

Herbicide Options in the Landscape

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Herbicides are one of the tools available in a weed control program. In a landscape situation, other components, such as nutrition, cultivation, crop competition, mulching, and water management may have limited suitability. Additionally, the close proximity of the public in landscaped areas has direct impact upon our weed control strategies. Herbicides can help reduce equipment and hand labor requirements, result in more efficient use of water and nutrients, reduce potential fire hazards, and increase visibility along rights-of-way. As with any effective pest management system, herbicides should be used according to the label, with application techniques which are appropriate for the situation.

According to a recent survey from *Lawn & Landscape Magazine*, the most prevalent landscape problems in 1997 were turf weed pests, followed by turf insects, tree and ornamental insects, turf diseases, and tree and ornamental diseases. Turf weed pests represented 34% of total problems, with dandelion, clover, and crabgrass as the most commonly reported weeds. The same survey indicated that product effectiveness is the most important factor influencing pesticide purchasing decisions. Cost, product safety, location, and toxicity were also important factors.

Because of the diverse nature of landscape areas, the potential for off-target damage is relatively high. Proper application techniques should be practiced, including calibration and drift avoidance. Spray droplet size is the most important factor affecting physical drift, and the factor that can most easily be controlled. As droplet size decreases, and spray nozzle height and wind speed increase, there is greater potential for physical drift. A 20 micron droplet takes 4 minutes to fall from a height of 10 feet; in a 1 mph wind, that droplet would travel a distance greater than a football field. By comparison, a 240 micron droplet takes 5 seconds to fall from a height of 10 feet, and would travel 6 feet in a 1 mph wind. Herbicides perform satisfactorily with spray droplets in the 200 micron or larger size range, while at the same time reducing the potential for off-target damage.

Commonly used preemergent herbicides effectively control a broad range of germinating weeds, while providing a high degree of safety to turf and ornamentals.

- Oxadiazon (Ronstar) is a shoot-absorbed, broad-spectrum residual. It has low solubility, forms a barrier near the soil surface, and has no apparent effect on rooting.
- Oryzalin (Surflan), pendimethalin (Pendulum), and prodiamine (Barricade) are dinitroaniline chemistry. They inhibit cell division at shoot and root tips, have generally low solubility, and may inhibit shallow roots. This chemistry generally controls annual grasses and shallow-germinating broadleaf weeds.

- Isoxaben (Gallery) is a long-residual preemergent, with low solubility, which selectively controls broadleaf weeds. Snapshot is a premix of Gallery and Treflan (another dinitroaniline) for broad-spectrum residual control.

All landscape preemergent herbicides require irrigation or rainfall to incorporate and activate.

Knowing the mode-of-action and soil-active characteristics is important in selecting the proper herbicide. A perennial or deep-germinating annual weed may never come in contact with a preemergent herbicide near the soil surface, resulting in a perceived failure of the herbicide. Mode-of-action can determine what type of phytotoxicity symptoms to expect from off-target application. Solubility, soil adsorption, and half-life characteristics will have an effect on the movement of herbicides through the soil.

Selective postemergent herbicides include clethodim (Envoy), and fluazifop (Fusilade II), for grass control. These products control annual and perennial grasses, generally without harming broadleaf plants. They do not control sedges, since sedges are not grasses. Sedges can be controlled with Manage. Triclopyr (Turflon), clopyralid, 2,4-D, and dicamba selectively control broadleaf plants, without harming grasses, with a few exceptions.

Non-selective postemergent herbicides include systemic materials, such as glyphosate (Roundup), and glufosinate-ammonium (Finale), and contact materials, such as diquat (Reward) and pelargonic acid (Scythe). Systemic postemergent herbicides generally require 1-3 weeks for complete control, depending on weed species, and environmental conditions. Contact materials give rapid burndown, and are most effective on annual weeds. For effective control, weeds must be actively growing, and perennials may require retreatment.

Aquatic sites in the landscape present a different set of challenges. There are limited products with aquatic registration. Glyphosate (Rodeo) is a systemic, postemergent herbicide, for emergent weeds only. Diquat, (Reward), is a fast-acting contact, for submersed and emergent weeds. Copper complexes control algae and some submersed weeds. Fluridone (Sonar) is a slow-acting systemic for control of primarily submersed weeds. Environmental concerns with aquatic weed control include:

- Acute and long-term toxicity to fish, birds, and invertebrates.
- Oxygen depletion during algal bloom or weed degradation.
- Potential use of treated water.
- Potential damage to surrounding desirable plants.
- Proper identification of aquatic weeds.

Herbicides are one component in an integrated approach to weed control in the landscape. Knowing the mode-of-action and environmental characteristics is critical in selecting herbicides for a particular situation. Proper use of herbicides can result in cost-effective weed control, resulting in a healthy and attractive landscape, with high aesthetic value.