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## Weed Management in the Greenhouse

*Insect and disease management in the greenhouse is often made more challenging when weeds are a problem under greenhouse benches. Weeds can serve as reservoir for INSV and will provide the perfect habitat for thrips and other pests.*

Each year brings with it new challenges and opportunities for the greenhouse industry and the growers that are tasked with overseeing the various production facilities across the world. Weeds growing underneath greenhouse benches may not be the focal point for some growers, but as hosts for pests and a reservoir for diseases they deserve as much attention as the pests and diseases that they may harbor.

Weed management is best accomplished in the greenhouse through the use of ground cloth under the benches. While there may be a temptation to cover the ground cloth with stone, this practice makes it impossible to remove potting media that has fallen to the ground from spilled containers. Accumulation of media in the gravel provides the perfect environment for weed seed germination and growth. If ground cloth is utilized under benches, spilled media can be easily swept-up thus eliminating the substrate needed for weed establishment.

If ground cloth has not been utilized and weeds are well established under greenhouse benches a grower may be forced to consider the judicious application of an appropriately labeled herbicide in the greenhouse structure. While there are hundreds of herbicides on the marketplace for outdoor environments, there are very few products that are labeled for use in protected culture (greenhouses and high tunnels).

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Growers that are tempted to go-off label and utilize herbicides that are not cleared for greenhouse use may see non-target injury to the plants growing in the greenhouse this season and in extreme cases, the next several seasons by virtue of their persistence and volatility in the greenhouse environment.

If ground cloth has not been utilized and weeds are well established under greenhouse benches a grower may be forced to consider the judicious application of an appropriately labeled herbicide in the greenhouse structure. While there are hundreds of herbicides on the marketplace for outdoor environments, there are very few products that are labeled for use in protected culture (greenhouses and high tunnels). Growers that are tempted to go-off label and utilize herbicides that are not cleared for greenhouse use may see non-target injury to the plants growing in the greenhouse this season and in extreme cases, the next several seasons.

Several years ago, I received a call from a young grower who was noticing widespread injury to their poinsettia crop in their greenhouse range in mid-August. Perplexed by the severity of the damage the grower reached out to their local Extension educator for assistance. After a quick walk-through the greenhouse range by the educator and an interview with the grower it was determined that the grower had selected and applied a total vegetation killer containing the active ingredient prometon (same active ingredient found in the product, Pramitol) to the weeds under the benches in the greenhouse.



Ground cloth laid across the greenhouse floor can serve as a barrier to prevent troublesome weeds. (Photo by Tom Ford)



Poinsettia baskets hanging 6' off the ground were injured by the vapor from the herbicide application (prometon) to the gravel floor in the greenhouse. (Photo by Tom Ford)



When the grower first observed chlorotic foliage they thought that they were seeing a nutritional problem. As they watched the progression of the symptoms they began to suspect herbicide injury. (Photo by Tom Ford)



Poinsettia depicting injury from prometon after a total vegetation killer was applied under greenhouse benches to control weeds. Photo by Tom Ford)



Glyphosate injury on greenhouse tomato from spray drift. Weeds were spot sprayed in the greenhouse with all fans and vents off/closed. (Photo by Tom Ford)

In my discussion with the grower it was apparent that the grower did not read the pesticide label and that they had failed to realize that the principal ingredient in the product, prometon is 1) very mobile, 2) volatile, and 3) very persistent.

In this specific case, the grower treated the gravel covered areas in the greenhouse, waited a period of time, and then moved the newly potted poinsettia crop into the greenhouse. Applications of water to the poinsettia crop re-wet the greenhouse floor which created the perfect environment for the volatilization of the prometon herbicide. This inexperienced grower who was unfamiliar with herbicide modes of action and/or herbicide injury symptoms mistook the yellowing and interveinal chlorosis symptoms in the poinsettias and initially attributed the observed symptoms to a nutrient and/or pH issue. If the grower had acted on their instincts to increase fertilizer rates or tweak the media pH they may have exacerbated the injury while wasting financial and human resources on a crop that essentially needed to be discarded.

There are two herbicides labeled for pre-emergence activity in commercial greenhouses. The first labeled product, BareSpot Monobor Chlorate (sodium chlorate and sodium metaborate) can be applied in the greenhouse with the crop present. BareSpot Monobor Chlorate has both pre-emergent and post emergent activity on small emerged weeds. BareSpot Monobor Chlorate is considered a non-selective residual herbicide that should be watered in after application.

The second herbicide, Marengo (indaziflam) **cannot** be used in the greenhouse with crops present so it is best applied between cropping cycles when the greenhouse is empty. Marengo has a long residual and should be irrigated in lightly (0.125 to 0.25 inches) after application to ensure activation.

In respect to post-emergent applications of herbicides in the greenhouse to growing and/or established weeds a grower can consider systemic products like Roundup Pro (glyphosate), Touchdown (glyphosate), or Finale (glufosinate). Products containing the active ingredient, glyphosate should never be applied in the greenhouse when greenhouse crops are present. Countless numbers of growers have caused non-target injury to plant materials when glyphosate containing products have been applied in greenhouses where plants have been present.

The herbicide Finale (glufosinate) is a systemic, non-selective herbicide. Finale cannot be used in greenhouses/high tunnels for weed control if edible crops are present. In ornamental greenhouses, Finale (glufosinate) is best applied using low pressure with a coarse spray or large droplet nozzle. In order to prevent non-target injury in the greenhouse growers should shut-off all fans and consider closing vents and/or rolling up the sides to minimize spray drift in the greenhouse.

Contact herbicides like Reward and Scythe are effective on small annual weeds and will only burn-down larger emerged weeds or perennials. Reward (diquat) is relatively inexpensive and has a 24-hour REI with a relatively high mammalian toxicity level.

Scythe (pelargonic acid) acts as a membrane disruptor and is less effective on larger seedlings. Scythe with its lower mammalian toxicity is more expensive than Reward and has only a 12-hour REI. It typically works very quickly (within 2-3 hours) in the warm greenhouse environment.

Scythe unfortunately also possesses a rather unpleasant odor that can linger in greenhouse structures after application. Since the odor can be offensive to some people, aggressive venting and air circulation may be necessary (post-treatment) to improve the air quality for customers and employees.

If you have any questions regarding this article please contact the author at [tgf2@psu.edu](mailto:tgf2@psu.edu).

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