

## When Roundup Isn't Roundup: Clearing up the confusion between products

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In the last newsletter, an article on triclopyr ([www.purduelandscape.org/article/the-summer-of-triclopyr-mounting-evidence-for-off-target-damage/](http://www.purduelandscape.org/article/the-summer-of-triclopyr-mounting-evidence-for-off-target-damage/)) brought up much discussion on the *Roundup* brands now containing multiple active ingredients other than glyphosate. Professionals in the industry may encounter a client with herbicide damage symptoms that mimic growth-regulator injury instead of typical glyphosate damage symptoms. While the client may have used *Roundup*, they didn't necessarily use glyphosate. Going forward, it's important to keep in mind that *Roundup* no longer means glyphosate in the consumer market.

*Roundup* has been one of the most used herbicides for many different weed control applications. *Roundup*, with the active ingredient glyphosate, was first registered with the EPA in 1974. When *Roundup* went off patent in 2000, glyphosate started being sold under many different names. According to the National Pesticide Information Center (<http://npic.orst.edu/factsheets/glyphogen.html>) there are currently over 750 products containing glyphosate. Formulations may differ with salt carriers, adjuvants, concentrations, and mixed with other herbicides.

Recently, Bayer announced glyphosate would be phased out of consumer *Roundup* products. In its place, consumer *Roundup* products include other active ingredients. This can lead to confusion in the consumer market. It's important to note that professional-use *Roundup* (turf and ornamental, agronomic crops, etc.) still contains glyphosate.

Within the consumer *Roundup* product line, there are many different formulations designed for specific purposes, which include *Roundup Weed and Grass Killer*, *Roundup for Lawns*, *Roundup for Lawns: Crabgrass Destroyer*, *Roundup Dual Action Weed and Grass Killer*, *Roundup Poison Ivy and Tough Brush Killer*, among others. Each of these products contains distinct active ingredients that target different types of weeds.



Figure 1. Consumer versions of *Roundup* are no longer glyphosate. Pay close attention to the active ingredients on labels to prevent unwanted plant injury.

### ***Roundup Weed and Grass Killer: Glyphosate as the Active Ingredient***

The original *Roundup* herbicide contains glyphosate as its primary active ingredient. Glyphosate is a systemic, non-selective herbicide, meaning it is absorbed by the plant and translocated throughout the vascular system, ultimately leading to the plant's death. Glyphosate works by inhibiting the enzyme 5-enolpyruvylshikimate-3-phosphate synthase (EPSPS), which is a key component of the shikimic acid pathway—a pathway critical for the synthesis of aromatic amino acids in plants.

#### **Active Ingredient:**

1. **Glyphosate:** The 'traditional' version of *Roundup* that controls many different weeds. Can take 10-14 days to kill weeds.
2. **Pelargonic Acid:** A contact herbicide that quickly breaks down cell walls. This is added to provide a quick burndown of the weed.

### ***Roundup Dual Action Weed and Grass Killer Plus 4 Month Preventer: Multiple modes of action***

*Round Dual Action* is a formulation that includes four very

different herbicides that is intended for use in areas with limited vegetation (i.e. sidewalks, driveways, mulched beds). In addition to postemergence herbicides, this product includes two preemergence active ingredients.

#### Active Ingredients:

1. **Triclopyr:** Systemic herbicide that mimics auxins. Very effective herbicide for woody plants, which is used frequently in invasive species treatments.
2. **Fluazifop:** Grass-specific herbicide (graminicide) that controls several annual and perennial grasses.
3. **Diquat:** Contact herbicide that exhibit symptoms rapidly. Good for annual weeds.
4. **Imazapic:** Pre- and Postemergence control of several grasses and broadleaf weeds.

#### Roundup for Lawns: A Combination of Selective Herbicides

*Roundup for Lawns* is a specialized formulation designed for residential use, particularly for controlling broadleaf weeds in lawns. Unlike traditional *Roundup*, which contains glyphosate, *Roundup for Lawns* contains a combination of selective herbicides, including MCPA, quinclorac, dicamba, and sulfentrazone. These ingredients are chosen for their ability to target broadleaf weeds and grassy weeds without harming most turfgrass species. This product is similar to the traditional 'three-way' herbicides that are commonly used in turf.

#### Active Ingredients:

1. **MCPA:** MCPA is a selective herbicide that mimics the action of natural plant hormones known as auxins. When absorbed by broadleaf weeds, it causes uncontrolled growth, leading to the plant's death.
2. **Quinclorac:** Quinclorac is effective against grassy weeds, primarily used for crabgrass control in turf. It can be similar to auxin herbicides, causing epinasty, curling, and a change of color.
3. **Dicamba:** Similar to MCPA, dicamba disrupts the growth of broadleaf weeds by mimicking natural plant hormones.
4. **Sulfentrazone:** Pre- and postemergence activity in turf. Very effective on nutsedge.

#### Roundup for Lawns: Crabgrass Destroyer

*Roundup for Lawns: Crabgrass Destroyer* is a product designed to control grassy weeds and several broadleaf weeds in cool-season turf. In addition to crabgrass, other grassy weeds and some broadleaves can be controlled.

#### Active Ingredients:

1. **Topramezone:** Very effective herbicide for several annual and perennial grassy weeds and some common broadleaf weeds.

#### Roundup Poison Ivy and Tough Brush Killer: Triclopyr for Tough Woody Plants

*Roundup Brush Killer* is formulated to tackle tough, woody plants, such as brush, brambles, and small trees. The active ingredient in this product is triclopyr, a selective herbicide that targets broadleaf plants with less damage to grasses. This product can be effective on invasive woody plants.

#### Active Ingredients:

- **Triclopyr:** Systemic herbicide that mimics auxins. Very effective herbicide for woody plants, which is used frequently in invasive species treatments.
- **Glyphosate:** The 'traditional' version of *Roundup* that controls many different weeds. Can take 10-14 days to kill weeds.



Figure 2. Glyphosate damage to sycamore.

#### Conclusion:

All of the consumer *Roundup* products contain unique active ingredients tailored to specific weed control needs. There can be understandable confusion around these products due to the historical uses of glyphosate. The Green Industry needs to be aware of the confusion around these products to better inform their clients. Understanding the active ingredients and mechanisms of action of these herbicides is crucial for their effective and safe use in various settings.

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