

Yard and Garden – 10-01-2011- Ted Griess / Extension Horticulture Assistant

Autumn has officially arrived and with it much cooler weather. For the past few mornings, Rita and I have been taking turns lighting the fireplace to remove the chill in the house. Delighting in its warmth and while sipping our first cup of coffee for the day, we engage in conversation. One morning Rita commented, “I’ve been thinking about your column from two weeks ago. You advised your readers to apply 2, 4-D herbicide to control broadleaf weeds in their lawns. Why does 2, 4-D destroy broadleaf weeds and not harm the grass?”

My immediate response to her was, “2, 4-D is a selective herbicide. It only harms broadleaf plants.” Duh. it was obvious; she already knew that. I then said, “I’m not real sure, but I know it has something to do with the vascular tissue of dicotyledonous plants compared to that of monocotyledonous plants.” That answer drew a bewildered stare, which I instantly interpreted as her saying, “Sorry I asked.” Quickly, our conversation switched to something entirely different.

Stewing over her question I began to think you, too, may be asking the same question and, if so, a valid one indeed.

2, 4-D, (2, 4Dichlorophenoxyacetic acid) is possibly the most extensively researched herbicide in the world. It was originally introduced in 1946. Today this product is authorized for use by regulators charged with the protection of public health in about seventy countries including the United States. In the last twenty years, 2, 4-D has undergone a plethora of regulatory reviews worldwide, concluding that 2, 4-D does not present an unacceptable risk to human health or the environment when used properly. Even so, I cannot stress enough the importance of following label directions when using any herbicide products, including 2, 4-D.

Now, back to dicotyledonous plants versus monocotyledonous plants. I am sure you will agree both of these words are a mouthful. To avoid being perceived as a scientific egghead, which I can assure you, I am not, let us, from this point on, call them dicots and monocots.

Dicot plants produce seeds containing two cotyledons (seed leaves). Their veins are net-like in appearance, and they have a conductive tissue called the cambium. Dicots have their conductive tissues arranged in rings and contain a vascular cambium layer, a region of tissue responsible for the plant increasing in diameter and secondary growth. Examples of dicot weeds frequently found in lawns include dandelions, spurge, wild violets, and white clover.

On the other hand, monocots are that group of plants whose seeds contain one cotyledon, parallel-veined leaves with no vascular cambium. Monocots include grasses as well as key agriculture crops including corn, wheat, oats and rice. The key is in the arrangement of the conductive tissue. A monocot's conductive tissues are arranged in bundles scattered throughout their stems. Thus, they are incapable of little, if any, secondary growth.

2, 4-D is a growth-regulating chemical. When applied to the foliage of dicots, it is readily absorbed and travels directly to growing regions of the plant. Here, it induces uncontrollable growth, causing stem curl, withering leaves and ultimately the plant's death. Since monocots have their conductive tissues scattered throughout the stem, with fewer growing regions, if exposed to 2, 4-D, little inducement for unsustainable growth takes place.

Does this mean that if wheat or oats were sprayed with 2-4-D, no damage would occur? Not necessarily. During specific stages of growth, wheat as well as other monocots, if sprayed with 2, 4-D may realize some measurable damage. The wheat would probably live, but little, if any, grain would develop. The same rule applies if exposing new grass seedlings to 2, 4-D. It may not necessarily kill the young seedlings, but they would sustain some serious damage.

Perhaps one can now realize the question, "Why does 2, 4-D destroy broadleaf weeds but not the grass," is not that easy to answer. The underlying fact is, when broadleaf weeds are properly exposed to 2, 4-D, they die.

Now let's see, is it my turn to light the fire and make the coffee, Rita, or is it yours?