



The Plant Doctor's LANDSCAPE TIPS

By Dr. David L. Roberts, The Plant Doctor LLC a.k.a. The Tree Doctor

RECOGNIZING BROADLEAF HERBICIDE DAMAGE ON TREES AND SHRUBS

INTRODUCTION

Broadleaf Herbicides are used in a variety of applications including but not limited to lawns, landscapes, right-of-way locations, farming, etc (Photo 1). Some of the most common Broadleaf Herbicides are 2,4-D, Dicamba, and Triclopyr. For broader spectrum management of broadleaf plants, several chemicals are often combined: Confront (Triclopyr, Chlorpyralid), Trimec (2,4-D, Propionic Acid, Dicamba) and Lesco Three Way (same as Trimec) among many other products. Many companies are producing similar products because most of the patents on these chemicals have expired. Nevertheless, these and other chemicals are still excellent at what they were designed to do.

REBECCA'S DILEMMA: TO DIAGNOSE OR NOT, IS THAT THE QUESTION?

I received a phone call from Rebecca who exclaimed that she and her husband put a lot of effort into their landscape (Photos 1, 2A, & 2B) but expressed concern that all her ornamental pear trees were dying. She was beside herself and sought help. Apparently, she had already asked several local experts to no avail. One of those experts suggested that Rebecca contact me. She asked how much it would cost for me to come to her residence in southwest Michigan. She further revealed that her neighbor had the same problem and that he had hired a turf and landscape company with a national presence to come out, diagnose the problem, and treat the malady on his pear trees. The company charged her neighbor, Kevin, about \$500 to treat four trees. She contemplated aloud to me that perhaps she should just have her trees treated as well, rather than pay to have me come out to help her. The only problem was that she had many more trees than her neighbor and the cost to treat all her trees would be

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Photo 1

Photo 1: While Broadleaf Herbicides are utilized in many environments, they are especially important for weed control in lawns and landscapes. When arriving at Rebecca's property, this is one of the first vistas I saw where herbicides can benefit the appearance and health of desirable plants.



Photo 2A



Photo 2B

Photos 2A & 2B: Another view of Rebecca's property demonstrates an extensive landscape (Photo 2A) with a number of unique features. In Photo 2B, Rebecca's husband converted a farmer's grain storage bin into an outdoor bar, replete with many antiques (Inset).

When my fledgling career was getting underway in the late 1970s-early 80s and after assuming the Director's position of Michigan State University's Plant and Pest Diagnostic Clinic, I had to become a quick learner on innumerable issues, including herbicide toxicity (known in the plant world as "Phytotoxicity"). Broadleaf Herbicide damage on trees and shrubs was so common that I quickly became "expert" at diagnosing such damage on plants. These herbicides are considered "selective" because broadleaf plants (dandelion, plantain, trees, shrubs) are primarily affected while grasses (turf, corn, sugar cane, etc.) are generally not affected. To 2,4-D and/or Dicamba, a maple tree or an oak tree is simply an overgrown dandelion. As I have come to learn, many individuals in the public sector and, even occasionally, professionals in our industry, are not particularly adept at recognizing herbicide damage to trees. This past summer (2024), I had an interesting experience that exemplifies the apparent difficulty of recognizing Broadleaf Herbicide injury to trees.



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exorbitant. She asked me if it made sense for me to come out. I asked her if it made sense to accurately diagnose the problem before treating for some uncertain malady . . . further proposing what she would think if her doctor prescribed a medicine she might not need to treat an unknown problem he had not diagnosed. After a little sensible discussion, she decided to have me visit her after all.

BROADLEAF HERBICIDE SYMPTOMS

When I arrived at Rebecca's, I saw a very large landscape area encompassing several acres with some interesting features (Photos 1, 2A, & 2B). She again explained her concern that her ornamental pear trees were dying from some unknown "disease". When she finally took me to her trees, I saw pear trees with twisted, cupped, lethargic foliage (Photos 3A & 3B). Her curious neighbor joined us and explained he had a similar problem.



Photo 3A



Photo 3B

Photos 3A & 3B: Although Rebecca's pear trees did not appear "sick" from a distance (Photo 3A), I could see her concern as I approached the branches (Photo 3B). The foliage appeared droopy, cupped, and twisted with twisted petioles. Her neighbor's four pear trees appeared similarly.

I immediately recognized the telltale signs of Broadleaf Herbicide symptoms on their trees. In not only diagnosing the problem as Broadleaf Herbicide toxicity rather than a disease, insect or other incitant, I told them I could likely tell them the name of the specific herbicide: 2,4-D (2,4-Dichlorophenoxyacetic acid).

In my discussions with Rebecca and her neighbor, I started to wonder if they had used the "ester" form of 2,4-D rather than the "amine" form. 2,4-D is typically sold on the web or in stores as the ester or amine derivatives. The ester form is frequently used by farmers because it can volatilize and redistribute itself across their fields for better distribution. The amine form is used for areas such as lawns where we cannot tolerate volatilization and redistribution; applications of the amine form tend to "stay put". To better understand the ester formulation, think of perfumes. Perfumes are made from compounds that we call esters in chemistry. For example, perfumes tend to emit odors beyond the areas to which they are applied. When I

discussed the ester form vs. amine form, Rebecca showed me the container she had purchased at her local farm store. It was the amine form (Photo 4 Inset). But she proceeded to explain that she had applied the product to her lawn extra heavy to kill the clover (Photo 4). I then explained to her that 2,4-D does not control clover to any appreciable extent and that she would need another product.



Photo 4

Photo 4: The reason so many species of Rebecca's trees showed Broadleaf Herbicide damage symptoms is because she was trying to control clover in her lawn (note white clover in lawn) with heavy doses of Amine 2,4-D, (Inset), which does not control clover.

Other tree species showed symptoms of 2,4-D herbicide as well in Rebecca's landscape, probably due to the extra heavy herbicide application. The crabapples appeared especially debilitated because of scab (fungal disease defoliation) combined with herbicide damage (Photo 5). Other affected species included Oak



Photo 5

Photo 5: Crabapple trees appeared especially ratty because of the fungal disease scab (defoliation) and 2,4-D toxicity. Note the rolled, dark leaves, typical symptoms caused by the herbicide.

(Photos 6A & 6B), and Red Maple (Photo 7). 2,4-D and its other companion herbicides are called "growth regulator" herbicides, the reason growth distortions (cupping, leaf elongation, dark green color) are characteristic of these herbicides.



Photo 6A



Photo 6B

Photos 6A & 6B: Symptoms of 2,4-D on oak include distorted, elongate (strap-shaped) foliage (Photo 6A) and dark green downward cupped foliage (Photo 6B).



Photo 7

Photo 7: While most tree species in Rebecca's landscape showed symptoms of 2,4-D, such as these red maples, all trees will recover just fine, thank you.

First, by having me visit, Rebecca was able to save \$100s if not \$1000s by obtaining an accurate diagnosis rather than having her trees treated by a nationally known landscape company, which could apparently not distinguish among various tree maladies. Furthermore, it is probable that Rebecca and her neighbor will avoid future problems with 2,4-D and other Broadleaf Herbicides if they learn to apply these materials in a measured manner, according to label directions. 🌳

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THE GOOD NEWS

Broadleaf herbicides are employed for a variety of uses. When sprayed on woody broadleaf trees and shrubs, they can be effective in managing brush and trees in Right-of-Way areas such as power lines, drainage ditches, and railroads. That's good news! The other good news is that unless our valuable landscape trees and shrubs come in contact with significant doses of Broadleaf Herbicides (such as direct sprays), they will generally not be harmed severely or long-term. In Rebecca's situation, exposure was likely root uptake. However, spray drift may have also been possible, given her propensity to apply large doses of 2,4-D. Regardless, Rebecca's trees and those of her neighbor will all likely recover from the herbicide just fine.

EPILOGUE

Rebecca and her neighbor were extremely glad and relieved that I was able to come and help them with their tree problems.