HS1171

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Considerations for Use of Roundup® and Similar Products in the Home Landscape[1]

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A weed in a home landscape is defined as a plant in an undesirable location. That weed could actually be a species that was intentionally planted, but that has begun to spread beyond its intended location. There are also those "true weeds" that come up through the cracks in sidewalks, underneath shrubs, beside doorsteps.... The list could go on and on. With so many ready-to-use weed control products available in stores, it seems easy to grab a bottle and start spraying. But before you do that, read on for a little information on one of the most recognizable trade names in the homeowner weed control market: Roundup®.

Roundup® is a trade name, and as such, there are different products available for sale under the trade name. As with most trade names, the products for sale under the Roundup® moniker are similar, but each has a specific use and purpose, just like automobile companies sell different models to serve specific areas of the market. All automobiles are designed to move people from one place to another, but their function can be different. Hauling a load of gravel in a compact car isn't really possible, but a truck can do the job.

Weed control products sold under a trade name are all designed to kill weeds, but while some are designed to work near desirable plants, others are only to be used in places where no plants are desired. Some weed control products are designed to only kill emerged weeds, while some will prevent any weed growth in an area for up to four months or more. It may seem like a great idea to put a long-term weed control product in flower beds and gardens, where hand weeding is often necessary, but many of these products are very harmful to annual and herbaceous perennials. Always read the label carefully to determine where to use the product.

There are many types of Roundup® products, but the one thing they have in common is the main active ingredient, glyphosate. Glyphosate, an herbicide that was first discovered in the 1960s and received patents for use in agricultural products in the 1970s, changed the way weeds were managed in both the agricultural and homeowner sectors. Glyphosate is a systemic herbicide, meaning it moves through the plant via the vascular system. This makes it very effective on perennial weeds. It is absorbed by the leaves, then moves to the roots of a plant and back to the growing points, thoroughly mixing within the plant and increasing its efficacy.

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The Environmental Protection Agency (2001) estimated agricultural use of 13–15 million pounds of glyphosate in 2001 and homeowner use of 5–8 million pounds the same year. This usage is only surpassed by 2,4-D, which is widely used for broadleaf weed control in grass crops and turfgrass. In the 1990s, the invention of genetically modified organisms expanded the use of glyphosate as use of Roundup Ready® corn, soybean, and cotton crops exploded in the United States.

Glyphosate is no longer protected by patent, and as a result, several other trade names for homeowner weed control products list glyphosate as their active ingredient. This publication is not intended to discount these products, but rather to provide information about how one trade name can have products with different use patterns and to give tips for preventing injury to desirable plants.

Product Types

In the homeowner market, there are several types of concentrated and ready-to-use Roundup® products available, all of which fall into the format of the five products shown below. In all cases, the label should be consulted for proper use patterns. More information can be found at http://www.scotts.com/smg/brand/roundup/brandLanding.jsp?icid=hp1_bb_rup

Roundup® Weed & Grass Killer Super Concentrate (50.2% glyphosate)

This is the ultra-concentrated form of glyphosate and does not have any other active ingredients. A homeowner will need patience when using this type of product, as it may take two to several weeks before weeds die. It can be used in most situations.

Roundup® Weed & Grass Killer Concentrate Plus (0.73% diquat, 18% glyphosate)

This is also a concentrated version of a glyphosate product (although less so than the previously discussed product), but it has an additional active ingredient. This is a common formulation that often lists fast-acting control. Glyphosate by itself takes time to kill a plant (often several weeks). The addition of the diquat speeds up the foliar injury symptoms of the application, but the main job of killing the plant is still being done by the glyphosate. The diquat may actually improve the weed's uptake of the glyphosate if the weed has a waxy surface. The diquat helps break down the plant cell membranes and can allow more glyphosate to enter the plant. It can be used in most situations.

Roundup® Weed and Grass Killer Ready-to-Use Plus (2% glyphosate, 2% pelargonic acid)

The percentage of glyphosate has been reduced to make the product ready to use right out of the container. These containers often have a pump and spray option attached for easy application. They are good for small areas, but cost more. This product has pelargonic acid, which, much like diquat, speeds up the foliar injury symptoms on the weed. It also may improve control, much like diquat, and can be used in most situations.

Roundup® Weed and Grass Killer Ready-to-Use Plus Weed Preventer (1% glyphosate, 2% pelargonic acid, 0.17% imazapic)

The weed prevention claim on the container states that weeds may be prevented for up to four months after application. That is the job of the active ingredient, imazapic. Read the label for specific use instructions and application procedures prior to using this product. These weed preventers will sometimes allow the use of the product under established shrubs and trees, but the desired vegetation must be shielded to prevent injury from the spray. In the case of this product, do not apply to annual beds or gardens, as the imazapic will cause injury to annual and herbaceous perennials. Be careful with these types of products; if placed in the wrong area, it will take many months before sensitive species can be planted.

Roundup® Poison Ivy Plus Tough Brush Killer Ready-to-Use (1% glyphosate, 1% triclopyr)

This product is effective, but sometimes several applications will be necessary to control poison ivy. Remember, poison ivy can still cause skin irritation even after the vine has been killed. Wear protection if you are intending to remove the dead vines, and thoroughly clean all tools used for removal with a

strong soap and water solution. Never burn the poison ivy plant, whether alive or dead, as the irritant is present in the smoke and, if inhaled, can cause severe respiratory distress and may lead to death. This product also will control briars and other undesirable large plants, but it will take several applications in most cases. This product will cause injury to all desirable plants, and extreme caution should be used around those plants you wish to keep. Read the label carefully for use patterns and sites.

Tips to Limit Off-Target Movement of Glyphosate Products

Application in adverse weather conditions

When using a backpack, hand-held, or ready-to-use sprayer, it is important to note weather conditions before making an application. Herbicide application should never take place if the wind is above 7 mph. This value will be lower if you are trying to spray directly beside desirable vegetation. Wind-drifted rates of a glyphosate product can cause severe injury to neighboring plants.

Only apply enough product to cover the foliage of the plant you are trying to kill

It is often said that if some is good, then more is better. This philosophy does not apply to glyphosate. The homeowner products are formulated with the expectation that most users will apply product until it begins to run off the plant, but it is wasteful to apply any more than what is necessary to cover the leaves, where the product is best absorbed, and it provides no residual (long-term) weed control by itself when applied to the soil. Overapplication wastes money and may increase your chances of causing injury to desirable plants. As always, follow the product labels; some will indicate how many square feet to spray.

Application over organic mulch

Organic mulches such as hardwood chips and bark are often used in landscapes. Glyphosate becomes tightly bound to soil and organic matter and as such provides no residual control of weeds. In other words, it will only control plants on which it is sprayed. In some cases, however, this tightly bound glyphosate can come off of its binding site and affect the roots of desirable vegetation. This occurs most commonly in a flood situation. For example, if a heavy rain of 2 in. or more occurs after glyphosate has been applied on organic mulch, the glyphosate could move into any standing water in the landscape. This water will then move down through the soil profile and could enter the root zone of the desired vegetation. While the amount of glyphosate in the water will be extremely small, it can cause stunting and yellowing of the growing points of the desired vegetation. Never apply a glyphosate product just prior to a heavy rain. For best results, try to apply when several days of dry weather are expected, and never apply to an area that has standing water.

Application over inorganic mulch

Many homeowners like the look of crushed stone, either in a bed or along the edge. Also common is the use of a weed mat, which is often comprised of plastic. Glyphosate does not bind tightly to these types of mulches. If overhead irrigation or rainfall occurs within a couple of weeks after application, it is possible for the glyphosate to move into the root zone of desirable plants. After a couple of weeks, the amount of glyphosate available will decrease significantly due to photo degradation from the sun.

Application over hardscapes

With common use of concrete, stone, and asphalt in today's urban environment, care must be exercised in the use of products containing glyphosate. As with inorganic mulches, glyphosate is not tightly bound to these products. If the hardscape is on a slope that ends in desired vegetation, any heavy rain or irrigation that causes movement of the water into the desired vegetation may cause injury. Besides the waste of water, this is another reason why having your irrigation system set properly so as not to apply water over hardscapes is a good idea.

Conclusion

Remember that glyphosate moves throughout the plant, so if a perennial desirable plant is spreading in your landscape, you must sever the root system if you wish to spray the invasive portion. Application of a glyphosate product will move back to the mother

plant and will cause injury and even death of the desired portion of the plant.

As with all chemical pest control products, use them sparingly and only as part of a greater pest management system. If you have just a few weeds, chances are it would be safer and easier to hand pull or cultivate them. Always read the labels and pay attention to the reentry interval (i.e., the time you must wait until returning to the area). Keep pets away from areas where glyphosate has been applied because some products can cause skin irritation on the pads of their paws.

Weeds are troublesome, but being vigilant with weed control can significantly reduce weed populations in the future.

Literature Cited

U.S. Environmental Protection Agency. 2001. *2000-2001 pesticide market estimates: Usage*. http://www.epa.gov/oppbead1/pestsales/01pestsales/usage2001_3.htm#3_7 (accessed April 4, 2010).