnsongrass, and volunteer wheat. Purple and yellow nutsedge are controlled using halosulfuron or glyphosate in combination with sweep type cultivators. Accent gives excellent control on Johnsongrass and small barnyardgrass when applied to up to 20 inch tall corn, then after that using drop nozzles to 36 inches.

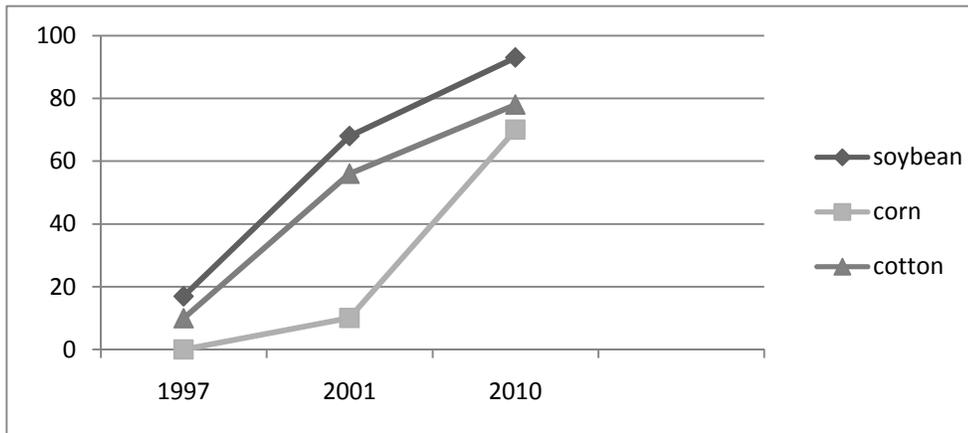
Cultural practices play an important role in corn weed management. In California, a well-managed corn crop is extremely competitive with most weeds. Good cultural practices, including timely cultivations, often control weeds sufficiently to maximize yields and profit.

Growing corn under no-till or reduced tillage may reduce weeds because the soil is not disturbed, thus reducing the number of seeds that germinate. Preirrigation prior to planting and controlling volunteer cereals and emerged weeds will get the crop off to a good start, although this practice delays planting. For weeds that do emerge, postemergent herbicides can be applied. In practice though much of the reduced tillage corn has uncomposted manure spread on the fields, fields are irrigated up, and often a single mode of action (glyphosate) is used, leaving fields very weedy by the end of the growing season.

Preplant, preemergent, or postemergent herbicides are available that will selectively control most species of weeds in corn. Select an herbicide based on costs, weeds present, stage of corn growth, soil type, succeeding rotation crop, and adjacent crops.

Transgenic Corn. Herbicide-tolerant varieties represent approximately 60% of corn grown in California and provide additional options for weed control. The Roundup Ready technology has provided growers with an excellent tool for managing many annual and perennial grasses. Glyphosate can be applied post emergence so growers can wait and see the weeds present. There are no plant back restrictions nor is it listed as a restricted material like several other corn herbicides. There is substantial fuel savings, as tillage operations are reduced. In Roundup Ready varieties, glyphosate can be applied over the top to corn up to the V8 stage of corn or 24 inches. Drop nozzles are recommended for corn taller than 24 inches. Keep spray out of whorls after corn is 30 inches tall. Rates depend on formulation and weed type and size.

Fig. 1. Percent of soybean, corn and cotton acreage planted with glyphosate resistant crops in the United States



Kassim Al-Khatib

The following herbicides are used in corn:

Pre-Plant: Atrazine, Aatrex, Eradicane, Sutan, Roundup, Dual Magnum, Outlook, Gramoxone Inteon, Micro-Tech

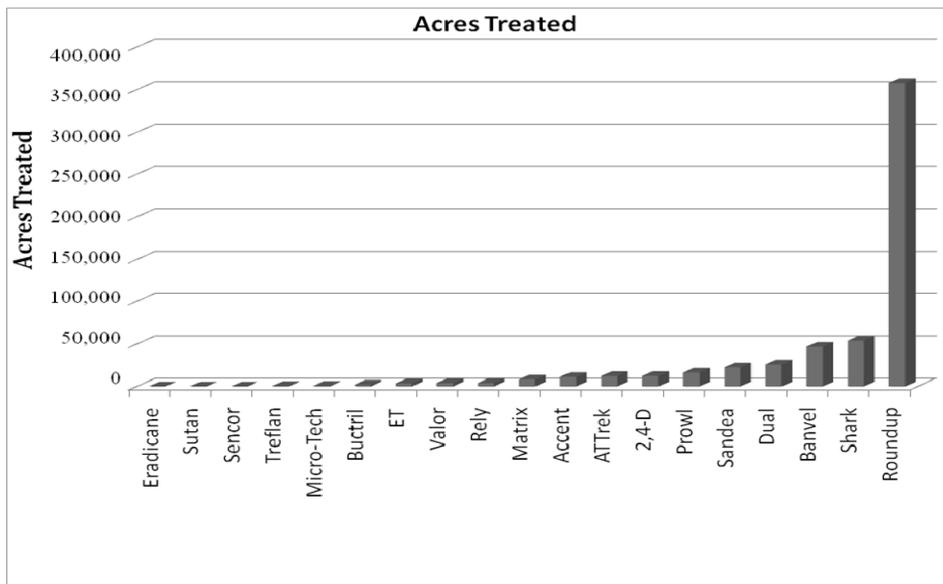
At Planting: Micro-Tech, Aatrex, Atrazine, Dual Magnum, Roundup, Gramoxone Inteon, Eradicane

After Planting: Accent, Prowl, glyphosate, 2,4-D, Banvel, Clarity, Distinct, Buctril, Gramoxone Inteon, Sencor, Aatrex, Atrazine, Sandea, Shark, Yukon, Option, Outlook

Weeds not controlled by a pre-plant incorporated herbicide or by cultivation can often be controlled with a postemergent herbicide application, depending on the weed species present and its growth stage. Postemergent herbicides are most effective when applied to weed seedlings.

An over-the-top application can be used, but some products or tank mixes require a directed spray on corn larger than 8 to 12 inches in height to keep the herbicide out of the whorl and to minimize the risk of corn injury. Postemergent herbicides commonly used in corn include 2,4-D, bromoxynil (Buctril), carfentrazone (Shark), dicamba (Clarity), dicamba/halosulfuron (Yukon), diflufenzopyr (Distinct), halosulfuron (Sandea), metribuzin (Sencor), nicosulfuron (Accent), and foramsulfuron (Option). It is important, however, to pay close attention to application guidelines on the labels to avoid phytotoxicity to the crop, especially with carfentrazone (Shark). Fig. 2 demonstrates the acreage of various herbicides used in California. Even though there are many herbicide options to use in corn, the chart demonstrates the dominance of a one mode of action approach. Research conducted in 2011 with Matrix (rimsulfuron) as a post plant but either preemergent or postemergent to the weed demonstrated excellent weed control. Hopefully this herbicide will be registered and add to the options available for corn growers.

Fig. 2. 2010 Herbicide Usage in California Corn



Summary

Weed management in corn should incorporate resistance management strategies that include crop rotation, herbicide rotation, and control of weed escapes by tillage or hand. In Roundup Ready crop systems in other states, weed shifts and weed resistance occurs. Weed shifts occurred when an herbicide program was used repeatedly, resulting in the survival of only weeds that are tolerant of the herbicide. Weed shifts were associated with reduced tillage systems and not rotating herbicides nor including tillage even when that was the most appropriate weed control tool.

A major concern is the development of resistance to glyphosate (Roundup) in lambsquarter, pigweed species, horseweed, fleabane, and Italian ryegrass in California. Rotating glyphosate-resistant corn with another glyphosate-resistant crop such as cotton or alfalfa will only increase this problem. To help prevent the development of herbicide-resistant weeds and prevent weed shifts from occurring, it is important to incorporate tillage into your weed management practices, as well as alternating herbicides that have a different chemical mode of action. The use of residual herbicides should be considered. Manage field edges as many of these weed seeds can blow into neighboring fields.

References:

Wright, S., D. Munier, M. Canaveri, 2010. Weed Control in Corn. University of California IPM Pest Management Guidelines in Corn Publication.

Wright, Steve, 2010. Integrating Weed Control in Cotton and Corn. California Weed Science Society.

Wright, Steve, R. Vargas. 2008. Integrating Weed Control in Cotton and Corn. California Weed Science Society.