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 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
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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
Troubleshooting Problems
You may have to diagnose problems

Weed control problems:
- Failure to control weeds
- Injury to crop
- Herbicide damage to nontarget vegetation

A Four-Step Approach

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

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

3. Examine injured plants for specific symptomology.

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)

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
   • Consider all evidence before reaching a conclusion