

## Now that you know everything about weed science, how do you actually control weeds?

### (Designing a weed management program)

Today's topics:

- Weed management decisions
- Troubleshooting

Learning objectives:

- Be able to explain how cropping situations influence weed control options.
- Be able to discuss the three main times for weed control operations.
- Be able to locate credible information on herbicide usage.
- Be able to troubleshoot problems in herbicidal weed control.

## You may find yourself making decisions about weed control:

- Grower
- Farm/nursery/golf course manager
- Manufacturer representative
- Product distributor
- Commercial applicator
- Extension agent/specialist
- Consultant



## Steps in weed control

1. Understand cropping system
2. Identify weed
3. Identify strategy to control weeds



## Weed Management Programs

The weed management program depends on the cropping system

- Annual
- Perennial
- Non-cropland

This dictates which control methods are available:

- Tillage
- Herbicides
- Cultural techniques
- Biological
- Mulches
- Mowing

## Timing of Weed Management

### Timing influences weed control options:

Major times for weed control:

- Before planting (site preparation)
  - Non-selective approaches possible
- During crop establishment (critical weed-free period)
  - Selective control pre- or post-emergence
- Crop maintenance
  - Selective post-emergence control



### Examples

Annual crops:

- Site preparation
- Crop establishment
- Crop maintenance
- Post harvest clean-up

Perennial crops:

- Site preparation
- Crop establishment
- Crop maintenance (multiple years)
  - Control germinating weeds
  - Manage for competitive crops
  - Post emergence weed control

## Other Considerations (1)

The weed control program is only a part of the overall crop production system

Thus weed control practices must be compatible with other crop management objectives.

Factors to consider include:

- Expected value of crop

Table 14.2 Acreage and Value of Some Agronomic and Horticultural Crops Grown in the United States in 1996<sup>a</sup>

Crop	Total Acres	Average Production/Acre	Average Price	Average Return/Acre
Corn (for grain)	79,487,000	127.1 bu	\$ 2.70	\$ 343
Wheat (all)	75,639,000	36.3 bu	4.30	156
Soybeans (for beans)	64,205,000	37.6 bu	6.85	258
Hay (all)	61,029,000	2.45 ton	93.00	228
Cotton	14,666,000	709 lb	0.70	496
Sorghum (for grain)	13,188,000	67.5 bu	-2.35	159
Rice	2,819,000	61.2 cwt	9.50	581
Dry beans	1,813,000	15.9 cwt	24.20	385
Potatoes	1,455,000	349 cwt	5.11	1783
Sugar beets (1995)	1,444,600	19.8 ton	38.10	754
Peanuts	1,413,000	2619 lb	0.26	681
Sugarcane (1993)	948,300	32.8 ton	28.50	935
Tobacco	733,900	2133 lb	1.88	4010
Sweet corn (for processing)	492,000	6.95 ton	78.50	546
Tomatoes (for processing)	345,370	33.64 ton	63.50	2136
Tomatoes (fresh)	122,830	260 cwt	28.50	7410
Lettuce	280,250	304 cwt	16.70	5077
Green peas (for processing)	259,000	1.67 ton	284.00	474
Onions	169,830	383 cwt	9.58	3669
Broccoli	116,000	123 cwt	27.70	3407
Cucumbers (for processing)	111,340	5.44 tons	248.00	1349
Carrots (fresh)	96,320	291 cwt	12.80	3725
Strawberries	48,470	336 cwt	47.30	15,892

<sup>a</sup> Data from Statistical Highlights of U.S. Agriculture Crops, U.S. Department of Agriculture (<http://www.usda.gov/nass/pubs/statstgh/1997/stgh96-c.htm>).

## Other Considerations (2)

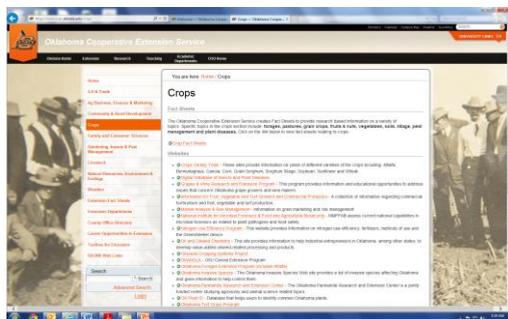
The weed control program is only a part of the overall crop production system

Thus weed control practices must be compatible with other crop management objectives.

Factors to consider include:

- Expected value of crop
- Planting and harvest dates
- Timing and type of fertilizer applications
- Insect and pathogen control operations
- Rotational crops
- Appearance/aesthetic factors
- Environmental impact

## Finding Information: Extension

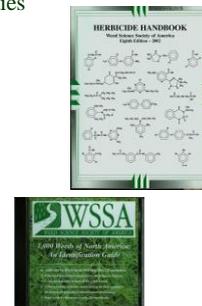


## Finding Information: Organizations

Weed Science Society of America Herbicide Handbook

Summaries of herbicide properties

<http://www.wssa.net/>



## Finding Information: Professional Services

MeisterPRO Crop Protection

Cross-listings for herbicides, weeds, and crops

<http://www.meisterpro.com/>



## Finding Information: Pesticide Resources

Greenbook

Complete collections of pesticide labels and MSDS

<http://www.greenbook.net/Search/QuickSearch/>



## Finding Information: Industry

Manufacturers (e.g., DuPont)

The screenshot shows the DuPont website's navigation menu and main content area. The navigation menu includes links for 'Home', 'About Us', 'Contact Us', 'Products & Services', 'Crop Protection', 'Solutions & Programs', and 'Investment & Finance'. The main content area features a large banner for 'Agriculture United States' and a sidebar with 'Crop Protection' and 'Account herbicide' sections. The 'Crop Protection' section lists various products and services, while the 'Account herbicide' section provides information about the herbicide's effectiveness and application.

## Finding Information: Vendors

Commercial vendors (e.g., Interstate Products)

The screenshot shows the Interstate Products website's product page for 'Selective Kill Herbicide'. The page features a large banner with the product name and a 'Triple Selective Weed Killer' tagline. Below the banner, there is a detailed description of the herbicide's benefits, including its effectiveness against various weeds and its safety for crops. The page also includes a 'Directions for Use' section and a 'Contact Us' button. The Interstate Products logo and contact information are visible at the top of the page.

## Troubleshooting Problems

You may have to diagnose problems

Weed control problems:

- Failure to control weeds
- Injury to crop
- Herbicide damage to nontarget vegetation



### Step 1

1. Determine what is normal in regard to plant growth.
  - Examine affected plants and compare with normal, unaffected plants to accurately assess injury symptoms.

## A Four-Step Approach

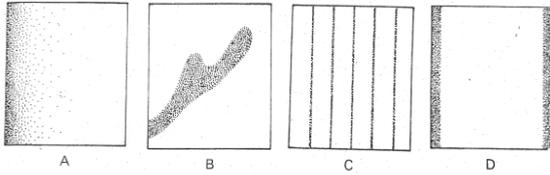
1. Determine what is normal in regard to plant growth.
2. Check the pattern of injury observed and determine the time frame of the injury occurrence and development.
3. Examine injured plants for specific symptomatology.
4. Determination of causal agents.

### Step 2

2. Check the pattern of injury observed and determine the time frame of the injury occurrence and development.
  - Pattern of injury in field (random or in patterns; straight lines or rounded corresponding to geographical features)
  - Soil conditions at time of application (wet, dry, tilled?)
  - Weather before, during, and after application
  - Previous crop (and herbicides applied previous year)
  - Size of weeds/crops at time of application
  - Sprayer equipment history (nozzles, calibration, cleanliness)
  - Fertilizer applications
  - Diseases
  - Nutritional deficiencies
  - Soil type
  - Neighboring fields - crops growing and herbicides applied to them

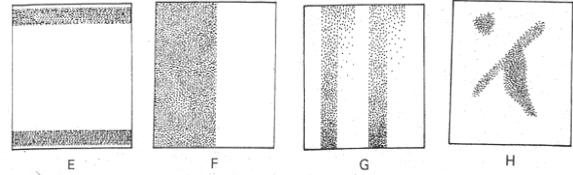
## Herbicide Injury/Failure Patterns

- What could be the problem here? (Each box represents a field and shading shows pattern of crop injury or poor control)



## Herbicide Injury/Failure Patterns

- What could be the problem here? (Each box represents a field and shading shows pattern of crop injury)



## Steps 3 & 4

3. Examine injured plants for specific symptomology.
  - Look at leaves, stems, roots, flowers, and fruits.
  - Pay attention to the spectrum of weed/crops injured
4. Determination of causal agents.
  - Consider all evidence before reaching a conclusion