



Rules of Engagement: Tactics for the Small Acreage Land Manager

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To many small acreage land managers, invasive plant control can be a frustrating process. Clearing an overgrown backyard or wooded lot of invasive plants is a common goal, but a lack of understanding of how to approach the problem often results in time, money, and physical effort being wasted. Many people will aggressively attack a problem with a chainsaw, bush axe, or mower and then walk away, expecting to be done. However, following mechanical control, most invasive plants in the Southeast rapidly re-sprout from the stump or creeping roots. Within a few months (or even weeks, for some weeds) the problem has roared back and appears worse than ever. The landowner then turns to a herbicide recommendation ill-gotten from the neighbor's cousin's uncle who "knows" how to kill weeds. The results from that action typically vary from complete failure to complete control (which may be great, or, also include the roses, flowers, vegetables, and every other living plant within the area). This management process may be repeated in intermittent cycles before the landowner basically gives up. The good news is that it doesn't have to be that way. Armed with a bit of knowledge, you *can* reclaim your little piece of heaven from invasive plants. Here are some of the basics you need to know.

PLANT BIOLOGY 101

Invasive trees, shrubs, and vines in Alabama are almost always re-sprouters. Similar to arborescent hardwoods, many invasives quickly initiate new shoots from dormant meristems (growing points) around the root collar or on creeping roots. These quiescent growing points are maintained dormant by signals from the shoot. However, when that signal is removed, the dormant meristems are released. This is why you often see large numbers of re-sprouting shoots from recently cut stumps. Energy reserves stored within the roots are generally sufficient for many cycles of re-sprouting, so cutting even several times over the summer is not generally effective. Therefore, mechanical control is still a very useful first step for clearing dense infestations, but cannot be expected to work alone.

In addition to the re-sprouting issue, many forest invaders also produce numerous fleshy fruits that are eaten and spread by wildlife. Large showy fruits have been a signature of many horticulturally introduced species that have become invasive. This was also one of the early premises for the introduction of species such as Russian olive, whose fruits were promoted as a good food source for wildlife. Many seed within the fruits pass

through the digestive system of birds and other animals and are deposited in the feces, where they may readily germinate. Those that don't immediately germinate may also remain dormant for some time. While seed dormancy and longevity vary greatly among invaders, you can generally expect large flushes of seedlings following the initial control phase. Some species such as privet have relatively short-lived soil seed banks and can be eradicated in a few short years, while species such as kudzu have seed that may last for decades. However, continued diligence is required to eliminate new seedlings that arrive on site via fruits eaten by birds and other wildlife.

These two basic points of plant biology should hopefully convince you that there are no silver bullets for immediate eradication of invasive weeds. Therefore, be wary of anyone trying to sell you a miracle cure. Beyond any single strategy, persistence is the word most commonly associated with successful invasive plant control.

Before getting into control, here are two words about safety and personal protective equipment. Use it! For non-chemical control, leather gloves, safety glasses, sturdy boots, and long sleeves and pants are highly recommended. Always wear eye protection. For herbicide use, read the label and use all protective equipment required. Also, remember that poison ivy is a common component of many forest systems and may cause severe contact dermatitis from contacting the leaves, vines, roots, fruits, or smoke. Additionally, many other critters may be present such as snakes, as well as biting and stinging insects, so be prepared for those, too. Now, on to the tools of the trade . . .

NON-CHEMICAL WEED CONTROL

Are herbicides always necessary? The answer is no, and here are some guidelines for nonchemical weed control methods. Physical methods of control include cutting, mowing, digging, hand pulling, smothering, and prescribed fire.

Cutting and mowing: Cutting and mowing with hand tools, brush mowers, or brush grinders are an excellent first step. These methods open up dense stands of invasives and can improve access to interior parts of the stand. However, as previously mentioned, most invasive species re-sprout following mechanical damage, so follow-up action will be necessary. Remember, cutting brush all day is tough on chainsaws, so be sure to keep them well maintained and keep your cutting tools sharp. Cutting brush all day is also physically tough, so avoid dehydration, overheating, and exhaustion. Also, recognize that cutting smaller stems with a bush axe can often leave sharp or jagged stumps. Brush grinders, while more expensive to use, also eliminate the need for piling and burning or chipping. Walk-behind brush mowers are typically good at cutting stems under one inch, but may struggle with larger stems. For limited use, many equipment rental companies rent walk-behind models daily or weekly, which reduces costs and maintenance associated with purchasing one.

Hand digging and hand pulling: Hand digging is useful to remove the roots of small shrub stands or patches. It is easiest in sandy soils and most difficult in heavy clays, especially when soils are dry. Get as much of the roots as possible, but recognize that you will likely miss some in the process. Allow the roots to completely dry before disposing of them, as many species may re-root and re-establish if left on moist soil. Also, remember that

the disturbance you create will stimulate seeds to germinate, so expect a new flush of seedlings soon after digging. Hand pulling is effective for seedling trees, shrubs, and some vines. Grasp the young stems at the base and pull directly upward. If it does not release from the soil immediately, it may be a re-sprout from an established plant. At this point, stop pulling before you pull a muscle. Re-sprouts are typically extremely difficult to hand pull. For vines that send out shallow lateral roots in the forest understory – such as Japanese honeysuckle – you may often get several feet of root with careful hand pulling. For stems too tall to pull by hand, tools such as a weed wrench are useful. The bottom line is this: get all you can, but know you won't get it all the first time.

Smothering: Smothering is the use of plastic, weed fabric, or heavy mulch to prevent weeds from emerging. While these techniques work well for landscaped areas, they may be cost prohibitive in natural areas. In addition, while they work well for preventing annual weeds, they are less effective for perennials, which may be delayed but will still emerge through deep mulch or beyond the edges of plastic or fabric.

Prescribed fire: Prescribed fire is a useful tool in forest management but is difficult for controlling many invasives since they are re-sprouters. Low intensity ground fires may girdle some stems and kill seedlings, but the post-fire conditions are prime for new invasive recruitment. Additional low intensity ground fires may rapidly become out-of-control stand fires. When cogongrass or fire-laddering plants such as Japanese climbing fern are present, they can carry fire into the upper tree canopy. Drought conditions as experienced in 2007 also hinder safe, effective burning. Consult with your local Alabama Forestry Commission office for updates on burning regulations for your area as some regulations have recently changed.

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Photo by John Pirtle

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CHEMICAL WEED CONTROL

Herbicide treatments are quite different for small-scale land applications compared to large-scale forestry operations, and the end result is also different. Whereas weed control in forestry is designed to suppress weeds to foster tree establishment and survival through the early years, invasive weed control is focused on long-term prevention, control, and complete eradication where feasible. For the small acreage landowner, herbicide treatment recommendations can be a confusing set of details filled with uncertainty. Common issues among homeowners and land managers may include 1) herbicides I have never heard of and can't find at my local retailer; 2) application equipment and techniques I am unfamiliar with; 3) treatment recommendations for small patches, not acres; and 4) concern over non-target damage to desirable vegetation. Given these issues, here are some guidelines to help clear up the confusion regarding small-scale applications.

Herbicide names: University recommendations typically provide common chemical names of the active ingredient (i.e. the component responsible for killing the target plant). This is different from the trade name, which is the formulated product that you purchase and use. An example of this is glyphosate, which is the name of the active ingredient in numerous products with trade names such as *Roundup*, *Accord*, and *Glyphomax*. The reason for this is that the university does not endorse one product over another. To find the right product, look at the

active ingredients and their percentages and select the product labeled for use in your situation. Be careful to read all of the active ingredients, because many products have very similar trade names with different active ingredients. This can be very important when trying to selectively control invasive weeds growing near desirable plants. Also, remember that the selection of herbicides for sale at your local hardware, discount, or feed and seed store will be very different from those at a pesti-

cide distributor. The herbicide products are often marketed and sold to different clientele groups. The names will be different, as will the quantities for sale. A common complaint is that a 2.5 gallon jug which may treat several acres is way too big and too expensive for the small area to be treated. Why get 2.5 gallons when you only need a pint? This goes back to knowing the active ingredients recommended. If you cannot find the exact product name you are looking for, check the active ingredients and percentages on the label. While there is no guarantee that all products with comparable active ingredients perform the same, you may still be able to find a smaller amount of product that will get the job done.

Application Equipment: Typically, agricultural applicators use large boom sprayers with multiple nozzles for accurate, uniform herbicide applications. However, boom sprayers are often difficult to use on small areas, especially when rough terrain and shrubs and trees are present. For small jobs, or in the woods, or on very rough terrain, handheld pump sprayers or backpack sprayers are very useful. Sizes range from small 1 gallon models to larger 3-5 gallon backpack-style sprayers. When considering which one to buy, recognize the following issues: 1) quality of construction, 2) the load weight you are comfortable carrying and, 3) the ability to change nozzle types and replace worn nozzles.

Small hand pump sprayers require frequent stops to pump to maintain pressure while backpack sprayers can be pumped during use. Remember, you get what you pay for, so look for quality construction, comfort and proper support in carrying the spray load, and the ability to change nozzle types. Spray wands, hoses, and handles may all become entangled in vines or brush, and a quick turn may result in breaking cheap plastic parts, or pulling hoses loose and sending herbicide solution into your face, torso, or legs.

Another sprayer consideration: if you also apply insecticides or fungicides to desirable trees or garden plants, you should use a different sprayer for herbicides. Many desirable fruit trees, vines, and vegetables are extremely sensitive to very small amounts of herbicides, and severe injury or death is likely. Even a well-washed sprayer may contain enough herbicide residue to injure or kill your azaleas or tomatoes, so don't use it to spray them!

Herbicide mixing: Often you will see a herbicide rate recommendation given as percent volume to volume (%v/v) for a specific product. This is the percent of herbicide in the total solution volume [herbicide + carrier (typically water) + anything else added to the tank such as surfactant]. For example, if the recommendation is for glyphosate at 25%v/v and you want to mix 1 gallon total volume, you would add one quart of glyphosate ($0.25 \times 1 \text{ gallon} = 0.25 \text{ gallons}$ or 1 quart) with 3 quarts of water ($1 \text{ gallon} - 0.25 \text{ gallons} = 0.75 \text{ gallons}$ or 3 quarts). While you might rationalize that ratio as one quart

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Silverthorn and privet were chemically controlled, leaving the native hardwoods unharmed by the application. This example demonstrates the ability to control invasives selectively in mixed stands.

glyphosate to three quarts water $[(1/3)*100\%] = 33\%$, this is wrong. Always calculate the herbicide percentage based upon the total volume $[(1 \text{ qt}/4\text{qt})*100\%] = 25\%$.

Do not over-apply: Remember the old adage, “If a pound works well, then two pounds works even better.” Now that you remember it, do your best to forget it, and never *ever* use that approach! It may feel good to put an extra glug into the tank or spray weeds multiple times to the point of runoff, but you will be wasting herbicide, money, and may even be in violation of the herbicide label, which is the law. You may get tired of hearing this, but **READ THE HERBICIDE LABEL!** Small-scale applications are no excuse to get sloppy in your work. Unless the herbicide label specifically calls for it, you do not need to spray until runoff with most herbicides. One pass across most weeds for foliar treatment is sufficient.

For spot applications, add a water-soluble indicator dye to the spray tank. This will allow you to see where you have sprayed and will help prevent both missed weeds and over-application.

HERBICIDE APPLICATION TECHNIQUES

Spot foliar treatment: Foliar spot treatments are sprays directed to the foliage of individual or small clumps of target weeds. These can often be done selectively around desirable vegetation. One pass with the spray wand will be sufficient, and you do not need to spray to runoff. While late summer or fall timings may be most effective on many woody invaders, applying to green actively growing foliage is probably the most important concept. Severe drought stress may reduce efficacy for many herbicides on many weed species. If leaves are curled or drying out due to drought, it is advisable to delay spraying until conditions are better.

Basal bark treatment: This is a technique that sprays certain herbicides on the lower 12-18 inches of bark around the entire shrub or tree. Basal bark treatments work well on young thin-barked trees, but are not recommended for older trees greater than four inches in diameter. Typically, the carrier is oil-based instead of water-based, and herbicides used for this method are more soluble in oil than water. The oil improves penetration of the herbicide through the bark to the cambium layer where it is translocated to the growing points. Historically, diesel oil has been used as the carrier for basal bark treatments but it is very

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messy and there are better oil-based carriers to use. However, they are typically only available from pesticide distributors. Alternatively, some herbicides are formulated as ready to use with the correct carrier already in the jug. Read the herbicide label for this information.

Cut stump treatment: This entails mechanically cutting the tree or shrub and immediately applying a herbicide solution to the cambium layer just inside the bark. It is best to apply the herbicide as quickly as possible. For trees greater than four inches in diameter at the base, apply the solution to the cambium layer just inside the bark. For shrubs and trees less than four inches in diameter, apply the solution to the entire cut surface.

Pesticide container disposal: When emptied, pesticide containers must be triple-rinsed and crushed or punctured before they can be placed in a landfill. Although many pesticide bottles have a recycle symbol on them, it is illegal to recycle them with household recycling. Consult your local authorities for pesticide container recycling programs in your area. In case of potential accidents, always keep a spill kit on hand and the number for Poison Control in your cell phone. The number for the Alabama Poison Center is 1-800-222-1222. Herbicides are safe when used according to the label, and most accidents occur due to carelessness and a lack of understanding. For more information on safe pesticide application, contact your local Alabama Cooperative Extension System office.

RE-VEGETATION AND RESTORATION

Following successful weed control, it is important to re-vegetate heavily disturbed areas to prevent erosion and invasion by weedy annuals. While a healthy native plant community may not completely resist some invaders, it *can* suppress many. In some situations, you can utilize passive restoration and allow grasses, forbs, shrubs, and trees to naturally re-vegetate the area. However, diligence is required to remove new invaders that may also come in. Active restoration may be necessary to establish the plant community or species that you desire. While techniques for successful restoration are beyond the scope of this article, consult with your local Extension specialists or county Forestry Commission for information on restoration. There are also many nurseries now selling native plants that are useful for restoration. Again, the bottom line is this: keep restoration in mind as a critical component in the weed control process.

CONCLUSION

The struggle with invasive plants is not hopeless. Educate yourself and your neighbors on how to identify and control invasive plants that you are dealing with. If you do nothing, your neighbors' weeds will become your weeds and vice versa.

Always remember that invasive plants don't play fair, so use every tool in the toolbox to combat them. Be aggressive, follow up and learn from your successes and failures, and adapt your control strategies as you go. You can do this. You *can* make a difference. 🐾