

The Pesticide Applicator Report

News for Vermont's Pesticide Applicators from the
Vermont Agency of Agriculture, Food & Markets and UVM Extension



Fall 2019 Volume 20 – Issue 2

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Reporting Pesticide Usage

Erica Cummings, Vermont Agency of Agriculture

It's that time of year again! Annual license renewals and pesticide usage reports will be due soon. If you don't want me bogging you down with questions and clarifications please review the below list of the common mistakes made in 2018 usage reporting:

- The total amount used is the amount used directly from the product container, **NOT** the dilution amount
- **Liquids** should be reported in **Gallons**
- **Solids** should be reported in **Pounds**
- Surfactants and Adjuvants do not need to be included in the usage report
- 25B products should be included on usage reports
- Record the amount of product used by county (i.e. no lists of counties with a total amount of product used)

Draft Agency product form determinations for reporting (unless clearly specified by the label):

- Aerosols, Foggers = Liquid
- Gels, Foams = Solid

****Please remember to write clearly and legibly****

If you have questions or need help with your reporting please don't hesitate to get in touch with me; (802) 917-2073, erica.cummings@vermont.gov

(See next page for helpful conversions of weights and measures.)

Pesticide Formulations

*Doug Johnstone, Vermont Agency of
Agriculture*

A pesticide formulation is product produced by a manufacturer that contains a substance, or mixture of substances with the goal of killing a pest, or repelling, preventing or reducing damage caused by a pest. However, control can only be achieved if the product can be used effectively, which means that it must be easy and safe to handle, and in a stable and usable form so that it remains effective long enough to successfully reach and control the pest.

A pesticide formulation is comprised of the **active ingredient(s)**, the substance that controls the pest, and the **inert ingredients**, that make the product usable. A formulation is categorized by its physical state, that is whether it is a solid, liquid or gas. Once the formulation is mixed with a carrier, most often water, it is referred to as a dilution.

When discussing pesticide formulations or products, three primary names are used. The **Trade, Brand or Product Name** is what the manufacturer uses to market the product. The **Chemical Name** identifies the chemical components and structure of the active ingredient, while the **Common Name** is a more simplified description of the chemical name. Below is the example used in the Northeast CORE Manual:

One pesticide product, three pesticide names:

Trade name: Deep Woods OFF!

Chemical name: N,N-diethyl-meta-toluamide

Common name: DEET

Example of pesticide names

Helpful Conversions

16 dry ounces = 1 pound

454 grams = 1 pound

3,785.4 milliliters = 1 gallon

128 fluid ounces = 1 gallon

8 pints = 1 gallon

4 quarts = 1 gallon

Other formulation terms include:

- **CARRIER**, which can be either a gas, liquid or solid and can be either an inert ingredient or a substance to which the pesticide is added to aid in its delivery.
- **SOLUTION**, which results when a substance is dissolved in a liquid such that it requires no further agitation.
- **SUSPENSION**, describes a mixture of finely divided, solid particles that are dispersed within a liquid and require continued agitation.
- **EMULSION**, is the result of one liquid being dispersed within another, such as oil and vinegar and this mix does require some minor agitation.

When a formulation is applied as a liquid dilution it is most often mixed with water, although light oils and liquid nutrients may be recommended by a product label.

The most common formulations are:

- **EMULSIFIABLE CONCENTRATE (EC)** contains petroleum-based solvent(s) along with an emulsifier that enables the formulation to be mixed with water. EC's are economical due to their moderate to high concentrations and are relatively easy to handle, mix and apply. They are one of the most versatile formulations and are especially good at controlling insects due to their oil base.

However, due to their concentrations over or under mixing can be problematic. Their oil base makes them potentially flammable, as well as a dermal exposure concern.

- **WETTABLE POWDERS (WP)** are dry, finely ground formulations. They are most often mixed with water but require constant agitation to maintain the suspension. WP's are one of the most widely used formulations as they can be used for most any pest problem and in many types of application equipment. Due to their concentration they are economical and because they are a dry formulation, are easy to store, handle and transport. However, they pose one of the highest inhalation exposure risks, can be somewhat abrasive and may leave residues on treated surfaces.
- **FLOWABLES (F or L)** are comprised of finely ground particles suspended in a liquid that does not dissolve in oil or water. When mixed with a carrier the result is a diluted suspension requiring moderate agitation. F's have many of the same advantages of EC's and disadvantages of WP's except they are far less of an inhalation risk.
- **WATER DISPERSIBLE GRANULES (WDG) or DRY FLOWABLES (DF)** are similar to WP's but much larger in particle size. They are economical due to their concentration, easy to handle, store, transport and mix, although they do require continued agitation to maintain the suspended dilution.
- **READY TO USE (RTU)** require no mixing as their name implies. They are convenient, less toxic and easy to use. But because they rarely contain more than 2% active ingredient, they are expensive and limited in use to small areas.
- **ULTRA LOW VOLUME (ULV)** formulations are highly concentrated and may contain close to 100% active ingredient. They are used as is or in minute dilutions, often less than 1 gallon per acre and are primarily used with specialized equipment such as aerial applications or mosquito control programs where large areas are treated.
- **INVERT EMULSIONS** are essentially the opposite of EC's in that they are water-based pesticides dispersed in an oil carrier. The oil carrier acts as an anti-drift agent as well as a spreader-sticker that aids in improving coverage and absorption of the active ingredient. Specialized equipment is necessary due to droplet size and use is almost exclusively limited to vegetation control along rights-of-ways.
- **AEROSOLS (A)** are available in ready to use formulations similar to RTU liquids, although they use petroleum-based propellants and can be an attractive nuisance due to their packaging. They can also be in formulations that are used in aerosol generators when large areas are to be treated. Advantages include thorough coverage and they are relatively easy to use, store and transport. However, they pose a very high inhalation exposure risk.
- **DUSTS (D)** are largely ready to use and usually contain 10% or less active ingredient. Due to their extreme potential for drift, and hazard to pollinators they are rarely used outdoors. They are mostly used in seed treatment and in structural pest management where liquids would be ineffective or even hazardous in structural voids and utility conduits. Even distribution is difficult and the risk of exposure through inhalation, dermal, eye, nose and throat are very high.
- **GRANULES (G)** are particles that are larger and heavier than D's. Their active ingredient concentrations are usually less than 15% and are most often applied to soil to control weeds, nematodes or subterranean insects, although in some cases for systemic absorption through plant roots. They are easy to store, transport and are ready to use, and pose less risk of drift or applicator exposure than sprays. However, they are difficult to apply uniformly and are largely limited to ground applications due to their particle size and density. They often require moisture to become activated which requires proper timing and they can be a risk to foraging wildlife.

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- BAITs (B) usually contain less than 5% active ingredient mixed with food or an attractive substance. They are largely used inside and around structures to control insects and rodents, although some outdoor uses are labeled providing containment is implemented. They are ready to use and can be placed in areas that are inaccessible to people, pets and wildlife thereby reducing drift and exposure. However, they usually need to be replaced frequently, can be an attractive nuisance as well as a source for secondary poisoning, which occurs when a non-target animal eats a target animal that has been poisoned by the bait (mouse dies – cat eats mouse and becomes poisoned or dies).

There are many other types of formulations, such as pellets, fumigants, microencapsulated materials, water soluble packets and research concentrates.

The priority of the applicator is to choose a formulation that is most appropriate for the site and pest situation at hand. **Considerations are:**

- Is it labeled for the site and pest?
- Will it remain long enough to provide effective control?
- Will the formulation control the pest at the desired life cycle stage?
- What is the risk to the applicator, non-target organisms, the environment and the site?
- What application equipment and Personal Protective Equipment are needed?
- How easy is it to handle and mix?
- What carrier is needed?
- Will the formulation allow the applicator to mix only the required amount of dilution for the job?
- Is the formulation cost effective?

Many formulations may display a number in their Trade, Brand or Product Name.

With regard to solid or dry formulations, the active ingredient is expressed as a percentage of weight by volume.

For example: The Product Name of Captan 80 WP tells the applicator that it is a WETTABLE POWDER, so it is a solid or dry formulation that contains 80% active ingredient by total volume such that a 10-pound bag of Captan 80 WP contains 8 pounds of active ingredient.

Most liquids have different weights per gallon. For instance, kerosene weighs 6.6 pounds per gallon while water weighs about 8.5 pounds per gallon and maple syrup can weigh more than 11 pounds per gallon. For this reason, percentage of weight by volume is not accurate for liquid formulations, so the label of a liquid pesticide formulation will disclose the amount of active ingredient in pounds per gallon.

For example: The Product Name of Captec 4L tells the applicator that it is a FLOWABLE LIQUID formulation. The “4” indicates that Captec 4L contains 4 pounds of active ingredient per gallon, such that a 2.5-gallon jug contains 10 pounds of active ingredient.

When discussing formulations, it is also necessary to consider **ADJUVANTS**. An adjuvant is an unregulated chemical that is added to the pesticide formulation or dilution in order to enhance the overall pesticidal efficacy of the application. There are many different types of adjuvants that perform very different functions.

- **SURFACTANTS** are often called wetting agents or spreaders and act as surface active agents meaning they help pesticide dilution droplets wet plant foliage and spread evenly across the leaf surface to increase absorption.

- **STICKERS** increase the adhesion of the spray particles to the target surface and can aid the pesticide in remaining on the target surface during most types of precipitation. They can also reduce evaporation and photodegradation.
- **EXTENDERS** function similarly to stickers in that they help to retain the pesticide on the target surface and reduce their evaporation and degradation.
- **PLANT PENETRANTS** enhance absorption of pesticides by some plants, thereby increasing efficacy.
- **COMPATIBILITY AGENTS** eliminate chemical incompatibility that often occurs between pesticides and other carriers, such as liquid fertilizers that can clump or plug application equipment.
- **BUFFERS & ACIDIFIERS** prevent premature pesticide degradation by adjusting the pH of the dilution carrier to the optimum level as indicated on the pesticide formulation label.
- **DRIFT CONTROL ADDITIVES** increase and homogenize the average droplet size of the dilution to improve uniform droplet placement to the target.

There are other adjuvants that may be needed to enhance the applicator's dilution and increase the effectiveness and control of the pesticide application. It is important to read the product label, as many formulations may already contain adjuvants, and adding incompatible additives may prove counterproductive. The pesticide label very often provides guidance about which adjuvants may or may not be added to the mix.

Remember to read the pesticide label thoroughly to ensure a safe and effective application with the ultimate goal of controlling the target pest!

Cleaning & Winterizing Pesticide Application Equipment *Adapted from Nebraska Extension G1770 by Greg J. Puckett, Clyde L. Ogg, Robert N. Klein, and Cheryl A. Alberts*

Cleaning pesticide application equipment is necessary and worthwhile. The risk from not cleaning your spray equipment is reason enough to take the time to do it right. Even a trace of leftover chemical sprayed on a different crop can cause severe damage. To reduce the risk that pesticide residues could harm a crop, it is crucial to clean every nook and cranny (of a sprayer system) that might hold spray solution.

Places Where Residues Hide

- spray tanks
- sumps and pumps
- around baffles
- hoses
- valves
- booms
- screens
- end caps
- nozzles

The following is a general set of guidelines to clean a sprayer system. If this contradicts label instructions for a given pesticide, always follow the label's instructions instead. ***The label is the law.***

- **Step 1. Clean booms after each use.** Some pesticide formulations can settle inside spray equipment very quickly, which can make cleaning much more difficult. To avoid cleaning difficulties, it is important for handlers to clean out sprayer booms every single day the sprayer is used. This prevents chemicals from penetrating plastic or becoming cemented to the inner surfaces of equipment. Never allow the spray solution to remain in the boom lines overnight prior to

flushing. Hoses can become contaminated. Use oil-resistant hoses on sprayers. Remove end caps after the nozzles and screens have been flushed to further help clean out the spray booms.

- **Step 2. Rinse sprayer the first time in the field.** Because of the high concentration of residue still in the system during the first rinse, it is wise to perform this first rinse at the original application site. Use 10 percent of the tank's water capacity to rinse. Agitating the rinse water is helpful in freeing any residue. A pressure washer can make this rinsing more effective. Be sure to open all valves to ensure every part of the system is rinsed on the first flush. Run water through the system for at least five minutes. Doing this by boom section makes it easier to check for plugged nozzles.

Apply the contaminated rinse water to the outer rows of the field you treated. Check to make sure that these outer rows are not near susceptible vegetation. It is up to the handler's judgment as to where to clean other parts of the system and dispose of that rinse water. Alternate the places to spread rinse water and avoid having pesticide residues concentrated in one spot. Avoid contaminating other water sources such as lakes and streams.

- **Step 3. Clean all screens.** The screens in a sprayer system collect solids and semisolids (e.g., gooey pesticide residue), so clean them to prevent clogs in the line. Dirty screens can negatively affect sprayer performance. Removing and cleaning these screens is a very important step in cleaning the system. Dirty screens can continually recontaminate the rest of the system. Clean with a brush and hot soapy water. Rinse. It is also important to clean the filter housings, where residues can also build up. After cleaning, put screens back in the system, except nozzle screens; these should be left off until the end.

Rinsate can also be used as a diluent for future pesticide mixtures if:

- the pesticide in the rinsate is labeled for use on the target site where the new mixture is to be applied,
- the rinsate is used to dilute a mixture containing the same or a compatible pesticide, and
- the amount of pesticide in the rinsate, plus the amount of pesticide product in the new mixture, does not exceed the label rate for the target site.

Rinsate cannot be added to a future pesticide mixture if:

- the rinsate contains strong cleaning agents, such as bleach or ammonia, that might harm the plant, animal, or surface where the rinsate will be applied, or
- the rinsate would alter the pesticide mixture and make it unusable.

- **Step 4. Clean the end caps and rinse a second time.** The space between the last nozzle and the very end of the boom is called an end cap. This is yet another essential part of a sprayer to thoroughly clean. There are two end caps on each section of the boom sprayer.

If the sprayer does not have end caps, you need to install them in order to adequately clean the booms. Remove the end caps and scrape the residue off with a brush, using tank cleaner and water. Put one end cap back on each section of the boom to prepare for the second rinse cycle. The rings on end caps break easily, so watch for rings that need replacing.

Circulate water through the system a second time. With one end cap in place on each boom section, flush each section, one at a time, so there is enough water pressure and volume to

properly rinse the boom. Once a section is rinsed, put the missing end caps back on and move to the next section. Remove the end caps that were attached previously. Rinse again. After all sections have been rinsed, put all end caps back in place.

- **Step 5. Add tank cleaner.** Commercial tank cleaners neutralize and loosen chemicals that remain in spray equipment; use them only after the first two thorough rinses. Tank cleaners should not be expected to do the bulk of the cleaning, but rather to manage remaining traces of pesticide. Cleaners typically have a high pH level, which counteracts the acidity of many pesticides. There is some doubt about the effectiveness of ammonia or bleach as tank cleaners. However, some pesticide labels may specify using ammonia or bleach to clean a tank. If so, do not use both at the same time. When bleach and ammonia mix, they generate toxic chloramine vapor. Many pesticide labels offer suggestions on what commercial tank cleaners to use. For more information about specific cleaners to use with specific herbicides, see the “Recommended Cleaning Agents for Selected Herbicides” table in the Guide for Weed, Disease, and Insect Management in Nebraska, EC130.

Put water in the tank first. Add the cleaner next. The rate of cleaner to be used is usually expressed as pints or quarts per 100 gallons of water and can be found on its label. Once this mixture is in the tank, turn on the agitation and circulate the cleaning solution throughout the system.

Most tank cleaner labels will list an amount of time that the cleaner needs to successfully neutralize the chemicals. The longer the solution is in the system, the better. In fact, letting it sit overnight is perfectly acceptable. Once you decide the cleaner has had ample time to do its job, proceed with Step 6.

- **Step 6. Perform final system flush.**

Thoroughly flush out the system with clean water. You can also use a tank mix surfactant or a fertilizer additive to remove residues that commercial cleaners can miss.

- **Step 7. Wash up.** After you are completely finished with the process of cleaning your spray equipment, do not come into contact with other people. Do not eat, drink, chew gum, use tobacco, or use the bathroom until you and your clothing are properly cleaned. Wash gloves thoroughly before removing them. Remove outer clothing outdoors, then immediately shower. Wash the clothes you wore separately from any other clothing. After removing the clothes, run the empty machine with the hottest water available and detergent, on the longest cycle to completely cleanse it. Safely discard any clothing that is heavily contaminated.

Cleaning Backpack Sprayers

Cleaning backpack sprayers is much different from cleaning a field rig. Backpack sprayers are far smaller in size with a lot less plumbing to hide pesticide residues. Thus, they are much easier to clean. In fact, cleaning a backpack sprayer is a lot like rinsing a pesticide container. Rinse out the tank thoroughly and then spray the rinsate from the sprayer onto the site of application. When applying the rinsate, do not exceed the legal amount of pesticide that may be applied to a given area. Repeat this procedure for a total of three rinses. For the second rinse, consider using a commercial tank cleaner to make a solution that will more effectively remove residues. See the pesticide label for recommended cleaning agents. Another source is the Guide for Weed, Disease, and Insect Management in Nebraska, EC130. Allow the solution to sit for the amount of time listed on the label of the cleaning product. Rinse a third time with only water. After the third rinse, the sprayer should be sufficiently cleansed to be

used with a different product.

Winterizing Sprayers

Tank and Pumps: To begin the process of winterizing the sprayer, add a solution of 50 percent automotive antifreeze and 50 percent water to the empty tank. RV antifreeze is nontoxic but is harder on pumps and seals. If you choose to use RV antifreeze, do not add water. Turn off all the boom sections, turning on the pump and master spray switch. If the sprayer is a backpack sprayer, pump the solution through the system and collect it after it comes out of the nozzle. Likewise, with a field sprayer, run the solution through the entire system for at least five minutes. Do not allow the antifreeze solution to fall on the ground. Drain any and all accessory tanks and lines. Keep in mind that the solution can usually be reused for two years after the first use, a total of three uses. Make sure the antifreeze does not become diluted. Using compressed air, blow any remaining liquid from the sprayer lines. Open, drain, and clean the mixing chambers. Some pumping systems have a drain plug within the pump housing that can be used to drain the pump.

Spray Boom: Begin by taking the boom feed hoses off of the boom section valves. Thoroughly flush all the boom sections with compressed air through the feeder hose and out the nozzles until dried. Take off the nozzle tube end plugs and blow out any water left in the boom. Once dry, clean out any and all boom section filters. Remove screens and nozzles and store them in a lightweight oil such as vegetable oil, kerosene, or diesel fuel during the winter. Plug any open assemblies. Check to see if the boom is dry. Apply vegetable oil to O-rings and reinstall. All gauges should be removed and stored indoors upright so they do not freeze. Plug these open assemblies also. This will help the remaining antifreeze prevent any freezing/cracking of boom lines. The stainless steel plungers in solenoid valves come in

contact with the spray solution. Apply lithium grease on solenoid switches and relays. This will prevent rust and sticky valves during the winter months. Always store spray equipment indoors when possible.

When cleaning spray equipment, it is just as important to **protect yourself** from pesticide exposure as it is to protect the crops you are spraying. Determining what **personal protective equipment (PPE)** to wear when cleaning equipment is simple. Read the PPE statement on the label of the product you are cleaning out. At the very least, wear the PPE required by the label.

In addition, wear a chemical-resistant apron, eye protection, pesticide-resistant gloves, and any other appropriate PPE.



NEW! Training and Recertification Credit Online Courses

Online courses are now available through **eXtension Campus**, part of the national Cooperative Extension System. eXtension Campus requires you to create a free account to enroll in courses. Your participation in courses will be recorded and any recertification credits will be tied to your account. Upon completion of Vermont credit courses, a certificate will be granted that must be printed and mailed to the VAAFM to receive recertification credit.

- Online course overview can be found at uvm.edu/extension/pseonline



eXtension Online Campus

Vermont Pesticide Safety Education: CORE Manual Review (no credit)



Teacher: Sarah Kingsley-Richards

Anyone in the state of Vermont who uses, supervises, recommends, or sells pesticides and/or trains Worker Protection Standard handlers/workers may be required to take and pass the CORE exam and all appropriate category exams to become certified. Certification is administered by the Vermont Agency of Agriculture. Food

Vermont Pesticide Safety Education: CORE Manual Review, Unit #1 (1 credit) 



Teacher: Sarah Kingsley-Richards

Pest, Pesticides, Pest Management (Chapters 2, 3, 13)
Environment, Water, Resistance, Application, Drift (Chapter 10-12, 21, 22)

This approximately **1 hour course** is presented in **two modules** that provide a review of CORE manual content required for Vermont pesticide applicator certification. Each

Vermont Pesticide Safety Education: CORE Manual Review, Unit #2 (1 credit) 



Teacher: Sarah Kingsley-Richards

Exposure and Risk, Toxicity, PPE, Responding to Exposure, Heat Stress, Residue and Tolerance, Safety (Chapters 5-9, 15, 23)
The Label (Chapter 28)

This approximately **1 hour course** is presented in **two modules** that provide a review of CORE manual content

Vermont Pesticide Safety Education: CORE Manual Review, Unit #3 (1 credit) 



Teacher: Sarah Kingsley-Richards

Formulations (Chapter 4)
Calibration, Calculations, Mixing and Loading, Managing Waste (Chapters 24-27)

This approximately **1 hour course** is presented in **two modules** that provide a review of CORE manual content required for Vermont pesticide applicator certification. Each

Vermont Pesticide Safety Education: CORE Manual Review, Unit #4 (1 credit) 



Teacher: Sarah Kingsley-Richards

Pesticide Laws and Regulations (Chapters 1, 14, 16)
Storage, Transport, Security, Emergency Planning, Conduct and Liability (Chapters 17-20, 29)

This approximately **1 hour course** is presented in **two modules** that provide a review of CORE manual content required for Vermont pesticide applicator certification. Each

Helpful Contacts for Pesticide Applicators

Vermont Agency of Agriculture, Food & Markets

Field Agent NE	(802) 793-1628	Bethany.Creaser@vermont.gov
Field Agent SW	(802) 793-2167	Dominique.Golliot@vermont.gov
Field Agent SE	(802) 793-2547	Doug.Johnstone@vermont.gov
Field Agent NW Golf Course Permit Coordinator	(802) 318-1383	Matthew.Wood@vermont.gov
Certification & Training Toxicologist	(802) 828-3479	Anne.Macmillan@vermont.gov
Director	(802) 828-6531	Cary.Giguere@vermont.gov
Agrichemical Section Chief	(802) 828-6417	Linda.Boccuzzo@vermont.gov
Agrichemical Research & Policy Specialist	(802) 917-2073	Erica.Cummings@vermont.gov
Groundwater Monitoring Program Manager	(802) 828-3473	Patti.Casey@vermont.gov
Entomologist	(802) 279-2212	Judy.Rosovsky@vermont.gov

University of Vermont Extension

Pesticide Safety Education Program	(802) 656-0475	Sarah.Kingsley@uvm.edu
Plant Diagnostic Clinic Pesticide Safety Education Program	(802) 656-0493	Ann.Hazelrigg@uvm.edu
Vegetable & Berry	(802) 257-7967 x303	Vernon.Grubinger@uvm.edu
Entomology	(802) 656-5440	Margaret.Skinner@uvm.edu
Field Crops & Nutrient Management	(802) 388-4969 x332	Jeff.Carter@uvm.edu
Agronomy Outreach Specialist	(802) 751-8307 x356	Laura.O.Johnson@uvm.edu
Agronomy	(802) 656-0478 (802) 524-6501 x437	Sid.Bosworth@uvm.edu Heather.Darby@uvm.edu

Home Study Quiz 1 – Pesticide Formulations & Reporting Pesticide Usage
(Please keep answers brief; use additional paper as needed.)

- 1. Which formulation likely causes the greatest risk of secondary poisoning?**
- 2. Which formulation poses the greatest risk to pollinators if used outdoors?**
- 3. What is the difference between a solution and a suspension?**
- 4. Name 5 considerations when choosing the right formulation.**
- 5. How many pounds of active ingredient are found in a 100-pound bag of Force 2G?**
- 6. How many pounds of active ingredient are found in a 15-gallon container of Garlon 3A?**
- 7. In what units should liquids be reported?**
- 8. In what units should solids be reported?**
- 9. Should pesticide usage be reported in concentrate or dilution?**

Mail the completed quiz to receive one (1) pesticide recertification credit.

The following information is required.

Name:		
Certificate #:		Please check: <input type="checkbox"/> Commercial <input type="checkbox"/> Private <input type="checkbox"/> Non-Commercial <input type="checkbox"/> Government
Street Address:		
City/State/Zip		
Company/Farm:		
Signature:	Date:	
Email address (optional):		
Mail to:	Vermont Agency of Agriculture, Food & Markets Attn: Anne Macmillan 116 State Street Montpelier, VT 05620-2901	

Did you know?

- The UVM Extension Plant Diagnostic Clinic aids **COMMERCIAL GROWERS** in Vermont greenhouses, farms and orchards by assisting in the identification and management of diseases, pests and weeds. Management options are based on integrated pest management principles (IPM).

UVM Plant Diagnostic Clinic

(802) 656-0493

uvm.edu/extension/pdc

Home Study Quiz 2 – Cleaning & Winterizing Pesticide Application Equipment *(Please keep answers brief; use additional paper as needed.)*

- 1. List four places where residues hide.**
- 2. How often should sprayer booms be cleaned?**
- 3. What type of hoses resist contamination?**
- 4. How can you avoid having rinsate pesticide residues concentrated in one spot?**
- 5. It is also important to clean this when cleaning screens:**
- 6. To adequately clean booms, remove and clean these: (If you don't have them, install them!)**
- 7. How long should a winterizing antifreeze solution be pumped through a field sprayer? A backpack sprayer?**
- 8. How should sprayer gauges should be stored over the winter?**

Mail the completed quiz to receive one (1) pesticide recertification credit.

The following information is required.

Name:		
Certificate #:		Please check: <input type="checkbox"/> Commercial <input type="checkbox"/> Private <input type="checkbox"/> Non-Commercial <input type="checkbox"/> Government
Street Address:		
City/State/Zip		
Company/Farm:		
Signature:	Date:	
Email address (optional):		
Mail to:	Vermont Agency of Agriculture, Food & Markets Attn: Anne Macmillan 116 State Street Montpelier, VT 05620-2901	

Did you know?

- The UVM Extension Master Gardener Helpline volunteers serve **HOMEOWNERS** in Vermont to answer gardening questions, providing science based information about home horticulture issues.

UVM Master Gardener Helpline
(802) 656-5421
uvm.edu/extension/mastergardener/helpline