

## CONTROLLING WEEDS IN OR NEAR THE GREENHOUSE

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*Dr. Ahrens has conducted many herbicide trials in the greenhouse over the years. The last issue (#120) summarized the control aspects of herbicide use in the greenhouse as interpreted by Mr. Maisano. The following article presents details of Dr. Ahrens' research.*

Numerous experiments have been conducted at the Valley Laboratory over the past 10 years to evaluate the usefulness and potential hazards of herbicides in and around greenhouses. In addition, many grower problems involving herbicides in greenhouses have been investigated. The following is a brief summary of our findings.

To use herbicides effectively in or around greenhouses, it is essential to understand their potential hazards. These hazards include:

- A. Production of vapors toxic to plants.
- B. Contamination of ground water wells.
- C. Injury to plants in flats or pots from root uptake.
- D. Mistaking herbicides for other pesticides.
- E. Use of field soils that contain residues for potting mixes.
- F. Misuse of herbicides by gross overapplication or by sabotage or vandalism.

A. To be safely used under benches or under flats or pots in greenhouses, a herbicide should not produce phytotoxic vapors. Herbicides that we or others have found to produce phytotoxic vapors include:

2,4-D	Spike	- tebuthiuron
Casoron	Treflan	- trifluralin
Diclomec dichlobenil	Goal	- oxyfluorfen
Worosac	Pramitol	- prometon
Tordon - picloram	Vapam	- metham
Lasso - alachlor	Dowfume	- methyl bromide
Dual - metolachlor	Pentachlorophenol	- PCP
Aatrex - atrazine		
Scott's Ornamental Herbicide II	- oxyfluorfen+pendimethalin	

Other herbicides in our tests that produced vapors that were mildly toxic to plants included:

Chloro IPC	} chlorpropham	Konstar	} oxadiazon
Furloe		Scott's Ornamental Herbicide I	
Devrinol - napropamide			

All of these would be hazardous to use in greenhouses with live plants other than those listed on the labels.

B. Contamination of ground water can occur from soluble herbicides applied too heavily or dumped in the vicinity of wells. Two herbicides that have contaminated wells supplying greenhouses are Tordon (picloram) and Banvel (dicamba). Both are highly toxic to annual plants, highly water soluble and neither has any place in or near greenhouses. Water from ponds or streams where Tordon is used on the watershed is best not used to irrigate plants without testing.

C. Application of many residual herbicides in ground beds is hazardous to flats or pots of plants placed on the treated areas. Problems occur as roots grow into treated soil and absorb the herbicide or as ponding occurs and the herbicides dissolve in the water and penetrate the containers. Safe herbicides for pretreatment of ground beds include Diquat, Paraquat and Roundup for preplant control of established weeds, and Surflan at 2 to 3 teaspoons per 100 ft<sup>2</sup> for preemergence control under flats or containers. Surflan inhibits roots but does not translocate in the plant. Tilling soil treated with Diquat, Roundup or Paraquat before plants are planted in the soil reduces danger of root uptake.

A current experiment indicates that at least one week should elapse after Roundup application and placement of flats or pots with exposed roots. However, Roundup sprays on soilless potting mixes such as peat, perlite and sand may seriously injure herbaceous plants for several weeks after application. Roundup is not rapidly detoxified in such mixes as it is in soil. Spraying of weeds growing on stored piles of soilless potting mixes is therefore dangerous.

D. Mistaking herbicides for other pesticides can be minimized by storing herbicides apart from other pesticides and by reserving a separate sprayer for herbicides.

E. Contaminated field soil. If field soil is obtained for greenhouse use, it could be contaminated with herbicide residues such as atrazine or simazine that are used on corn fields. If the cropping history of the soil is unknown, it can be bioassayed, using seeded and transplanted annuals as test plants. Oat is a good test plant for simazine or atrazine. For a control planting, one can thoroughly mix 3 tablespoons of activated carbon (such as Gro-Safe) into a flat of the same soil. The carbon detoxifies most field residues of herbicides. If growth is much better in the carbon-treated flat than in the untreated one, herbicide contamination is suspected.

F. Misuse of herbicides by gross over-application or by sabotage can occur with any herbicide. Sabotage has occurred with disgruntled (or fired) employees, where herbicides were readily available. Diagnosing the problem is often difficult. Herbicides are best stored under lock and key and out of the greenhouse area.

In the case of the soil fumigants (Vapam, methyl bromide), sufficient time and warmth of soil is necessary before planting to allow the vapors to dissipate. Cold soils in the late fall or early spring greatly delay dissipation. Plants placed in treated houses or soil under these conditions are killed. Using 2,4-D herbicides around greenhouses is hazardous because of potential drift of vapors and spray droplets into the houses.

Herbicides that we have found to cause no injury to plants in tests in plastic enclosures included:

Asulox	- asulam	Princep	- simazine
Dacthal	- DCPA	Roundup	- glyphosate
Diquat	- diquat	Surflan	- oryzalin
Paraquat	- paraquat	Tenoran	- chloroxuron
Gramoxone	- paraquat	Karmex	- diuron

It is possible even these could be hazardous if sprayed onto heating pipes, which would greatly increase vaporization. Many other herbicides have not been evaluated for indoor use and should be considered hazardous until proven otherwise.

If a greenhouse is contaminated with a herbicide producing phytotoxic vapors, it may be possible to decontaminate it with activated carbon (Gro-Safe or Aqua Nuchar). Our earlier research showed that 100 to 200 lbs of activated carbon will detoxify 1 lb of most organic herbicides. Thus, if a herbicide were applied at 4 lbs/A,

up to 800 lb/A of activated carbon would be required. The carbon can be mixed with water and sprayed on. Sometimes it is necessary to incorporate the carbon into the soil.

Effective treatments to control established weeds and prevent regrowth under benches include:

<u>Herbicide</u>	<u>Per Gal of Water</u>
Princep 80W plus Diquat*	3 tablespoons plus 2 tablespoons

An alternative treatment:

<u>Herbicide</u>	<u>Per Gal of Water</u>
Surflan 75W plus Diquat*	2-3 tablespoons plus 2 tablespoons

Apply about 1 qt of mix per 100 sq. ft.  
Avoid spraying of heat pipes.

\* Roundup at 2 tablespoons may be substituted for Diquat.

### OUR APOLOGIES

This issue is late - it should have been labelled "May." Instead, it is "June, #121".

We hope that it will be possible to bring the Newsletter back into schedule so please remember that your subscription is not truly on a yearly basis. Each "year" will consist of six issues no matter how long the year is.