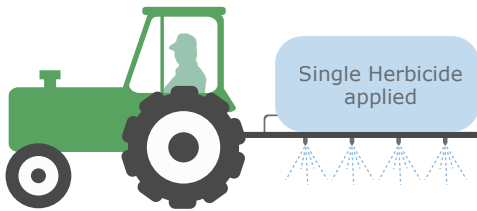


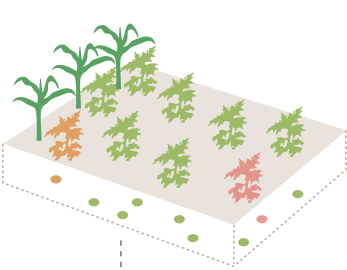
# Benefits of Herbicide Mixtures

Managing and Delaying Development of Herbicide Resistant Weeds

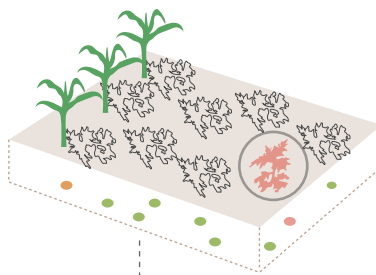


## Single Herbicides & Resistance

With use of a **single herbicide** in the absence of other methods of control, weeds may be **selected for resistance**



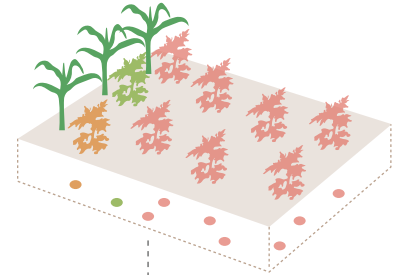
**1** Weed population with resistance at low frequency



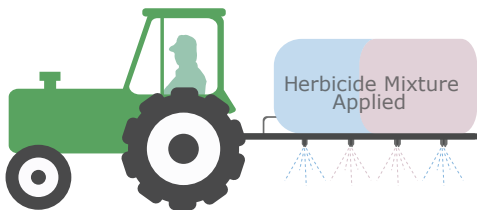
**2** Resistant weeds **do** survive



**3** Resistant plant produces seed that survives in the soil

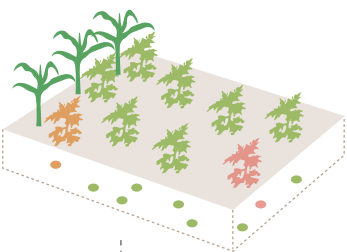


**4** Over time there are higher frequencies of resistance in population

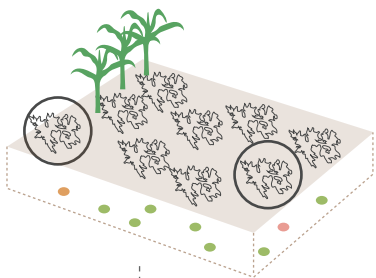


## Herbicide Mixtures Delay and Manage Resistance

**Herbicide mixtures** delay development and keep resistance at low frequencies because each herbicide can **control the weeds resistant** to the other herbicide



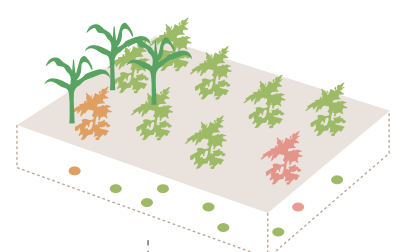
**1** Weed population with resistance at low frequency



**2** Resistant plants **do not** survive



**3** Any seed, if produced is in similar frequency as original population



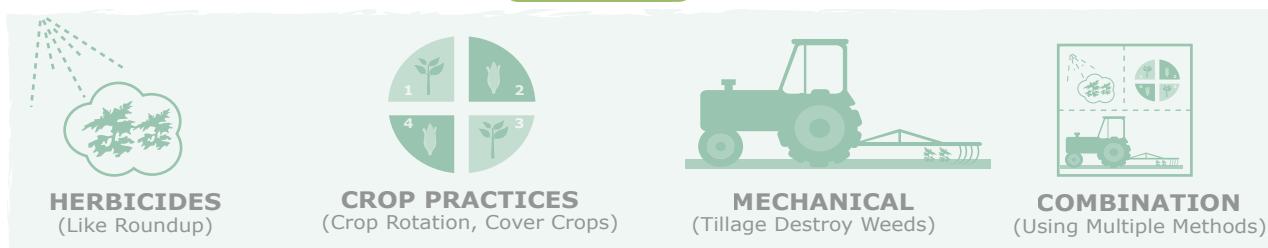
**4** Over time frequency of resistant plants remains low

# Herbicides...

# Protecting Crops from Weeds



Farmers don't just use herbicides, they use several **methods** to control weeds



## Best Management Practices for Weed Control

- Know which weed species you are trying to control.
- Use a diversified approach toward weed management focused on preventing weed seed production and reducing the number of weed seeds in the soil.
- Plant crops into fields that are as weed-free as possible and then keep them as weed-free as possible.
- Plant crop seed that is free of seed weed.
- Scout fields routinely, before and after herbicide application.
- Use multiple herbicide mechanisms of action that are effective against the most troublesome weeds in your field and against those with known resistance.
- Apply herbicides at application rates listed on the label when weeds are within the size range indicated on the label.
- Emphasize cultural practices that suppress weeds by using crop competitiveness.
- Use mechanical and biological weed management practices where appropriate.
- Prevent field-to-field and within-field movement of weed seed or vegetative propagules. Manage weed seed at harvest and after harvest to prevent a buildup of weed seed in the soil.

## Want to Learn More?

### Weed Science Society of America

<http://wssa.net/wssa/weed/resistance/>

### Narrated learning modules

<http://wssa.net/herbicide-resistance/agronomic-crops/>

**Lesson 1:** "Current status of herbicide resistance"

**Lesson 2:** "How herbicides work"

**Lesson 3:** "What is herbicide resistance?"

**Lesson 4:** "Scouting after a herbicide application and confirming herbicide resistance"

**Lesson 5:** "Principles of managing herbicide resistance"

### Take Action

Steps to manage herbicide resistant weeds

<http://takeactiononweeds.com/>

### International Survey of Herbicide Resistant Weeds

Information on occurrence of herbicide resistance in weeds (herbicide, species, country) can be found at:

<http://www.weedscience.org/>

### Monsanto

Give it a minute video on herbicide resistance

<http://bit.ly/2bfrVsX>