Weed Control in Ornamentals

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Weeds are commonly found in any ornamental site. These plants may not be a problem (weeds) since they may not be competitive or aesthetically displeasing. These small plants may be low-growing and scattered, and thus may not be considered weeds. On the other hand the plants may be large, are competing with the desired plants for nutrients and water, and are obviously a bad site, thus are weeds. Weeds can be a problem in all sites where ornamentals are grown, either as a landscape location or as a growing crop.

There are many locations where ornamentals are grown in California, namely urban or commercial landscapes, public buildings and infrastructure, parks and recreation sites, and production sites. Production of ornamentals can further be divided into container and field woody ornamentals, greenhouse-grown flowers, and field-grown flowers and bulbs. Often there are specific weed species associated with the different growing sites. In landscape sites weed are often the same species found at the location, whereas in container-grown nurseries, weeds are commonly found associated with the nursery culture; specifically, common groundsel, creeping wood sorrel, bittercress, spurge and willow herb.

There have been some major changes that have occurred in the ornamental industries over the late few years. These include the increase in use of synthetic (geotextile) and naturally produced mulches in the landscape, reduced dependence on preemergence herbicides in landscape and nursery production areas, “as needed” applications of post emergence herbicides, and the 2005 phase-out of methyl bromide as a preplant fumigant with the need for alternatives for hundreds of crops.

Mulches have many uses in the landscape. When a wood-derived mulch is used without a synthetic fabric underneath, often annual grasses and bermudagrass or other perennial weeds become more prevalent. The use of a synthetic fabric will reduce the number of yellow nutsedge compared to a preemergence herbicide or mulch alone. Though black plastic (polyethylene) is effective for weed control, it is not water and air permeable. The newer polypropylene fabrics are sometimes slightly less effective for weed control than black plastic but they remain effective for a longer period of time than black plastic and allow water and air to penetrate to the soil. All of these synthetic mulches would have a wood-derived mulch of the top of them to make them more aesthetically pleasing. In container grown ornamentals, yard waste, almond shells and pecan shells have given control of most of the common weeds found in this industry, though they may not be as effective as herbicides for the broad spectrum of weeds. Also, weeds may germinate and establish in the mulch from seeds coming in from outside the container.

Preemergence herbicides can be used with wood-derived mulches. These herbicides are deactivated by adsorption onto organic matter and clay. The colloidal size of clay and organic matter is 0.000001 to 0.001 mm diameter. If a 1 cm cube of the smallest diameter particle were evaluated for surface diameter to absorb herbicides, it would be equivalent to 6000 m² or about ½ acre. Thus when compared to 1 ½ to 2 inches of chip mulch present, there would be more
contribution from obstruction from the mulch for the herbicide to reach the soil than adsorption and herbicide loss. In two studies, Kuhn’s in Pennsylvania and Elmore in California, found that oryzalin was slightly more effective for weed control when used before compared to after a chip mulch was applied, whereas oxadiazon was effective if use before mulch application but weed control was reduced when the herbicide was applied after the mulch application. The obstruction was greater from the mulch on the oxadiazon. This result is due to the mode of action of this herbicide, which requires a critical continuous layer of herbicide to be present to be effective.

There are many preemergence herbicides available for use in container grown ornamentals. The most frequently used herbicides are isoxaben, oryzalin, oxadiazon, pendimethalin or prodiamine used alone or a combination of oxyfluorfen plus oryzalin or oxyfluorfen and pendimethalin. All of these herbicides need to be matched with the weed species present and the species and plant age of the ornamental plant material being grown.

Field-grown flowers are a very diverse group of ornamentals. They are being grown for the cut flower, fresh or dry foliage, fruits and bulbs. The plants may be annual or perennial, direct seeded, transplanted or planted from bulbs, or young propagative materials (cormels, rhizome, tubers, etc). Preemergence herbicides are not available, nor will they be for each species, thus there is need for a preplant treatment that could be used for many species. There are herbicides available that can be used on some species including Gypsophila, Limonium, Dutch iris, Narcissus, gladioli and many woody species. Most of the other species require clean seedbeds, cultivation and hand weeding as the major methods of keeping weeds in check.

Yard waste has been evaluated as a weed control method compared to several herbicides in Dutch iris. Results indicate that weed control is possible, sometimes with a slight delay in flower maturity, but at other times with no effect. Herbicides that were safe in Dutch iris trials included: diuron, linuron, isoxaben (removed from the label), dimethenamid (not registered in California), DCPA, quinclorac (not registered in California) and thiazopyr (not registered for ornamentals in California). In China aster and snapdragon, as transplants however, though yard waste has controlled weeds, there has been some killing of snapdragon when the mulch contacts the base of the transplants.

Many herbicides have been evaluated for weed control and plant tolerance in several field-grown flower crops (Table 1). In Clarkia spp. (Godetia) isoxaben was selective on transplants, however many herbicides reduced early vigor though flower yield was not reduced. Other herbicides killed the transplants. Similar results have been shown with the crop Delphinium spp. transplants. Low rates of pendimethalin or isoxaben gave some weed control but were only moderately safe on the plants. Other herbicides killed the plants. Snapdragon was sensitive to all the preemergence herbicides evaluated (Table 1). No new herbicides were found to be safe on Limonium sinuatum or L. tartaricum other than the herbicides currently available.

The post emergence herbicides clethodim, fluazifop and sethoxydim were found to be safe on all broadleaf ornamentals tested when they were in the vegetative stage as transplants. Grasses including annual bluegrass were controlled with clethodim but not with others. Clopyralid was evaluated for broadleaf control of aster and legume family weeds. Clopyralid was phytotoxic to China aster and snapdragon transplants but L. sinuatum was partially tolerant.
New, potential preplant fumigants evaluated to replace methyl bromide included iodomethane and propargyl bromide. Both of these fumigants are broad-spectrum pesticides and have been effective for the control of annual weeds and residual bulbs of calla lily and gladioli. Registered fumigants 1,3 dichloropropene (1,3-D) and chloropicrin were also evaluated in combination with metam sodium for broad-spectrum pest control. At the rates and methods of applications of 1,3-D and chloropicrin there is little weed control achieved. Metam sodium will be needed to obtain weed control. Chloropicrin has been shown to give effective weed control at 300 pounds per acre if applied into the bed top using drip irrigation. Additional research will be conducted to evaluate more fumigants and other preplant treatments for flower crops. Although other products such as composted chicken manure, blood meal and corn gluten meal have been combined with solarization; additional weed control was not apparent over solarization alone.

Weed control can be achieved in landscape plantings and most container-grown ornamentals. However, in field and greenhouse flowers a preplant treatment for a broad spectrum of pests will be difficult to develop for the market place. It probably will be even more difficult to maintain these products for the growers.