

The Mystery of the Freak Vegetables

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Just like the last two years, I continue to receive calls from clients who have experienced bizarre symptoms on their vegetables in what might be described as “freak show” vegetables. What seemed to be normally growing garden veggies had all of a sudden turned into pathetic looking oddities: tomatoes or potatoes with spindly, elongated, twisted stems and curling leaves, or hardened stems and growing points often looking as if the plants had “melted”. If severely affected, plants died. Clearly, something had gone awry. This problem was not just experienced by home gardeners, but even by veteran farmers, either growing commercial tomatoes or an entire suite of vegetables, or else planting a home garden of potatoes for their own enjoyment.

So, like our wonderful help-line folks do, I asked lots of questions and examined the freak plants up close in order to piece together some sort of cause and effect scenario. Some key questions dealt with the types of plants affected, how they were fertilized or the soil amended or mulched, and when the problems started to show themselves. If I had more time, I would take you through the whole process, sort of like a game, but because space is limited, I will let you in on the culprit: residues from pyridine-based herbicides.

These herbicides mimic the plant hormone, auxin, and include the active ingredients aminopyralid, picloram, and clopyralid. The pyridine herbicides are very effective when used in pastures, right of ways, corn crop fields, and turf areas for broad-leaf weeds including shrubs and other obnoxious, hard-to-control weeds like thistles, without harming any of the grasses. The reason they work so well is because they persist in the soil and are readily absorbed into susceptible broadleaf plants, making their control longer-lasting. But the benefit of persistence can pose a risk to sensitive crops and plants of unsuspecting farmers and homeowners alike.

Here are a few scenarios that demonstrate how unintended problems can happen. Scenario 1: Farmer John sprays his orchard grass pasture for nasty Canada thistle. His dairy cows graze on the pasture as supplemental feed. Because the herbicide readily passes through the cow’s system without being degraded, it ends up in the manure. Here is where the problem comes in. If Farmer John decides to use the fresh manure or compost it, the herbicide stays in the manure, EVEN if he cures the pile. The reason is that these chemicals do not break down readily when stacked or when composted. They are best degraded by applying them to a field growing a non-sensitive crop, where the sun and microbes can break them down. If he uses the manure or compost, or sells it to someone for use in their vegetable garden, the result can be the freak vegetables described above.

Scenario 2: Farmer Joe applies the herbicides to his hay field and soon thereafter cuts and bales the hay. He decides to store the bales under cover to protect them. A year or so later, he sells the hay to a homeowner as a straw-type mulch. The person spreads the hay all around his garden plants. It rains, the herbicide leaches into the soil and the roots take up the herbicide and, again, you get freak veggies. The problem in this case was that the farmer cut and baled the hay when the herbicide was still in the plant. The closer the cutting and baling is to the time of

application, the greater the risk of herbicide injury to non-target plants. If this had been a second or third cut, it would have been less problematic. The other problem is that the hay was stored, so the herbicide did not break down in any way. In this case, it would be best to apply the hay mulch to a grassy area since grass is not susceptible to injury.

Scenario 3: Jane horse owner feeds her horses the best quality hay she can find. What she doesn't realize is that the hay has been sprayed with the pyridine herbicides in order to provide her with that "perfect" weed-free hay. The horses eat the affected hay, it passes through them, and then the unsuspecting owner sells or gives away the bedding/manure to neighbors for use in their garden. Unfortunately, the freak veggies strike again!!

As a Master Gardener and home gardener, it is important to be aware of the potential for herbicide injury from the pyridine herbicides. What I do not want to do in sharing this information is present this in such a way that I imply that *any* herbicide use is bad, or that buying and using manure or compost is a bad idea! My point is not to debate pesticide use. When properly used, applied, and managed with understanding, these herbicides can be an effective tool. Certainly the use of organic matter is essential to build soil health, and mulching can conserve water. I want to emphasize that in each scenario, the injury was unintentional, but this brings out the key take-home messages I want to share.

First, education is crucial here and understanding the way the herbicide works, its persistence and carry-over, what causes it to break down, and what plants are and are not susceptible. Second, knowledge is power, so as a farmer and end-user of any products, it is important to ask the right kinds of questions: What was the compost made from? Did the manure come from cows that grazed on feed sources that might contain the herbicide? Was the mulch (hay) cut at a time when there might be more potential for higher residues? If the supplier cannot answer these questions, then you might want to find another source.

I have listed some very useful resources here if you would like further information. The NCSU publication describes a pot bioassay you can do to determine whether or not materials you have may be affected, especially if you purchased material and have found the freak vegetable phenomena happening. If this is the case, remember that there are end uses for affected materials such as applying to an all-grass area (lawn or pasture), corn, or small grain plot. Keep in mind that if that pasture is a grass-clover mix, the clovers will be injured. If the materials have already been used as amendments or mulch in a specific space, you will need to avoid planting any susceptible plants in that area until a sensitive bioassay demonstrates there is no residual activity of the herbicide. As always, consult the pesticide label to ascertain any precautions and restrictions.

Resources:

<http://pubs.ext.vt.edu/2909/2909-1413/2909-1413.pdf>

http://www.ces.ncsu.edu/fletcher/programs/ncorganic/special-pubs/herbicide_carryover.pdf