The Plant Doctor's LANDSCAPE TIPS

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ROUNDUP IS GLYPHOSATE … RIGHT?

INTRODUCTION:

The subject of this article is not to promote the March On Monsanto bandwagon of followers, some of whom apparently believe Monsanto is a nasty American corporation solely seeking profits while destroying the planet. Nor is my goal to praise Monsanto for producing many fine products enabling farmers to help feed the world. Rather, my somewhat lackluster but still important intention is to simply clarify some issues surrounding the Roundup product line of herbicides that may be confusing to the public and professional alike.

The active ingredient of the original Roundup was glyphosate, invented and patented by Monsanto sometime after The Creation. Over the ensuing years, Roundup garnered a stellar reputation among users as a highly effective, low-cost wonder herbicide. With inactivity upon contact with soil (or organic matter) and, hence, virtually no residual, this stuff was just what the doctor ordered when it came to killing weeds in unwanted places while allowing an immediate capability to replant or reseed as desired.

In recent years, however, there has been an increase in damage to non-target plants from Roundup products or from other companies' products with similar active ingredients. These non-target plants include trees, shrubs and, well, just about any plant one can imagine (Photo 1). Why is this happening?

ROUNDUP PRODUCT CLARIFICATION:

For many years, Roundup was sold with glyphosate as the primary active ingredient. As time went by but especially after glyphosate went "off-patent," the folks at Monsanto decided they needed to enhance the efficacy of Roundup while continuing to advance the sterling reputation that the Roundup brand had achieved. Subsequently, Roundup has become a line of herbicide products and this has apparently become rather confusing to people who are accustomed to the original glyphosate Roundup.

Today, Roundup is still sold with the active ingredient glyphosate, but other active ingredients have been added: primarily the contact herbicides pelargonic acid and diquat dibromide, and the systemic herbicide, imazapyr (Photos 2A-C). You may recall, perhaps with some frustration, that the original Roundup (glyphosate) might take at least 1-2 weeks before plants turned yellow and begin to die. The Roundup folks in all their infinite wisdom understood the average, impatient consumer's desires - "We want to see that plant die NOW!, not next month." So they added pelargonic acid, a fatty acid herbicide, to the formulation to ensure a rather fast "meltdown" of the plant. To immense gratification of the consumer,

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Photo 1

Photo 1: Initially, the damage to these oak trees was believed to be due to oak wilt, a lethal disease. Further investigation disclosed that the damage was done from an herbicide product containing glyphosate and imazapyr. The herbicide had been applied the year before to the driveway of this horse farm.

Photo 2A Photo 2B Photo 2C

Photo 2A, 2B & 2C: Expanding from the original glyphosate active ingredient, Roundup products now contain a variety of other chemicals to enhance the glyphosate's effectiveness and longevity. Be cautious of products containing imazapyr around trees, shrubs and other desirable plants.

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the sprayed plant often withered the same day of application while glyphosate became systemic to eventually kill the roots. Diquat dibromide largely does the same thing as pelargonic acid except ever so slightly slower.

The real problem for landscape plants, trees and gardens is the imazapyr component of some Roundup products. Imazapyr has been or currently is an active ingredient in the Roundup Extended Control and Roundup 365 products. Interestingly, some Roundup Extended control products contain diquat dibromide rather than imazapyr. Confusing enough? Imazapyr is a deadly, long-lived herbicide to most plants. Of considerable concern is that imazapyr is a carboxylic acid herbicide (like DuPont's Imprelis) that is soluble in water. In other words, imazapyr tends to move with water (irrigation or rain), either laterally across the landscape or by leaching down through the soil to the roots of tree and shrub, sometimes with deadly consequences (Photo 3A). Furthermore, because imazapyr persists for a year or more in soil, it is important to understand that planting seeds or transplants into imazapyr-contaminated soil may result in harm to these plants.

AVOIDING "ROUNDUP" DAMAGE TO TREES AND LANDSCAPE PLANTS:

There are apparently at least two rather confusing aspects about the current Roundup line of products. First, individuals

Photo 3A

Photo 3B

Photo 3A: The mulch rings of these trees were treated with a product containing imazapyr, with apparent deadly consequences. Note that the topically applied imazapyr not only leached into the root zones of the trees but also into the turf.

Photo 3B: Of the apparent damage to trees in Photo 3A, two apparently died and had to be replaced. Remarkably, many of the other trees eventually recovered! Believe it or not, most of the affected trees survived two years without foliage! Provided there is green cambium tissue beneath the bark, never give up!!

Photo 4A

Photo 4B

Photo 4A & 4B: In addition to the ever popular Roundup line of products, there are other manufacturers' products containing the same active ingredients, glyphosate and imazapyr, albeit at slightly different percentages.

Photo 5A: This dogwood contains sparse, strapped-shaped foliage as the result of a glyphosate application to the mulched area adjacent to the tree. Unfortunately, the application was also applied to epicormic shoots (suckers) emerging from the lower trunk and roots.

Photo 5B & 5C: A close-up photo of the tree in Photo 5A shows the deformed foliage (5B) compared to normal foliage (5C). Luckily in this case, the tree is likely to recover with time.

who have used the original Roundup (Glyphosate) in the past apparently believe that the "Extended Control" or "365" formulations are simply stronger doses of glyphosate, without understanding that other very lethal and long-lasting herbicides have been added to the product line. I suspect that these other chemical herbicides are not understood by the general public and even some professional applicators. Second, according to the packages and labels, recommended use of most Roundup products include locations such as driveways, patios, sidewalks/paths, tree rings, mulched areas, etc. – exactly where the roots of many trees and shrubs grow. The imazapyr component of certain Roundup products may leach into the root zones of trees and shrubs and be taken up systemically, causing severe harm to these plants (Photo 3A). It must be noted that there are many products marketed under different manufacturers' labels that contain similar active ingredients and that are just as deadly (Photos 4A and 4B). While the percentages of these active ingredients in these different products may vary slightly, imazapyr and other potentially long lasting chemicals can do serious harm to our desirable plants (Photos 5A, 5B and 5C).

To avoid damage to trees and landscape plants, it is very important to read and follow the label directions of the product you intend to use. It is important to understand that roots of trees often extend horizontally 1-2X the height of the tree. If there is any chance that the roots of trees and shrubs may exist anywhere in the vicinity of the area the herbicide is intended to be applied, it may be best to avoid applying any herbicide containing imazapyr (or similar long-lasting, leachable herbicide). If mistakes do happen, which according to my observations is happening in greater frequency, do not remove trees or shrubs immediately. Affected plants sometimes recover with time depending on the dose they receive (Photos 3A and 3B).

For more information, please feel free to email David Roberts at robertsd@msu.edu or contact a professional plant health care provider. The author, MSU and MGIA do not endorse any particular products. If using pesticides, be sure to read and follow label directions.

Development of Landscape Tips was sponsored by MSU and MGIA.

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