VTPP Quarterly

A Newsletter From Virginia Tech Pesticide Programs

IN THIS ISSUE

- Aerial Applications Pages 1-2
- Compatibility Testing: An Important Step Before Tank Mixing Pages 2-4
- Blast From the Past: Vermorel Knapsack Sprayer Page 4
- Program Updates
 Pages 4-5



Spring 2022 • Volume 3, Issue 2 • VTPP.ORG

Aerial Applications Rachel Parson – Extension Associate

"Aerial application" is the term used to describe applying pesticides from aircraft such as an airplane, helicopter, or unmanned aerial vehicle (UAV). Aerial application of pesticides in the United States got its start in the 1920s, when army pilots began crop dusting agricultural fields. Today, the term "crop dusting" is misleading because very little aerially applied pesticide is formulated as dust. Modern agricultural aircraft are designed to apply liquid formulations of pesticides efficiently and safely. In the United States, 16% of the aerial application industry's fleet are rotary craft (helicopters, fig. 1), while 84% are fixed -wing airplanes (fig. 2). UAV pesticide application (fig. 3) is still in its infancy and, for the most part, is in the research and development phase.

There are definite advantages to using aerial application. It allows applicators to treat sites quickly, treat sites that are



Figure 1. Helicopter. (Photo by John Ghent, Summit Helicopter Inc., Bugwood.org.)

hard or impossible to reach with ground equipment, and lower fuel energy costs per treated acre on large tracts. However, there are several disadvantages of aerial application as well, including risks posed by hazardous fixed obstacles, the expense of aircraft operation, a limited number of available pesticide products labeled for aerial use, and the increased risk of drift.

Aerial applications occur in all 50 states. The National Agricultural Aviation Association states that there are about 1,560 aerial application businesses in the United States and about 3,400 agricultural





Virginia Cooperative Extension Virginia Tech • Virginia State University



COLLEGE OF AGRICULTURE AND LIFE SCIENCES ENTOMOLOGY VIRGINIA TECH.



Figure 2. Fixed-wing aircraft. (Photo by Sean Ross, Pesticide Educational Resources Collaborative [PERC], Bugwood.org.)

pilots (many of whom run their own businesses). The crops and sites most commonly treated from the air are corn, wheat/barley, soybeans, pastures/rangelands, and alfalfa. Aircraft treat approximately 28% of the cropland in the U.S. In addition, nearly 100% of forest protection applications are made by aircraft, such as applications to control the spongy moth (formerly known as gypsy moth). In Virginia, aircraft are used to treat a variety of locations, including Christmas tree farms in the southwest, soybean fields on the Eastern Shore, and rights-of-way throughout the state. In coastal areas of Virginia, aircraft apply pesticides to combat disease-carrying mosquitoes. There are approximately 90 aerial applicators certified in the Commonwealth of Virginia.



Figure 3. UAV. (Photo by Vijay Singh, Assistant Professor and Extension Specialist, Department of Entomology, Virginia Tech.)

Safety comes first during all phases of aerial application. The applicator must follow all pesticide label directions and requirements for aerial application, and they must manage any off-target movement or drift. GPS and other technology are used to make sure that applications are precise and accurately made. Accidents are rare, but when they do happen, they can often be fatal to the pilot. Therefore, aerial applicators are required to have extensive credentials, including a commercial pilots' license and commercial pesticide applicator certification in every state they make applications. They must also meet the requirements of the Federal Aviation Regulations which allows for low-level aviation operations. Most aerial applicators have over 20 years of experience. It is a highly skilled field and a safe method for large scale application of pesticides.

For more information about aerial pesticide application, consult:

- National Agricultural Aviation Association (NAAA): <u>agaviation.org</u>.
- Aerial Pesticide Application (2022), Virginia Cooperative Extension Publication #456-233.

Compatibility Testing: An Important Step Before Tank Mixing Stephanie Blevins Wycoff – Extension Associate

Before mixing pesticide products together in a spray tank, it is important to perform compatibility testing to ensure the products can be mixed. This simple step can save pesticide applicators a lot of time, money, and stress.

What Is a Tank Mix?

A tank mix is when two or more crop production products (e.g., pesticides, fertilizers, and plant growth regulators) are combined and applied at the same time. Tank mixing is federally legal unless the label of one or more products of the intended mix has specific instructions that prohibit this practice. Many applicators choose to tank mix (or purchase pre-mixed pesticides) because it is practical and cost-effective. Advantages of tank mixing include reducing

- Time, labor, and fuel costs.
- Equipment wear and tear involved in multiple applications.
- Soil compaction.
- Risk of mechanical damage to crops or treated areas.

However, as a pesticide applicator, it is important to understand that tank mixing will only work to your advantage if the products are compatible. Products are compatible if, when mixed, their safety or effectiveness is not diminished in any way.

What Happens When Products Are Incompatible?

Incompatible products should NOT be mixed in a tank. Incompatible mixtures are not safe, effective, usable, or stable. If one product reacts negatively with another product, this is a sign of incompatibility. Incompatibility may be observed as physical changes (e.g., separation and clumping) that result in an inability of products to mix together or chemical changes which produce new products or unknown substances. Signs of chemical changes include

- Production of heat.
- Color changes.
- Formation of a gas, precipitate, gel, or sludge.

When mixing products that are incompatible, the physical (fig. 4) and/or chemical (fig. 5) changes that occur can damage spray equipment. Incompatible mixtures can clog tanks, hoses, pumps, and nozzles. They can also cause phytotoxicity to plants if applied. Furthermore, the mixture may no longer be safe to apply or can pose environmental hazards. Some pesticide labels will have information about product compatibility and/or incompatibility. If you are mixing products for the first time and are unable to locate any information, perform a compatibility test (also known as a jar test).

Figure 4. <u>Physical</u> incompatibility is demonstrated using water and vegetable oil. As the oil is poured into the water, the oil physically separates from the water forming a dividing line. Even with agitation, this mixture could not be applied evenly.





Figure 5. <u>Chemical</u> incompatibility is demonstrated using a washing soda solution and an Epsom salts solution. When the two clear solutions are combined, a cloudy, white precipitate (a new product) forms (left photo) indicating a chemical change. If left alone for some time, the precipitate will begin to settle as shown above (right photo).

Jar Testing

Before conducting a jar test, you will need to calculate how much of each product to add to the water in the jar. The water and the pesticide/fertilizer products will have to be added in the same proportions as you would in a tank mix. Use the same water source you would use for tank mixing. Check the labels of the pesticide products you are testing, and make sure to wear the appropriate PPE.

You will need a large, clear, clean glass to perform the test.



Figure 6. The proper mixing order for a jar test.

Add water to your jar before adding any other components. If mixing order is not described on product labels, use the W-A-L-E-S mixing order (fig. 6).

After adding each component, including the final component, agitate the mixture for at least 10 seconds. Let the jar rest for 15 to 30 minutes, and then check for incompatibilities. If your test yields any incompatibilities, try the jar test again using a compatibility agent (which should be added before any other products).

If a compatibility agent does not help, look for other products to substitute into your intended mix. Do not try to apply an incompatible mix. If you are unable to substitute any one product of the intended mix, you will have to apply the products separately.

Once you finish jar testing, dispose of the test contents properly. If the jar test was compatible, you can add the contents to the finished spray mix in your tank. If the jar test showed incompatibility, you should contact your local Extension agent for information about hazardous waste disposal.

More Helpful Tips

Some additional ways to avoid incompatibility issues include

- Use clean water and check that pH and hardness levels are in an optimum range.
- Apply pesticides as soon as you mix them, and clean out your spray tank as soon as the application is complete.
- Follow temperature recommendations on the label for both mixing and storage.
- Use proper agitation when directed by the label.
- Follow label instructions for mixing order when available. If the label does not specify, follow the W-A-L-E-S mixing order. Compatibility testing kits can also be ordered from Precision Laboratories: precisionlab.com/row-crops/marking-foam-dyes-sprayer-maintenance/compatibility-test-kit.

Further Reading

• Avoiding Tank Mixing Errors by Purdue Pesticide Programs: ppp.purdue.edu/wp-content/uploads/ files/PPP-122.pdf.

Blast From the Past

Stephanie Blevins Wycoff – Extension Associate

The Vermorel Knapsack Sprayer

The photo below shows a knapsack sprayer that was developed in the late 1800s for pesticide applications in vineyards. It was used to apply Bordeaux mixture, which discouraged the growth of downy mildew associated with pest outbreaks of grape phylloxera. The European company that made this sprayer, Vermorel, was a leader in its time in manufacturing pesticide application equipment. The company sold many early devices such as nozzles, dusters, and other various sprayers.



Figure 7. The Vermorel Knapsack Sprayer, circa 1890.

Program Updates

VTPP Updates

VTPP is currently seeking a non-tenure track Extension Associate in the area of pesticide safety education. The incumbent will be expected to develop and maintain Extension education programs in pesticide safety and integrated pest management (IPM), and serve as the instructor of record for the Pesticide Usage (ENT/PPWS 4264) and Chemical Application (AT 0554) courses. Experience in environmental and nontarget protection is preferred. Interested applicants can apply at: <u>careers.pageuppeople.com/968/cw/en-</u> us/job/519757/extension-pesticide-safety-edu.

VDACS Updates

Fee for Renewals Eliminated

2 VAC 5-675 regulations governing the pesticide fees charged by the Virginia Department of Agriculture and Consumer Services (VDACS) have been amended. Effective March 17, 2022, the fee for pesticide applicators to renew their certificates has been eliminated.

While there is no fee to renew their certificate, commercial pesticide applicators and registered technicians are still required to take one recertification course every two years before their certificate expires. Applicators whose certificates expire on June 30, 2022, who have not yet attended a recertification course are encouraged to view the list of currently approved recertification courses. Applicators who are unsure if they need to take a recertification course can check the status of their recertification credit on the List of Certified Pesticide Applicators.

Applicators whose certificate expires on June 30, 2022, and who take the required recertification course will have their certificate automatically renewed, and a new certificate will be sent to them. For applicators who do not take a recertification course by June 30, 2022, their certificate will expire. If a pesticide applicator applies a pesticide without a current certification, they are in violation of Virginia's laws and regulations and subject to enforcement action. Applicators who do not take a recertification course by August 29 of the expiration year are required by law to retest. This requires submission of an application and fee.

Applicators whose certificate expires on June 30, 2022, will receive a letter with additional information about the renewal process. VDACS will also update its website with the most current information as of the effective date. Questions can be directed to: <u>opsclrt.</u> <u>vdacs@vdacs.virginia.gov</u>.

2022 Pesticide Collection Program

Do you or someone you know need assistance with the disposal of unwanted or outdated pesticides?

the 2022 Pesticide Collection Program. Information about the program, as well as the 2022 Pesticide Collection Program brochure, can be found at: <u>vdacs.</u> <u>virginia.gov/pesticide-collection.shtml</u>.

EPA Updates

The EPA has updated the online application Bulletins Live! Two (BLT) to access Endangered Species Bulletins. Bulletins establish specific pesticide use limitations by geographic area for the protection of threatened and endangered (listed) species and their designated critical habitats. Updates to BLT include

- Faster load and search times by connecting directly to EPA's Pesticide Product Label System.
- A modernized user interface with higher resolution basemaps.
- Increased compatibility with more web browsers.
- A simplified search function with clarified instructions for searching products by registration number.

Pesticide applicators are required by law to reference Bulletins when directed by a product label. Most counties in Virginia currently have no additional restrictions beyond the label for pesticide applications. However, several counties in the Southside and Richmond regions of Virginia will have additional restrictions for certain pesticides listed on a Bulletin. Information and access to BLT can be found at: <u>epa.</u> <u>gov/endangered-species/endangered-species-protection-bulletins.</u>