When Poison is Profitable
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Poison…the word may conjure up images of skulls and crossbones or the old green Mr. Yuk faces of yester-year. Poison, however, is much broader than this. Technically speaking, the sun is poison if our skin is exposed to it for too long; but in the right doses, it's a great source of Vitamin D. In the context of caring for your woods, poison can be a very good thing for the health of your forest. Let's shift away from using the word poison, which has a negative connotation, to a (perhaps) slightly less triggering word - pesticide.

Pesticides are a broad group of chemicals (natural or synthetic) that are used to control an alive something that is causing harm to a plant or animal; i.e., a pest. Types of pesticides include insecticides (for insects), herbicides (for plants), miticides (for mites), fungicides (for fungi), rodenticide (for rodents), and disinfectants, such as hand sanitizers, that we use to control bacteria on our hands. There are even products known as biocides (literally, killers of life) used in some types of factories.

In the case of forestry, because we are primarily focused on either protecting trees from insects or killing certain plants (e.g., exotic invasives), we primarily use insecticides and herbicides. We will focus the remainder of this article on herbicides, as those are the most likely to be used by do-it-yourself woodland owners. Insecticides are more likely to be applied by professionals with specialized equipment.

Why would we want to kill certain plants in our woods? Don't we want a diverse ecosystem? Perhaps surprisingly, one reason to kill certain plants may actually be to increase diversity! Exotic invasive plants do not add to the overall diversity of a forest but instead out-compete native plants, reducing overall diversity. After I kill Japanese stiltgrass and privet bushes where I live, dozens of native plants have a chance to fill that space, improving habitat and overall forest health.

Another reason we might want to kill certain plants is to create more space for more desirable trees and/or create standing dead trees (snags) for wildlife. While we can accomplish this using mechanical tools, such as chainsaws, machetes, and other sharp-edged implements, mechanical control methods also come with a drawback. Mechanical control will most likely cause the injured tree to sprout. Most trees that grow in Virginia readily sprout from the stump or roots when cut or girdled. Sprouts can improve wildlife habitat because they provide browse, but they can also be problematic since they will eventually develop in-to new trees. This means you will need to regularly return to the site to treat them again. Or you can decide to kill them once and for all, using herbicides.

Risks

Are there risks associated with using herbicides? Certainly. One time I was spraying herbicide on weeds near a young tree I had planted the previous year. I ended up

accidently spraying the young tree. That's called an off-target application. In this case, it was not an illegal application. And, fortunately, I only sprayed a few leaves that I immediately removed from the plant. Ta-da, young tree saved!

A more serious example of off-target application is the use of an herbicide not approved for use on or near water to kill terrestrial plants on or near water. That is illegal and potentially damaging to the aquatic ecosystem.

Are critters at risk when we spray herbicides? Yes and no. Perhaps the biggest impact of herbicides on wildlife (assuming proper use) is when large acreages (such as a field or clearcut) are sprayed to kill all the plants in preparation for planting pine seedlings. The insects and wildlife that were feeding and living on those acres will experience a sudden and extreme change in habitat. It's not dissimilar to the impact that occurs when fire is used to keep warm season grasses in a field. Direct contact of herbicides on wildlife is fairly low risk. The chemistry of common forestry herbicides works on parts of a plant's physiology that are unique to that plant and not found in insects or wildlife.

Other factors influencing risk include scale (size of application) and frequency. Pine plantations are considered the most intensive forest management system. The rotation length (life cycle) of a pine plantation is generally 20-30 years. For pulpwood it may be as little as 10-15 years. In this intensive management system, the acreage would be broadcast sprayed (every square inch of land is treated) with an herbicide once or twice during the rotation. This is a large-scale application, but also very infrequent.

What about a more frequent, but smaller-scale, use of herbicides that is more applicable to the do-it-yourselfer? Such a scenario may involve spot treating individual plants instead of broadcast treating large acreages. One of my favorite things to do with herbicides is to kill tree-of-heaven. (I love trees… some of them, like this one, I love to kill – so that others I love have a chance.) I do this work for a few months every year. I may even do it every weekend, which is pretty frequent, right? The scale, however, is on the other end of the spectrum since I'm treating individual trees (spot treatment). Even for a patch of forest that is almost pure tree-of-heaven, the amount of herbicide applied per acre is very low. Furthermore, after a few years, there will be very few trees to treat and I'll be in a maintenance mode.

Another factor to consider in assessing risk is herbicide selectivity. Some herbicides are selective, while others are broad-spectrum. Selective herbicides are formulated to affect only certain types of plants. Triclopyr (the active ingredient in Garlon, Pathfinder II, and Remedy brands) is selective to woody plants and some broad-leaf weeds. Grasses, pines and other monocot type plants (e.g., corn, banana, green briar, bamboo, daffodils and more) are generally tolerant of the herbicide. Broad-spectrum herbicides, on the other hand, can kill a wide range of plants. Glyphosate (the active ingredient in Roundup, Rodeo, Accord brands) is a good example. This chemical can kill grasses, broad leaf herbaceous weeds, woody, and aquatic plants. Please note that it *can* kill. At low rates, it becomes selective. Recent research at Virginia Tech found that rates as low as 0.1% glyphosate can kill

stiltgrass while most everything else is tolerant of this low concentration. Furthermore, the method of herbicide application will influence its selectivity.

Methods of Application

There are several different methods of herbicide application. Choosing the correct method can minimize the chance of off-target application and increase the chance of successful eradication of unwanted plants. One of my favorite methods of targeting applications is by using a simple piece of cardboard. By putting this between what you want to spray and what you don't the application is more targeted. Recall the young tree I mistakenly sprayed…. I could have (should have) held a piece of cardboard against it while I sprayed the weeds; that way, the spray that landed on the tree would have been caught by the cardboard instead.

Another common application trick for woody plants is to apply the herbicide to a specific part of the plant, i.e., the sapwood. The sapwood contains most of a woody plant's active plumbing. This plumbing moves carbohydrates, water, and nutrients from the roots to the crown and vice versa. This same plumbing will carry herbicides throughout the woody plant.

While spraying the leaves is one way to put herbicides into the plumbing, and is efficient for smaller plants, larger shrubs and trees that can be very difficult to spray and may require a lot of herbicide.

So what are some more efficient ways to get herbicide into the sapwood? One way is to hack through the bark into the stem with a hatchet or machete. This creates a doorway into the sapwood into which you can squirt herbicide. This application method is called hack & squirt (yes, we foresters are that original). The number of hacks and squirts needed to kill a tree depends on the herbicide being used and size of the stem. Within a couple of weeks of application, you should see the tree begin to decline as the herbicide makes it way throughout the tree. Assuming the right chemical and timing were employed in the right manner, you should soon have a snag benefiting wildlife as well as more room for other plants.

As mentioned earlier, sometimes when you try to kill a tree by cutting it down, it sprouts right back. To prevent this sprouting, we can use the same basic principle just described to get the appropriate herbicide into the tree's plumbing. There are several herbicides that can be applied directly to a freshly cut stump. These will be transported through the sapwood into the root system, eventually killing it. You can spray the herbicide directly on the stump or apply it with a paintbrush. This is called a cut-stump application.

And a final method, basal bark application, can be used with certain herbicides that can be sprayed directly on to a stem. With the right kind of mix (usually an oil based diluent), these will penetrate the bark to enter the sapwood. This application method is limited to trees with smooth bark and smaller stems. This method requires a bit more herbicide than the previous two, so a backpack sprayer is a good tool to have. This type of sprayer also

leaves your hands free to move brush aside and assist with balance. Keep in mind, a 4 to 5 gallon backpack sprayer is pretty heavy when filled all the way up. But there is no mandate that you need to fill it all the way up. If you only have a small amount of work to do, only; mix enough herbicide to get the job done. This will eliminate the need to store unused herbicide. Speaking of mixing….

The most risky part of handling herbicide is not the spraying, but the mixing. This is the time when spills are most likely to happen and also when exposure to the product is highest. This takes us to understanding and obeying the herbicide law. This will be covered in detail in the Winter 2019 edition of the Virginia Forest Landowner Update.

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