

Clipping Management and Herbicide Residue in Home Lawns

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There are many agronomic benefits to returning grass clippings to the turf canopy during mowing (often called mulching or grasscycling). However, this practice is too often not followed, for a variety of reasons. Rainy seasons can make mulching difficult. Landscape contractors may not be able to schedule mowing frequently enough to avoid clipping accumulation. Often times, it is simply the preference of the property owner to collect the clippings. In many states, it is discouraged or even illegal to send yard waste, including grass clippings, to landfills. Alternative means for disposal of these collected clippings must be used.

Two possible alternatives include using clippings as garden mulch or compost feed stock. Research conducted at Michigan State University during 1991-92 showed that clippings collected between 2 and 14 days after being sprayed with the herbicides 2,4-D, triclopyr, clopyralid, or isoxaben caused unacceptable injury to tomatoes, beans, and impatiens when applied as mulch around these plants (Branham and Lickfeldt, 1997). Composting these clippings was also examined to determine if the herbicides break down during the process. All of the herbicides except clopyralid degraded to non-detectable levels during 128 days or less of composting. Clopyralid was still detected after 365 days of composting (Vandervoort et al., 1997). Based on this research, labels of herbicides containing clopyralid state that turfgrass clippings treated with the herbicide should not be used as a garden mulch, and treated clippings should not be used to make compost during the season of herbicide application.

During the 1990's, composting has become an important method of waste recycling. In some communities, programs have been established that collect yard waste and deliver it to commercial composting facilities. In and around Spokane, Washington, in 2000, plant injury in several gardens was traced to clopyralid in compost produced at the local regional facility. Several factors contributed to this problem. The Spokane area has a relatively high concentration of residents who utilize commercial lawn care services, perhaps as much as twice the national average (Dow AgroSciences, 2001). Clopyralid is a popular herbicide in the area due to its effectiveness. Combined with a curbside clipping collection program, these factors contributed to a high concentration of treated grass clippings becoming compost feed stock. The persistence of clopyralid through the composting process resulted in herbicide-contaminated compost.

Another important contributing factor was herbicide and clipping custody. Label language prohibits the use of treated clippings in compost, yet this requirement was not followed. Commercial applicators who apply the material are usually not responsible for mowing the lawns. Residents may have been unaware that clopyralid was applied, and they were probably also unaware of the composting restriction. Whether they mow their own lawns, or have a contractor mow, the custody of the herbicide and clippings was lost in the process. Better notification and communication may have limited or prevented the contamination problem.

During 2001, research was conducted at the Washington State University – Puyallup turfgrass research facility to address the contaminated clipping problem. The objective was to determine if there were management practices that could be used to limit the amount of clopyralid entering the compost stream. Clopyralid was applied at the rate of 0.25 lb ae per acre in two different formulations. The first was a sprayable formulation, Lontrel, which is commercially available. The second was a granular formulation, which was developed for research purposes by embedding clopyralid on granules of 12-12-12 fertilizer. Sprayed plots received equivalent rates of fertilizer nutrients. There were two mowing regimes. In the first, the turf was mowed weekly and clippings were bagged and removed each time. At each mowing, a sample was collected from a known area, clippings were weighed, and a subsample was analyzed for clopyralid content. In the second, plots were mowed twice weekly with a mulching mower. Again at each mowing, samples were collected as above for analysis. A different plot was sampled each week so that all clippings were returned (mulched) up until the time a sample was collected. The formulation and mowing treatments were combined to result in four treatment combinations: sprayable collected, sprayable returned, granular collected, granular returned. Samples were collected at 0, 0.5, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10 weeks after treatment.

Regardless of formulation, the mowing treatment did not impact clopyralid concentration in clippings. Clopyralid concentrations in samples collected approximately six hours after application were much higher for the sprayable formulation (55,000 ppb average) than the granular formulation (15,000 ppb average). By one week after treatment, the concentrations were essentially no different (approximately 15,000 ppb average). By four and ten weeks after application, clopyralid concentrations in clippings were 7% and 0.4% of their initial concentrations, respectively, averaged for all treatments. Although the concentrations had dropped drastically, they still averaged 150 ppb in clippings at ten weeks after application. Concentrations of this level in compost would be high enough to cause injury to many plants. What is not known at this time is what the final clopyralid concentration in compost would be based on an initial concentration of 150 ppb. A companion study measured clopyralid degradation during composting in bench top composting vessels. Data collection is still ongoing.

This research substantiated the information already on herbicide labels: do not allow clopyralid-treated grass clippings to be used as compost feed stock. Using a mulching mower to return clippings to the canopy is the best way to manage these clippings. In Washington, we are currently recommending that gardeners ask their compost supplier about clopyralid contamination. (Many compost manufacturers are monitoring their feed stocks and products). Contaminated compost should not be used in vegetable gardens, but it is probably safe to use it as a soil amendment for lawn or landscape areas, as most of the plants in these areas are not sensitive (although there may be exceptions). As has always been the case, compost should not be used as a sole growing medium, but should be mixed with soil at rates of up to 20% compost by volume. Microorganisms present in soil can break down clopyralid.

For additional information on clopyralid in compost, see the following WSU web pages: www.puyallup.wsu.edu/soilmgmt/Clopyralid.htm and www.css.wsu.edu/compost/compost.htm.

References:

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