WSSA FACT SHEET
Dispelling Common Misconceptions about Superweeds

Use of the term superweed has exploded in recent years and is frequently featured in news reports about herbicide-resistant weeds choking out crops. A few recent headline examples:

- **Superweeds Choke Farms** (*Des Moines Register, June 22, 2014*)
- **The Rise of the Super Weed Around the World** (*Wall Street Journal, June 23, 2014*)
- **U.S. Midwestern Farmers Fighting Explosion of "Superweeds"** (*Reuters, July 23, 2014*)
- **Superweed Spreading through Wall, Texas** (*KLST-TV, July 29, 2014*)
- **Super Weed Spreads Closer to Quad Cities** (*WQAD TV, August 4, 2014*)

While there is no science-based definition for superweed, the term is often used to describe weeds believed to have special capabilities that are helping them outcompete other plants in ways never experienced before. Many associate superweed with glyphosate-tolerant crops and the suspected transfer of resistance genes from these crops to weeds. The Oxford Dictionary, for example, is one of many online resources to define superweed as "a weed which is extremely resistant to herbicides, especially one created by the transfer of genes from genetically modified crops into wild plants."

But is that the truth? Are today's weeds "supercharged" in some way? And if so, why is that the case?

As a nonprofit organization that promotes science-based information about weeds, their impact on the environment and how they can be managed, the Weed Science Society of America (WSSA) has compiled the information below to clarify two common misconceptions about superweeds.

> **Misconception 1: Rampant gene transfer between genetically modified crops and weeds is creating weeds able to resist treatment by herbicides.**
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> **Reality: There is no evidence that gene transfer is a major factor in the development of herbicide resistance. Instead, overreliance on herbicides with a single mechanism of action to control certain weeds has led to the selection of weeds resistant to that mechanism of action.**

The transfer of resistance traits from genetically modified crops to weeds growing in the field is rare, and the occurrences observed and reported to date have had minimal impact. The only currently known mechanism for any crop trait to move into weeds (or vice versa) is through cross pollination – a sexual crossing between the crop and the weed. Gene flow is more likely to happen if the crop and weed are sexually compatible, near relatives. Gene flow among more distantly related plant species is rare because they do not cross as readily. There are often physiological barriers, including pollen incompatibility, varying numbers of chromosomes and other factors that serve as impediments.

Even among sexually compatible crops and weeds, the opportunity for crop-weed gene flow depends on proximity of the crop plant to its wild weedy relatives. For example, there have been no reports of gene transfer in the more than 160 million annually planted acres of genetically modified corn, cotton

and soybean crops where herbicide resistance weeds are such a significant issue today. Since these crops don't have sexually compatible, near relatives in the U.S. and Canada, the risk of gene flow to other plants in the region is extremely low. Crops like sunflower, wheat and canola do have compatible weed relatives in their major production areas (e.g. wild sunflower, jointed goatgrass, and wild relatives of canola, respectively). As a result, the risk of gene flow between those crops and wild plants is greater. Where gene flow has occurred, the resulting plants are no more weedy than their parent plants.

> **Misconception 2: Herbicide use is creating a new breed of herbicide-resistant superweeds unlike anything we've ever seen before.**
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> **Reality: The costly issue of herbicide resistance isn't new – and neither are the competitive characteristics of weeds. Although the number of acres affected by resistant weeds has increased over the last decade as more growers have come to rely solely on herbicides with a single mechanism of action for weed control, weeds have exhibited resistance to many types of herbicides over the past 40 years. Many weed populations have even evolved resistance to multiple herbicide mechanisms of action.**

Herbicide resistance is an important, costly and escalating issue, especially as growers have come to rely more than ever on a single class of herbicides that targets weeds in the same way. It is more critical than ever for a variety of carefully integrated weed management strategies to be used so weeds resistant to one method can be controlled in other ways before they have an opportunity to spread. This includes nonchemical means of weed control, such as crop rotation, tillage, cultivation, hand hoeing, seed capture, etc. The WSSA has created a variety of free educational materials and recommendations concerning resistance and how to avoid it, available online at http://wssa.net/weed/resistance.

As to those super powers that many individuals ascribe to herbicide-resistant weeds? Under herbicide-free conditions, resistant weeds are no more competitive or ecologically fit than their susceptible partners. Both can crowd out crops and other desirable plants by outcompeting them for water, nutrients, sunlight and space. They grow incessantly and can be prolific seed producers. A single Palmer amaranth plant, for example, can produce hundreds of thousands of seeds, regardless of whether it is herbicide resistant or not.

Weeds can be economically devastating if allowed to grow unchecked. As a result, we need to monitor vigilantly and use a variety of herbicide and non-herbicide strategies to control weed populations before they get out of hand.

Note:

The WSSA thanks the following scientists for their special contributions to this document:

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