

# Pesticide Applicator Report



A Publication of the Vermont Agency of Agriculture, Food & Markets  
For Vermont's Pesticide Applicators

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## News from the Vermont Agency of Agriculture, Food & Markets

### *Prevent Birds from Pulling Your Corn Seedlings*

Vermont corn growers have a new product available this spring to prevent birds from pulling up corn seed and seedlings. Avipel bird repellent has been approved for use in Vermont for this planting season and has a proven record in other states. The Vermont Agency of Agriculture issued a FIFRA Section 18 label to allow use in Vermont effective April 26, 2010. The product is available through agrichemical suppliers in Vermont.

Avipel is a planting time hopper box treatment for field corn and sweet corn. The active ingredient, 9-10-Anthraquinone (Avipel), acts as a taste deterrent that is naturally found in many plants. Studies show this product is safe for humans, wildlife, the birds and the environment. One packet treats 1 unit of corn seed, 1 case covers 125 acres. This product seems well-suited to those farmers that have experienced extensive bird pulling damage where fields would require re-planting, causing high economic losses.

If you decide that you will use or are using Avipel this spring, we'd like to track the results on your farm so we can document reduced bird damage and use the data to get EPA approval for continued use in Vermont.

For more information contact Cary Giguere, Agrichemical Management Section Chief, Vermont Agency of Agriculture – Agricultural Resource Management Division 802-828-6531 [cary.giguere@state.vt.us](mailto:cary.giguere@state.vt.us) or Jeff Carter, UVM Extension Field Crop Specialist, Middlebury, VT 802-388-4969 [jeff.carter@uvm.edu](mailto:jeff.carter@uvm.edu)

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Questions or comments regarding this newsletter? Please contact **Matthew Wood** at the Vermont Agency of Agriculture at 802-828-3482 or [matthew.wood@state.vt.us](mailto:matthew.wood@state.vt.us)

## **Pesticide Program Presents Provocative PC Presence**

The pesticide program here at the Agency of Agriculture is employing a new database system that will allow management of applicators, certificates and recertification credits more efficiently, and in the future will allow all applicators to check their own status easily online. In the past we have had commercial applicator information available for the general public to view online, since this is public information and people may want to check on the certification of a company or individual that they hire. With this new system all applicators will be able to login in to view their own list of meetings attended for credit, check their status to see if they are currently certified, and to find out when their certification category credits are due.

The address of this new site is  
<https://usaplants.vermont.gov>

Note there is no "www" in it. That is so 1990s anyway! Also note there is an "s" after the "http," which means it is a secure connection. That's how much we care!

*\*When you get to this home page you should bookmark it right away so you can always find it easily.*

The first menu item is "VT Plants Homepage." This is the link that will always bring you back to this beginning page from the other pages in the system. The second item down is "Vermont Agency of Agriculture," which will take you away from this pesticide program website and to the main agency homepage. The third and most important menu item is "Pesticide Program," and when you mouse over this one you will get 3 more choices to the right.

### **The Recertification Course Locator**

The first choice that pops up is the "Recertification Course Locator." This is where you can find information on anything that has been approved for recertification credit, whether it is a meeting planned for the future, or it already took place and you missed it. The date range defaults to the next three months starting from the current date, but you may change this to any date range you please.

At the top you can choose from one of three credit source types; choose "Onsite" for a listing of meetings that you can physically attend at a meeting place, choose the "Online" button for a listing of online trainings that are approved, and choose the "Correspondence" button for a complete listing of my newsletter quizzes that are worth credit. Note that you can only view a list of one of these meeting types at a time, so if you are looking at a list of "Onsite" meetings, you will not see any of the newsletter quizzes listed.

You may also narrow your search further by filling in the boxes from the pull-down menu and selecting a specific certification category, state or county. For example, you could set the certification category to "3b – Turf" if you only wanted to see the meetings that I have approved for credit in that category, or for private applicators, you can set this to the specific commodity group that you have on your certificate to see just those listings. I like to leave them set to "Select All" so I am not limiting my search in any way. I want to see everything that is available and decide for myself which ones to go to. Remember, you will only get credit for meetings that are approved for the categories that you have on your certificate.

Click the "Search" button to produce the list. All the meetings that meet the criteria you selected are displayed, showing the date, time, meeting title, status, meeting location/contact info, and categories/credits that are approved. For more specific information on the meeting, click on the word "Details" in the far left column. This will display everything about that meeting, including a map showing the meeting location. From here you can print out driving directions! Isn't technology wonderful!

You will still need to submit your meeting attendance forms the old fashioned way, by mailing them in to me. Please be sure you have printed your name and certification number clearly on these forms, and signed them in the appropriate place. If the meeting you attended was outside of VT, also supply me with information about the meeting location address, sponsor's name and contact info, and a complete agenda showing times, duration, and speakers names and bios if appropriate.

I will inform you of the other functions of the new website as they come online. -Matt

## **Reducing Surface Water Quality Impacts from Landscape Pest Control Applications**

*By Darren L. Haver, Ph.D., UC Cooperative Extension, Irvine CA*

Applications of pesticides to residential and commercial landscapes may have unintended negative impacts on local water quality if the pesticides do not remain at the site of application. As a licensed landscape pesticide applicator it is important to take steps to lessen the risk of off-target pesticide movement.

The greatest risk arises from spray or broadcast granular applications made over large landscaped areas interspersed with several standard landscape drains. Depending on the chemical properties of the pesticide, off-target movement may occur as a result of the pesticide being carried directly in water (i.e. diazinon\* and imidacloprid) or adsorbing to soil, dust or other organic solids (i.e. synthetic pyrethroids, such as bifenthrin and cypermethrin) that are subsequently mobilized in surface runoff resulting from rain or irrigation events.

Reducing the risk of surface water contamination requires the pesticide applicator to implement a few simple practices. The following practices will help to reduce the potential for landscape pest control pesticides from negatively impacting local water quality:

- Properly dispose of any leftover pesticide residues from spray equipment.
- Inform the client of the potential movement of pesticides as a result of irrigation runoff or washing down of sidewalk surfaces, especially immediately following the application.
- Ensure mulch and soil in application area is not easily washed into drains as synthetic pyrethroids readily adsorb to organic surfaces, such as soil particles, and therefore can be easily carried in water into storm drains.
- Avoid direct applications of pesticides (sprays or granular) to downspout drains and landscape drains by covering them prior to the application.

- Coordinate pesticide applications with the client to ensure irrigation or rain events do not occur within 48 hours of the application.

- Be aware of noticeable surface runoff issues related to poor irrigation and notify the client of the need to address these issues prior to applying the pesticide.

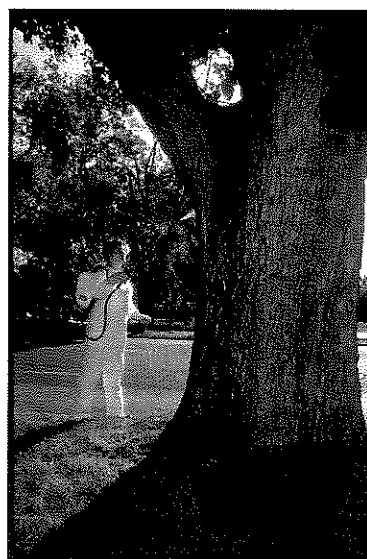
- Sweep up any off-target granular applications of pesticides from hardscape surfaces as irrigation or rain events will quickly mobilize the pesticide into storm drains.

- Applications of systemic pesticides such as imidacloprid should only be made when plants are actively growing to ensure pesticide uptake.

- Be cautious when applying pesticides directly to foliage extending over impervious surfaces, such as sidewalks, as pesticide runoff could end up being washed into storm drains by irrigation or rain events.

*\*Editor's Note: The sale of diazinon for residential use has been discontinued, but existing stocks can still be used by homeowners, and it continues to show up in surface water runoff samples from residential landscapes.*

*See quiz on page 9 for some credit...*



*Using Spot Applications can help prevent possible pesticide runoff.*

## News from UVM Extension

### **Late Blight - A Review of Last Season and New Outbreaks Found in PA, MD and LA**

Ann Hazelrigg, UVM Extension

Vermont vegetable gardeners witnessed a "perfect storm" of events last growing season that resulted in substantial losses of tomatoes and less devastating losses in potatoes. The weather was very wet and cool, perfect for the fungus-like pathogen, *Phytophthora infestans*. This pathogen causes the destructive disease called late blight, and is the same pathogen that decimated Irish potato fields in the 1840s. We often see late blight in Vermont but it typically arrives late in the season and losses have not been that significant. Last summer, however, the pathogen arrived in June on infected tomato transplants brought in from out of state. Windblown spores (propagules of the fungus-like organism) from the south also contributed to the significant losses. Unfortunately, isolated outbreaks of the disease have recently been spotted in Maryland, Pennsylvania and Louisiana. The original source of the pathogen has not been determined but it is suspected that *P. infestans* overwintered on infected potato tubers in the area. The disease starts as water soaked spots on the foliage, usually about mid way up the plant. This brown blighted area expands rapidly during cool wet weather. When the humidity is high, a white coating of sporangia is often seen on the undersides of the leaves. When the weather stays cool and wet, the blighted foliage rapidly spreads throughout the planting often killing the plants within a week or two.

*Phytophthora infestans* has many different races or "types" of the pathogen. The races we saw in the northeast this summer tended to be more virulent or aggressive on tomatoes than potatoes. Many tomato gardeners lost their entire crop, whereas potatoes in the same garden showed less blighting. Potato growers were advised to cut the vines as soon as the disease showed up in August. After 2 weeks of hardening, most harvested a good crop.

The good news about this disease is that it does not overwinter in Vermont. The pathogen can live only on live tissue, NOT on stakes, in seed, on cages or on greenhouse plastics. The only place the pathogen could overwinter in Vermont is on an

infected plant kept alive throughout the winter in a greenhouse or on potato tubers that were infected last fall from spores washing into the soil from the leaves. If these infected tubers survived the winter in the field or compost pile they could re-sprout in the spring and be a source of the disease.

Gardeners should scout early in the season for any volunteer potato plants sprouting from tubers missed in the garden and destroy when found, to eliminate any chance of the pathogen returning from a local source. Potatoes harvested last year and stored should not be used for seed. Purchase certified disease free seed and choose more resistant varieties like Elba, Rosa, Defender, Ozette, Jacqueline Lee, Kennebec, Sebago and Allegheny to avoid the disease. Do not plant potatoes in the same area of the garden as last year since this would make it hard to catch potentially infected volunteers, and this is a good practice for preventing other potato diseases which may overwinter in the soil.

So, What Next? Hopefully, we will not have the same wet weather this growing season that was so conducive for the disease last year. I suspect there will be better and more thorough scouting for the disease at the original greenhouses before they are transferred to retail stores and outlets. Gardeners should try to purchase local tomato transplants. A list of Vermont tomato growers producing transplants is available through the UVM Extension Master Gardener website at <http://www.uvm.edu/mastergardener/>

There is some varietal resistance to the disease in tomatoes, so consider growing *Mountain Magic*, *Plum Regal*, *Legend*, *Ferline*, *Fantasi* and *Matt's Wild*.

Scout your plants often throughout the growing season to watch for the symptoms of the disease. We will publish alerts through the UVM Extension Master Gardener website if the disease has been spotted in the state so check often, especially if the weather is cool and wet and conducive for the disease. Contact the Extension Master Gardener Helpline if you suspect you have the disease in your garden at 1-800-639-2230. Early detection and destruction of infected plants in our home gardens helps our vegetable growers combat this disease. Commercial growers should send samples to the Plant Diagnostic Clinic, Jeffords Hall, 63 Carrigan Drive, UVM, Burlington VT 05405.

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## ***Injury to Landscape Plants from Turf Herbicide Exposure***

*Dr. Sid Bosworth  
University of Vermont, Burlington*

Within managed landscapes where herbicides are used for weed control, there is always a potential risk of damage to non-target landscape plants such as ornamentals. Unfortunately, many of the injury symptoms caused by herbicides can be similar to symptoms from diseases, insects, over-fertilization, drought, excessive water, low temperature stress, etc. Professional turf and landscape managers need to have a general understanding of how their herbicide products work and what types of injury they can cause.

There are many ways that a non-target plant can be exposed to an herbicide resulting in injury and there are many different types of herbicide injury symptoms. The primary factors that should be considered when diagnosing a potential herbicide injury include the following:

Herbicide Mode of Action - This refers to the sequence of events from absorption into plants to plant death including the physiological mechanisms that disrupt normal growth. The mode of action can often lead toward a specific type of injury. Herbicides can be grouped according to their mode of action. For example, 2, 4-D is classified as a growth regulator and injury symptoms include twisting foliage and leaf cupping. Of all the herbicides on the market, there are seven major "mode of action" groups; however, not all of these are represented by the major turf herbicides.

Herbicide Residual Activity - Herbicides with a very long soil residual activity pose the risk of injury to ornamentals transplanted even a year later. Good records of herbicide application dates, rates and active ingredients can help minimize this problem.

Method and timing of application - Generally, preemergence herbicides used to control crabgrass and other annual grasses work by inhibiting root and shoot growth of seedling plants; therefore, they pose little risk to mature or established ornamental plants. Many of these herbicides such as oxadiazon, DCPA, trifluralin and pendimethalin are

also labeled for many nursery crops for the control of crabgrass.

On the other hand, post emergence herbicides used for broadleaf weed control can cause injury to landscape plants. Many ornamental plants are very sensitive to even minute amounts of the growth regulator types of herbicides. The most common means of injury is by spray drift due to windy conditions and spray droplets that are too fine. Vapor drift can also be an important means of injury for highly volatile herbicides such as 2, 4-D, especially when applied during warm temperatures. The ester formulation is particularly volatile. These products can also be root absorbed, posing higher risks for shallow rooted ornamentals.

Environmental conditions at time of and soon after application - As already alluded to, windy conditions and/or high temperatures can increase the risk of drift for certain herbicides. Heavy rainfall following application will increase movement of more soluble herbicides.

Soil texture and organic matter - Application rates of some herbicides are highly dependent on soil texture and the level of organic matter. If a high rate is applied to a coarse textured, low organic matter soil, there is a greater risk of herbicide movement.

Plant disorders that mimic herbicide injury symptoms - Leaf chlorosis and spotting, shoot or root stunting, epinasty (downward bending of leaves or other plant parts resulting from excessive growth of the upper side), twisted growth and distorted leaf appearance can also be symptoms of other non-herbicide causes such as other pesticides, insect feeding, viruses, fungal and bacterial disease, sudden changes in weather, soil condition, soil fertility and pH.

### **Types of Injury**

There are many types of herbicide injury symptoms. When diagnosing problems, it is important to be as specific as possible. The following are some of the more common symptoms caused by turf herbicides categorized according to their Modes of Action:

Growth Regulator Injury (epinasty, twisting, abnormal leaf appearance, tip chlorosis and dieback) - This is probably the most commonly

seen injury since it caused by the 2, 4-D and 2, 4-D like compounds which are so commonly used. Injury is somewhat dose related. At low doses, twisting and epinasty occurs. Plants can appear to be wilting. Leaves can produce abnormal shapes such as cupping or crinkling. At high doses, shoots will become chlorotic and die. Eventually, the whole plant will die.

Amino Acid Synthesis Inhibitor Injury - These herbicides act on a specific enzyme to prevent the production of specific amino acids. Glyphosate is a common nonselective herbicide found in this group. Halosulfuron (MANAGE), is a sulfonylurea that has a different chemistry but a similar mode of action as glyphosate. In general, plant growth will stop immediately but symptoms are slow to develop (1 to 2 weeks) and can include stunting and slow plant death. Ornamental plant injury includes tip chlorosis and dieback and abnormal leaf development; however, unlike growth regulators, there is no twisting or epinasty. The sulfonylurea herbicides may also cause pigment changes (red to purple) to occur in leaves, especially in the veins and petioles.

Seedling Growth Inhibitor Injury - These herbicides interfere with new plant growth, thus, reducing the ability of seedlings to develop normally in the soil. Most of the preemergence herbicides used for annual grass control fall into this category. There are two groups: those that inhibit root growth and those that inhibit young shoot growth. Usually the target weed is killed before it even emerges from the soil. Generally, ornamental plants are not damaged by these herbicides unless an excessive rate is applied near a young transplant. This is usually more of a problem in nurseries rather than landscaped areas. Some granular formulations of certain preemergence herbicides (i.e., oxidiazon) will cause leaf spotting if granules remain on the leaf for an extended period.

Photosynthesis Inhibitor Injury - These herbicides shut down the photosynthetic process in susceptible plants. Injury symptoms include yellowing (chlorosis) of leaf tissue followed by death of the tissue. Chlorosis of the leaf may come in many forms including veinal (along the vein), interveinal (between veins), marginal (along the leaf edge), and general. Some of the photosynthetic inhibitor herbicide families are mobile in the plant; therefore, injury shows up in the youngest growth of susceptible plants. There are no turf herbicides in

this group, but landscapers sometimes run into atrazine carryover problems found in topsoil purchased from agricultural land. Soon after plants germinate or are transplanted, they start showing signs of chlorosis and may eventually die.

One turf herbicide, bentazon (BASAGRAN), is a photosynthetic inhibitor, but it is not mobile in the plant and acts more like a contact herbicide. Injury from drift creates leaf spotting, usually bronze in color.

Cell Membrane Disrupter Injury - Herbicides causing this type of injury are post emergence contact herbicides that are activated by exposure to sunlight causing destruction of cell membranes. This results in rapid browning of plant tissue. Paraquat is in this group. Injury to ornamentals is usually caused by spray drift resulting in necrotic leaf spotting. Unless severe, the plants usually grow out of this injury.

The following table provides information about the most common turf herbicides and may be helpful in avoiding or diagnosing injury problems. The herbicides are arranged by their common name (the active ingredient in an herbicide formulation). It is always important to note what active ingredients are in a formulation since many will have combinations of two or more.

*See the following pages for a table showing characteristics of common turfgrass herbicides and see page 11 for the quiz for credit.*

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Bhowmik, P.C. 2009. 1997 New England Guide to Weed Control in Turfgrass. Univ. of Massachusetts.

Derr, Jeffrey and Bonnie Lee Appleton. 1988. Herbicide injury to trees and shrubs: a pictorial guide to symptom diagnosis. Blue Crab Press, Virginia Beach, VA.

Gunsolus, Jeffrey L. and William S. Curran. 1992. Herbicide Mode and Action and Injury Symptoms. North Central Regional Extension Publication 377.

University of California Cooperative Extension. Herbicide Injury Symptoms. <http://wric.ucdavis.edu/information/herbicideinjury/diphenylether.html>

## Characteristics of Common Turfgrass Herbicides

Common Name (Active Ingredient)	Trade or Brand Name	Type of Application	Primary Use	Mode of Action	Injury Symptoms
2,4-D	Several Brands	POST	Broadleaf Weeds	Growth regulator	Epinastic bending and twisting of stems and petioles, stem swelling (especially at nodes), leaf cupping and curling, chlorosis and dieback at leaf tips.
2,4-DP	WEEDONE DPC*	POST	Broadleaf Weeds	Growth regulator	See 2,4-D
benefin	BALAN Also in TEAM*	PRE	Crabgrass	Seedling Root Inhibitor	Weeds fail to emerge due to root growth inhibition. Injured roots will be short, thickened and swollen at the tip. Other injuries include stem swelling at soil line and stunting.
bensulide	LESCOSAN	PRE	Crabgrass, Poa	Root and Shoot Growth Inhibition	See benefin
clopyralid	CONFRONT*	POST	Broadleaf Weeds	Growth regulator	See 2,4-D
carfentrazone	SPEED ZONE* POWER ZONE*	POST	Broadleaf Weeds	Cell membrane disruptor, PPO inhibitor	Necrosis of leaves and stems
dicamba	BANVEL Several Brands	POST	Broadleaf Weeds	Growth regulator	See 2,4-D.
diquat	REWARD	POST	Nonselective	Cell membrane disruptor, Photosystem I electron diverter	Water soaked appearance followed rapidly by necrosis and desiccation of leaves and stems, may cause chlorotic spots in dilute concentration.
dithiopyr	DIMENSION	PRE	Crabgrass	Root Inhibitor	Swelling at root tips.
ethofumesate	PROGRASS	POST/PRE	Poa,	Shoot Inhibitor	n/a
fenoxaprop	ACCLAIM EXTRA	POST	Crabgrass and other annual grasses	Lipid Synthesis Inhibitor	Not a problem in broadleaf plants. Growth is inhibited quickly but visual symptoms do not show up for 1-2 weeks. Leaf chlorosis and dieback. Leaf sheaths become brown and mushy. Older leaves turn purple, orange or red before death.
fluroxypyr	SPOTLIGHT	POST	Broadleaf Weeds	Growth regulators	Epinastic (leaf curling) response and death occurs in days to weeks
glufosinate	FINALE	POST	Nonselective	Amino acid inhibitor	Chlorosis and wilting within 3 - 5 days after application, followed by death in 1 - 2 weeks.

## Characteristics of Common Turfgrass Herbicides (Continued)

Common Name (Active Ingredient)	Trade or Brand Name	Type of Application	Primary Use	Mode of Action	Injury Symptoms
glyphosate	ROUNDUP GLYPHOSATE PRO Several Brands	POST	Nonselective	Amino acid inhibitor (EPSP synthase)	Growth is inhibited quickly but visual symptoms do not show up for 1-2 weeks. Tip chlorosis and dieback, abnormal leaf development, but no twisting.
halosulfuron	SEEDGEHAMMER	POST	Annual bdleaf weeds, nutsedge	Amino acid inhibitor (ALS synthase)	Growth is inhibited quickly (hours) but visual symptoms do not show up for 1-2 weeks. Tip chlorosis and dieback, abnormal leaf development. Red to purpling of leaf veins and petioles.
isoxaben	GALLERY	PRE	Broadleaf Weeds	Seedling Root Inhibitor	Most weeds fail to emerge. Broadleaf weeds generally show stunting, reduced root growth, root hair distortion, and root clubbing
MCPA	TRIMEC CLASSIC* Several Brands*	POST	Broadleaf Weeds	Growth regulator	See 2,4-D
MCPP	TRIMEC CLASSIC* Several Brands*	POST	Broadleaf Weeds	Growth regulator	See 2,4-D
MSMA	DACONATE	POST	Nutsedge, crabgrass	n/a	Foliar chlorosis and rapid death
mesotrione	TENACITY 4L	PRE	Crabgrass	Pigment inhibitor	Bleached appearance to foliage
oxadiazon	RONSTAR	PRE	Crabgrass, an. bluegrass	n/a	Weed seedlings emerge and wilt. Ornamentals show bronze spotting on leaves from drift or granules on leaves.
sulfosulfuron	CERTAINTY	POST	Nutsedge, wild garlic	Amino acid inhibitor (ALS synthase)	See halosulfuron
pelargonic acid	SCYTHE	POST	Nonselective	Cell membrane disruptor, fatty acid	Rapid necrosis of leaves and stems
pendimethalin	PENDULUM PROWL	PRE	Crabgrass, chickweed	Seedling Root Inhibitor	See benefin
quinclorac	DRIVE	POST	Crabgrass		
siduron	TUPERSAN	PRE	Crabgrass	Root growth inhibition	Weeds fail to emerge due to root growth inhibition.
triclopyr	TURFLON* CONFRONT*	POST	Broadleaf Weeds	Growth regulator	See 2,4-D
trifluralin	TEAM*	PRE	Crabgrass	Seedling Root Inhibitor	See benefin

\* Refers to a Brand of two or more active ingredients. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Extension System is implied.

Prepared by Sid Bosworth, Agronomy Extension Specialist, University of Vermont, Revised 5/10

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## **Home Study Quiz 1 – Reducing Surface Water Quality Impacts from Landscape Pest Control Applications**

The following questions refer to the article on page 3. Fill out the information on the back of this completed quiz and mail it to the Vermont Agency of Agriculture to receive **(1) one pesticide recertification credit.**

1. Who is ultimately responsible for any off-target pesticide movement?
2. What type of application can lead to the greatest risk of pesticide contaminating surface water runoff?
3. What determines whether the pesticide is carried directly in water or is adsorbed to soil, dust or other organic solids?
4. Very briefly summarize the 9 practices that the pesticide applicator can implement to reduce the potential for pesticide runoff from treated landscapes:
  - 1.
  - 2.
  - 3.
  - 4.
  - 5.
  - 6.
  - 7.
  - 8.
  - 9.
5. T \_\_\_\_ F \_\_\_\_ Commercial applicators may still use Diazinon on their client's property.
6. T \_\_\_\_ F \_\_\_\_ It is a good idea to have the homeowner wash down their walkway and driveway after an application to get rid of the pesticides.
7. T \_\_\_\_ F \_\_\_\_ Using spot applications can help prevent pesticide runoff.

The following information is required. Mail the completed quiz to the Vermont Agency of Agriculture to receive one (1) pesticide recertification credit.

<b>Name:</b>		
<b>Certificate #:</b>		Please check: <input type="checkbox"/> Commercial <input type="checkbox"/> Non-Commercial <input type="checkbox"/> Government <input type="checkbox"/> Private
<b>Street Address:</b>		
<b>City/State/Zip</b>		
<b>Company/Farm:</b>		
<b>Signature:</b>		<b>Date:</b>

Mail to:

**Vermont Agency of Agriculture  
Attn: Matthew Wood  
116 State Street  
Montpelier, VT 05620-2901**

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## **Home Study Quiz 2 – Injury to Landscape Plants from Turf Herbicide Exposure**

The following questions refer to the article on pages 5 through 8. Fill out the information on the back of this completed quiz and mail it to the Vermont Agency of Agriculture to receive **(1) one pesticide recertification credit**.

1. T\_\_\_\_\_F\_\_\_\_\_ Fortunately, it is easy to distinguish herbicide injury on ornamental plants from other causes of plant disease since the symptoms of herbicide injury appear so different.
2. How long after transplant of ornamentals into soil that has been treated with an herbicide that has long residual soil activity could you still see possible herbicide injury?
3. What type of herbicide poses little risk to established or mature landscape plants?
4. What type of herbicide poses a much greater risk of injury to established landscape plants?
5. What is the most common means of injury when using this type of herbicide referred to in Question 4?
6. What type of weather conditions can lead to vapor drift of a volatile herbicide?
7. List some general plant symptoms that could be mistaken for herbicide injury and what, other than herbicides, can cause these symptoms.
8. What herbicide may cause pigment changes in the leaves that could make them appear pinkish or purple in color?
9. Why would an herbicide that inhibits seedling growth be less likely to cause injury on an established ornamental plant?
10. Why is epinasty so nasty? (OK to get creative...)

**Pesticide Applicator Report**  
Spring 2010

Vermont Agency of Agriculture, Food & Markets  
Agriculture Resource Management Division  
116 State Street  
Montpelier, VT 05620-2901

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PERMIT No. 74

The following information is required. Mail the completed quiz to the Vermont Agency of Agriculture to receive one (1) pesticide recertification credit.

<b>Name:</b>		
<b>Certificate #:</b>		Please check: <input type="checkbox"/> Commercial <input type="checkbox"/> Non-Commercial <input type="checkbox"/> Government <input type="checkbox"/> Private
<b>Street Address:</b>		
<b>City/State/Zip</b>		
<b>Company/Farm:</b>		
<b>Signature:</b>		<b>Date:</b>