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A Newsletter From Virginia Tech Pesticide Programs

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Do Your Part to Help Pollinators Thrive

Daniel Frank, Director, Virginia Tech Pesticide Programs

Pollinators play an important role in the reproductive success of many flowering plant species. Flowering plants need to move pollen from the male parts of a flower to the female parts of a flower. This results in fertilization and ultimately the production of seeds. However, pollen cannot move on its own. It requires assistance from animals, wind, or water. Although some birds, bats, and small mammals can play a role in the pollination of certain plant species, insects (e.g., bees, flies, butterflies, and beetles) are the main animal pollinators. Currently, there is strong evidence for a decline in insect pollinator abundance and diversity. This decline is the product of multiple factors such as habitat loss and fragmentation, spread of parasites and disease, and improper use of pesticides.

Figure 1. Environmental Protection Agency bee hazard icon.

Habitat Loss and Fragmentation

Replacement of native habitats with industrialized agriculture and urban sprawl has changed landscapes to the detriment of many insect pollinators. As native vegetation is replaced by crop monocultures, roads and buildings, manicured lawns, and nonnative gardens, insect pollinators lose the food plants and nesting sites necessary for their survival. To limit this decline, the public is encouraged to plant pollinator-friendly plant species. Consider native floral diversity when planting, and select plants with overlapping bloom periods to ensure that floral resources like nectar and pollen are available throughout the year. Growing flowering cover crops is another way to provide food resources for pollinators when garden beds or crop fields are fallow. It is also important to provide areas for shelter and nesting. Hedgerows, field margins, and other natural areas can provide important nesting habitat and shelter for many insect pollinators.

Parasites and Disease

Parasites and disease are damaging to the health of many insect pollinators, particularly the honey bee (*Apis mellifera*). Parasitic mites such as the Varroa mite (*Varroa destructor*) have significantly increased the challenges of maintaining hives. Honey bees are also affected by a range of bacterial, fungal, and viral diseases. Recent studies have suggested that some of these diseases are not necessarily restricted to honeybees. They may also spread to wild bee species. To limit the spread of parasites and disease, it is important that beekeepers learn to recognize the signs and symptoms of these pests early and provide appropriate control measures when needed.

Improper Use of Pesticides

The improper use of pesticides can negatively impact many insect pollinators. The best action the public can take to improve insect pollinator health and survival is to use integrated pest management (IPM) when controlling pests. IPM can help avoid unnecessary pesticide applications. When using pesticides, choose products carefully. Select those with the lowest toxicity rating to insect pollinators whenever possible. Avoid applying pesticides to blooming plants (including weeds), especially when bees are actively foraging. Pesticides that are harmful to insect pollinators will have label warnings that include a bee hazard icon (fig. 1) and/or language under the labels' "environmental impacts" statements about their potential pollinator risks. It is important to follow all pesticide label instructions carefully.

IPM and Resistance Management

Daniel Frank, Director, Virginia Tech Pesticide Programs

Integrated pest management (IPM) can be thought of as best management practices for controlling pest organisms. IPM focuses on long-term prevention of pests by using a combination of cultural, mechanical, biological, and chemical tools. Integrating multiple control strategies in a pest management program can help prolong the effectiveness of each individual tactic. The long-term and repeated use of a single control tactic can lead to reduced effectiveness over time if the pest population develops resistance.

Resistance is a genetically-based characteristic that allows certain individuals to survive a pest management tactic that would kill most individuals in a normal population. Resistance to pesticides is often the most well-known form of resistance for many pest organisms. Pesticide resistance occurs when individuals in a pest population have the genetic predisposition to survive exposure to a particular pesticide. These surviving individuals then reproduce and pass on the trait(s) for resistance to the next generation, while the susceptible individuals are eliminated by the pesticide treatment. If the treatment continues, the percentage of surviving (i.e., resistant) individuals will increase over time, and the susceptibility of the population to the pesticide will decrease to a point that it no longer provides adequate levels of control. This process is evolution in action. It is the same process that leads to antibiotic resistant bacteria that pose health threats to humans.

Pesticide resistance is a major concern in agricultural systems. Over the years, with every new pesticide introduction, cases of resistance developed two to 20 years later. Today, approximately 500 insect and arthropod species, 200 plant pathogens, and 273 species of weeds are resistant to one or more of the major pesticide classes/groups. Once a pest population becomes resistant, that pesticide, and all others with the same mode of action (i.e., how a pesticide affects/kills a pest organism), forever become ineffective for controlling that pest.

Unfortunately, resistance to pesticides is not the only risk. Resistance can occur with other pest management tactics as well. For instance, populations of northern corn rootworm (*Diabrotica barberi*) and western corn rootworm (*D. virgifera virgifera*) have developed resistance to crop rotations. Resistance to certain transgenic Bt crops has been observed with several insect pests such as corn earworm (*Helicoverpa zea*), fall armyworm (*Spodoptera frugiperda*), and western corn rootworm. Development of resistance to biological controls has been documented for the larch sawfly (*Pristiphora erichsonii*).

Resistance is a distinct possibility for virtually any tactic used on a widespread and/or intensive scale for pest suppression. The most effective way to combat resistance is to prevent it from occurring in the first place. This is why resistance management should be considered as one part of a larger IPM approach.

Common tips for reducing the risk of pesticide resistance include:

- Minimize pesticide use by practicing IPM.
- Routinely monitor/scout for pests, and use reasonable treatment thresholds.
- Rotate pesticide modes of actions (as a general rule, do not apply a particular mode of action more than twice consecutively during a season).
- Use label rates.
- Use pesticides with shorter residual activity.
- Limit treatment areas when possible.
- Avoid using a particular mode of action if you suspect resistance is occurring.

Safe and Proper Use of Repellents

Stephanie Blevins Wycoff, Extension Associate, Virginia Tech Pesticide Programs

Summer has arrived and has brought with it what seems like an endless supply of mosquitoes, ticks, and gnats. Along with this arrival, you may notice displays full of repellents in your local stores and markets. You may have a go-to brand like OFF! or Cutter. However, as you consider purchasing repellents (and before using them), take a few moments to understand these products.

What Are Repellents?

Repellents are formulated products that are used to deter or drive away insects and other arthropods like ticks (fig. 2). Many repellents are classified as pesticides, so it is very important to read the product label. How can you tell if the repellent you are looking at is a pesticide? If you see an EPA registration number on the label, then the repellent is a pesticide. As with any pesticide, you should always read the label before you purchase, use, store, or dispose of a pesticide or its container.

Figure 2. An example of repellent products that are commonly found at local retailers.

Proper Application of Repellents

The label will provide directions on how to properly apply these products. You may see statements such as "Do not allow children to handle this product" and "Avoid over-application of this product." Proper use of repellents ensures your health and safety and the safety of others. Some important and interesting tips on properly applying repellents include:

- Use enough repellent to slightly moisten and cover exposed skin or clothing. You should not overapply repellents (do not saturate) or apply them more times than their labels recommend.
- Apply repellents only to exposed skin or clothing. Never apply under clothing! Applying repellents underneath your clothing may cause adverse skin reactions.
- Do not apply repellents to cuts, wounds, or irritated skin.
- Do not spray repellents directly toward your eyes, nose, or mouth. Spray the repellent on your hands first, then apply it to your face. Apply sparingly around your ears.
- Do not spray in enclosed areas or near food. Avoid applying repellents near areas with sensitive surfaces (e.g., ornamental plants or the paint of an automobile).
- Refer to the label for information about appropriate uses on clothing. Repellents can damage certain materials like leather.

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Safe and Proper Use of Repellents

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Along with an increased need for repellents in the summer comes an increased need for sunscreen. If using sunscreen and repellents at the same time, apply sunscreen first and then repellents. Young children will need help with these tasks. Make sure young children do not handle or apply repellents. Adults should spray the repellents on their own hands and then spread the repellents on the child's exposed skin. Avoid getting repellents on children's hands, and do not apply them around their eyes and mouth. Older children should only apply repellents under adult supervision.

Choosing a Repellent

Repellents are available in several formulated end-use products like pump sprays, aerosols, lotions, and wipes. Your personal needs and preferences will influence your purchasing decisions. If you have children, for example, wipes are a good choice because they allow for simple application. Remember to read the product label in the store before you purchase a repellent. Each label will contain information specific to that repellent which will help you select the right product.

Additional Safety Tips

Once you are done using repellents and have returned indoors, make sure to bathe with soap and water and wash any treated clothing. Store these products in an area that is out of the reach of children and pets, preferably in a locked cabinet. Some repellents, like aerosols, may have flammability warnings, so it is important to keep these products away from open flames. Unless the label specifically includes uses for pets or other animals, do not use these products on animals.

Online Resources

Environmental Protection Agency:

- Using Insect Repellents Safely and Effectively - epa.gov/insect-repellents/using-insect-repellents-safely-and-effectively
-
- Find the Repellent that is Right for You - epa.gov/insect-repellents/find-repellent-right-you

Penn State Extension:

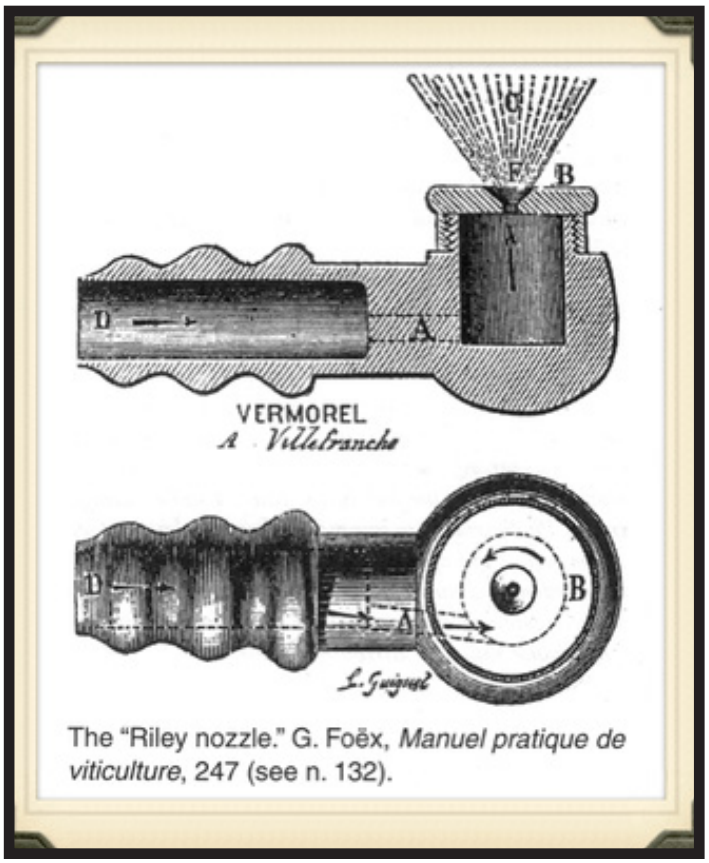
- Using Sunscreen and Insect Repellent with Children - extension.psu.edu/programs/betterkidcare/early-care/tip-pages/all/using-sunscreen-and-insect-repellant-with-children

»Blast From the Past«

Stephanie Blevins Wycoff, Extension Associate, Virginia Tech Pesticide Programs

The Riley Nozzle

The picture below (fig. 3) features a drawing of one of the first spray nozzles ever created. The nozzle was invented circa 1880 by C. V. Riley, a famous entomologist known for his research on biological control of various insect pests. Riley partnered with the French company Vermorel to have the nozzle manufactured; it was introduced into France around 1884. U.S. companies manufactured this nozzle in later years. The Riley nozzle is also referred to as the "cyclone nozzle." As liquid reaches the chamber below the spray orifice, it enters into a whirling motion, resulting in a cone-shaped spray pattern.



The "Riley nozzle." G. Foëx, *Manuel pratique de viticulture*, 247 (see n. 132).

Figure 3. The Riley nozzle (circa 1880).

Updates From the Virginia Department of Agriculture and Consumer Services

Do You Need to Renew Your Pesticide Applicator Certificate?

If you are a certified commercial pesticide applicator or a certified registered technician and the expiration date on your certificate is June 30, 2021, you should have received your applicator renewal notice and application in mid-May. You will need to complete your renewal application and return it along with the applicable fee to the Virginia Department of Agriculture and Consumer Services, Office of Pesticide Services (VDACS-OPS) for processing. Pesticide applicator renewal applications are processed in the order they are received. There are over 7,000 certified pesticide applicators eligible to renew in 2021.

As a reminder, applicator renewal is a two-step process:

1. **Recertification** – Pesticide applicators are required to take one recertification course every 2 years, before their certificate expires; AND
2. **Renewal (not the same as recertification)** – Pesticide applicators are required to complete and return their renewal application and renewal fees to OPS by JUNE 30, 2021.

   Keep in mind:

   a. If you did not renew by June 30, 2021, you are not allowed, by law, to apply pesticides on the job until you complete the renewal process.

   b. After August 29, 2021, the only way to renew your certificate is to reapply and retake the appropriate certification exam(s).

LOAs and Temporary Registered Technician Requirement

June 30, 2021 marked both the end of the extension for Letters of Authorization (LOA) issued on or after December 20, 2019 as well as the state of emergency in response to COVID-19. To that end, as of July 1, 2021, all authorization letters for prospective applicators to take the exam(s) to become certified expire on the date listed in the letter. There are no extensions to the expiration dates. Prospective applicators who do not take the exam(s) by the expiration date are required to submit a new application with appropriate fees to take the exam(s).

In addition, the Temporary Registered Technician Requirement, which allows employees of licensed pesticide businesses to apply pesticides without obtaining a registered technician certification, will cease on July 30, 2021, and registered technicians will be required to be certified to apply pesticides. The Temporary Registered Technician Requirement was valid for the duration of the state of emergency due to COVID-19, as declared by Governor Northam (Executive Order 51), and ceases 30 days after the state of emergency expires or was otherwise rescinded. Employees who have not completed the certification process within the 30 days will no longer be allowed to apply pesticides until they complete the certification process.

The VDACS-OPS webpage is currently being updated with this and other information. Please visit vdacs.virginia.gov/pesticides.shtml for the most current information.

Updates From Virginia Tech Pesticide Programs

2021 Pesticide Safety Educators Workshop

The 2021 Pesticide Safety Educators Workshop (PSEW) - our annual in-service for Virginia Agriculture and Natural Resource Extension agents - will be held on Wednesday, August 11 and Thursday, August 12 at the Hotel Roanoke. This year, attendees can participate in-person or live on Zoom.

2021 marks the 29th year for this train-the-trainer workshop sponsored by VTPP and VDACS. PSEW is designed to update agents and specialists on pesticide applicator training procedures and practices for the coming year. It also provides a venue to recognize the outstanding teamwork enjoyed between VDACS and Virginia Cooperative Extension.

It is not too late to register to attend PSEW via Zoom. Contact Rachel Parson at rparson@vt.edu or 540-231-4639 for assistance.