

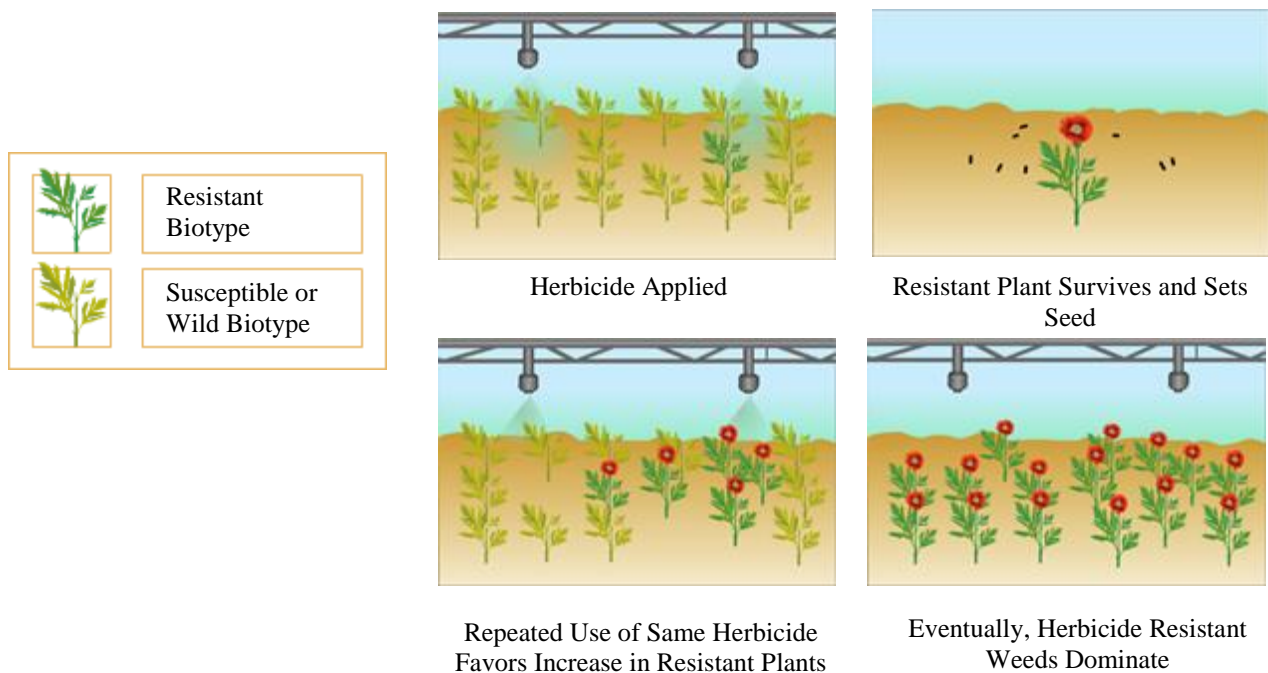
## WHAT IS HERBICIDE TOLERANT SEED TECHNOLOGY?

Herbicide tolerant crops tolerate herbicides at application rates that would kill non-herbicide tolerant hybrids or varieties of the same crop species. Crops with traits for herbicide tolerance allow farmers to apply herbicides to their crops that would otherwise kill or incur unacceptable injury to the crop.

## IMPORTANCE OF MANAGING HERBICIDE TOLERANT CROPS AND WEED RESISTANCE TO HERBICIDES

Proper management of herbicide tolerant crop technology is important to preserve the effectiveness and value of the tolerant crop seed and its corresponding herbicides for future use. Growers who utilize herbicide programs that include herbicide tolerant crops can do so on an annual basis provided the technology is effectively managed. If you have any questions after reviewing this information, please contact your PANNAR sales professional or agronomist.

## HOW DOES WEED RESISTANCE TO AN HERBICIDE DEVELOP?



DuPont CPP, 2005

## WEED RESISTANCE MANAGEMENT BEST PRACTICES

- The use of herbicide tolerant crops does not limit the grower to use only one herbicide product. Conventional herbicides can and should continue to be part of the grower's overall weed management system.
- Limit the number of applications of a single herbicide or herbicides from the same mode-of-action family within a single growing season.
- Apply herbicides at labeled rates and at the recommended stage of weed growth as stated on the product label.
- Use mixtures or sequential treatments of an effective alternate mode-of-action to control target weeds.
- Use alternative weed management practices, such as crop rotation, mechanical cultivation and delayed planting.
- Clean equipment before moving between fields to minimize the dispersion of weed seed.
- Scout fields after herbicide application to detect weed escapes or shifts. If a potentially resistant weed or weed population has been detected, use available control methods to avoid seed dispersion in the field.

## **Manage Volunteer Herbicide Tolerant Plants**

The seed of some crops can escape harvest, germinate the following year, and become “volunteer” weeds in a rotational crop. This can happen regardless of whether the crop seed was herbicide tolerant or not. Many tools are available for managing herbicide tolerant volunteers, but advanced planning is advised to provide the greatest flexibility and success.

The best strategies to manage herbicide tolerant volunteers are crop rotation, herbicide rotation, and rotation of herbicide tolerant traits. Properly adjusting harvesting equipment, cultivation, and tillage management will also help reduce volunteer plants from the previous year’s crop. Plan at least a year ahead when planting an herbicide tolerant crop to make sure you have a weed management plan that will control any herbicide tolerant volunteers using alternate herbicide mode-of-action families and/or tillage for the next crop.

## **Report Suspected Cases of Weed Resistance to Herbicides**

Possible indicators of weed resistance to herbicides include achieving good control of all but one of the labeled weed species in the field by the herbicide, and/or failure of repeated applications of the same herbicide to control only that weed species in a field. Be aware that not all weed control failures or performance issues are caused by herbicide resistance. Other factors include lack of rainfall to activate pre-emergence herbicides, rainfall right after post-emergence applications that wash the herbicide off the plant, cool temperatures, slow growth that reduces herbicide activity in the plant, and improper application timing, or improperly calibrated application equipment.

If you suspect a weed control failure is caused by weed resistance to an herbicide you should first contact your herbicide retailer or herbicide manufacturer’s representative, and your local PANNAR agronomist who will conduct a thorough investigation that can eliminate other more common causes of poor weed control. Your local PANNAR agronomist will assist you with the additional steps that will be required if weed resistance to the herbicide is indeed the cause of weed control failure.