

## **Weed Control in the Landscape: Choosing the Right Herbicide**

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Herbicides are very effective tools for controlling weeds while reducing costs associated with physical weed removal. Herbicide selection depends on the weeds you are trying to control, the stage of the planting, the plant material in the planting and the stage of the weed growth. Other factors influencing herbicide selection include timing of the herbicide application, classification and persistence in the soil, the chemical mode-of-action, soil type, temperature, soil pH, organic matter content, available soil moisture, whether the weeds or crop plants are under stress, spray pattern, equipment calibration, chemical retention on leaf or soil surface, uptake in the weed, and spray water quality. Some of these factors will be discussed below.

### **Weed Identification**

Identification of the weeds in your nursery is extremely important. Certain families of weeds respond to certain herbicides and not others. An example is the Mustard family. Treflan does not control Mustards. Failure to recognize shepherd's purse as a member of the Mustard family and use of Treflan for control would be a waste of time, money and chemical (Mathers and Leidenfrost 1995). Another example is with the Pink family. Many Pink family members are resistant to Ronstar. Members of the Pink family are annuals, biennials or perennials. Members of the Pink family include Corn spurry (*Spergula arvenis*), Chickweeds and Stitchworts (*Stellaria sp.* and *Cerastium sp.*), Bladder campion (*Silene vulgaris*), Pearlwort (*Sagina procumbens*) and Bouncingbet (*Saponaria officinalis*). Most preemergents work on members of the Pink family, including Simazine, Diuron, Casoron, Surflan, and Kerb; however, use of Ronstar would lead to lack of control. An example of a weed that has become resistant to certain herbicides is common groundsel (*Senecio vulgaris*), a prevalent weed and serious competitor in nurseries and landscapes. Strains of atrazine-resistant and glyphosate-resistant groundsel have emerged and are becoming an increasing concern. Other weeds with herbicide resistance are kochia, Russian thistle, prickly lettuce, wild oat, Italian ryegrass, Powell amaranth and yellow starthistle.

### **Herbicide Timing**

Herbicides are applied either to the foliage of growing weeds (postemergence) or to the soil to prevent germination (preemergence). Postemergent foliar herbicides are either contact or systemic chemicals. Contact herbicides weaken and disorganize the plant cell membranes causing leakage and eventual

localized death. Contact herbicides are generally most effective against annuals. Complete coverage is essential in weed control with contact herbicides. An example of a contact herbicide is Gramoxone. Systemic herbicides include the phenoxy herbicides (ex. 2,4-D) and dicamba, plicoram, amitrole and glyphosate. Systemic herbicides are translocated throughout the plant to their sites of physiological action. Translocated herbicides are effective against all types of weeds; however, they have their greatest advantage when used to control established perennials. Complete coverage is not required with translocated materials; however, uniform applications are critical. Postemergents are generally best when applied to young plants and make take several days to work. The older formulations of Round up, for example, would take 10 to 14 days to show activity. The newer Round up Ultra formulation works much faster. Postemergent contact with active growth of the ornamental plant, including green bark, will result in injury. So contact with the ornamental plant or conditions that could promote contact, such as high winds, should be avoided. Poor results can occur with postemergent applications if the weed is under stress at the time of application, if rainfall occurs within 6 hours or if heavy rainfall occurs within two hours.

Preemergent herbicides (e.g. Casoron, Surflan, Ronstar) are applied either to the soil or growing medium surface and are usually absorbed by root systems, or by emerging shoot tips as they make their way through the soil surface during seed germination. Most must be dissolved in the soil/medium to work. Generally one-half inch of irrigation or rainfall after application of a preemergent is required to activate. Soil type (sand, gravelly soils, clay), organic matter content and temperature are all important in determining the effect and activity of a preemergent application. Because they are preemergents, they must be applied to weed free surfaces. Generally, nurseries make two applications of preemergents per year, fall and spring.

### **Stage of Planting**

A chemical weed control program for a commercial field stock nursery may include four parts (Mathers and Leidenfrost 1995). The four parts may not be required in all situations or advantageous in all types of ornamental operations. The first component is a preplant application of a postemergent such as Glyphosate. Preplant, postemergents are applied to the top growth of weeds prior to working the soil and planting the nursery stock. Second is an application of preplant soil fumigant and the third, a preplant application of a preemergent. There are few preplant, preemergents registered for use in ornamental nurseries. One that is, however, is Treflan. Treflan applications can be made and incorporated from three weeks before planting to the time of planting. Treflan controls broadleaf and grass seedlings just after germination. Do not apply to wet soils or soils high in organic matter. The fourth part of the chemical control program will consist of postplant application(s) with selective herbicides. Applications of selective herbicides used either for post or preemergence weed

control can be applied over or between established ornamental crops, depending upon what the label reads (Mathers and Leidenfrost 1995).

## **Temperature**

Postemergent herbicides generally perform best at warmer air temperatures. The major effect of temperature is on rate of uptake of the herbicide. High temperatures favor rapid uptake and generally favorable weed control can be obtained if the temperature is high at the time of application. Not only does temperature affect herbicide uptake but also temperature can have a pronounced effect on dissipation or losses of herbicide from soils through volatilization and degradation (Fritz and Smith, 1975). Treflan for example, evaporates readily and vaporizes rapidly at high temperatures. The volatilization losses of Trefaln can be reduced by cultural practices such as physical incorporation into the soil. Generally the quicker a volatile herbicide is incorporated into the soil after application the better. The volatility of herbicides also influences their extent of application in established nursery stock. Casoron as an example, is so volatile at soil temperatures above 50°F, its use is limited to late fall, winter and early spring applications.

## **Summary**

Once you have selected the herbicide that will work best for you, be sure your spray equipment is properly calibrated to deliver the right amount of herbicide. Recent surveys have indicated that 63% of growers erred in 10% or more of herbicide applications (Cranston 1995). Over application can result in crop damage and waste of money. Under applying can cause poor weed control and again waste money. These 63% obviously did not calibrate their spray equipment properly. The majority of herbicide problems are a result of inaccurate application. Equipment calibration is essential to implementing your weed control program properly. Soil preparation is also very important. Most preemergents require well-worked soil, moist and smooth, free of clods and trash, to obtain uniform chemical distribution. Last, timing is key. Early diagnosis of your weed problems and early treatment cannot be over emphasized. You don't want to get behind in weed management (Neal 1999). Remember Oscar Wilde's instruction that experience is the greatest teacher. If our experiences have taught us nothing else, in ornamental weed control, it is to avoid the problems of dealing with weeds that are beyond the point of successful control.

## **References**

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