

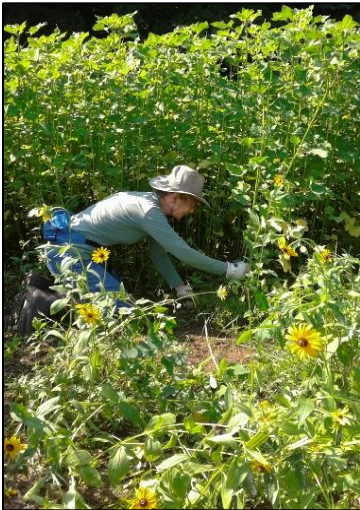
HOW TO CONTROL INVASIVE PLANTS

MANUAL, MECHANICAL AND BIOLOGICAL METHODS

You can attack the nonnative invasive plants that menace your property many different ways: by hand-pulling, digging, mowing or cutting, spraying with herbicides, grazing with goats, and even unleashing an insect or disease upon them. Some methods work better than others in a given situation. Which method is best for a particular invasive plant depends upon several factors, including:

- ❖ Extent and severity of the infestation.
- ❖ Length of time the invasive has been a problem.
- ❖ Time of year you wish to treat it.
- ❖ Quality of the surrounding desirable vegetation.
- ❖ Other invasives to be treated at the same time.

This factsheet details the manual and mechanical methods that PRISM members use and that are recommended on the PRISM's invasive plant factsheets. Here you'll learn how to carry out those control methods and learn about the pros and cons of each method. Often, a combination of methods is the most effective strategy.



Cocklebur, a tall annual weed, can be cut with hand-pruners at ground level in late summer before it sets seed and it will not regrow.

mechanical or manual removal can actually worsen the problem. Following up by spot-spraying or hand-pulling resprouts can solve this problem.

Another downside to manual and mechanical methods is that these methods disturb the soil. Even if pulling or digging effectively kills a particular invasive, the act of pulling it from the soil can bring buried seeds of that or other invasives to the soil surface. Seeds are then triggered to germinate by the increased light

and warmth. Invasives thrive in disturbed soil, so although hand-pulling garlic mustard and Japanese stiltgrass, for instance, can rid the site of mature plants and prevent them from setting seed, the soil disturbance it causes may encourage the dormant seed bank to germinate right away or the following year. This is particularly true where the infestation has existed for many years, because the soil contains a lot of seeds just waiting for the opportunity to germinate.

When we spot an invasive plant, our first impulse is often to yank it out of the ground. Sometimes this works, and sometimes it doesn't. Manual and mechanical methods are problematic because many invasives resprout if even a small piece of their roots is left in the ground after being hand-pulled or dug. This is one reason non-native invasive plants are so successful – they are persistent! Invasive shrubs, such as privet and autumn olive, trees, such as tree-of-heaven, and vines, such as Oriental bittersweet, return as dense thickets from root pieces left in the ground. So be forewarned, incomplete

removal can actually worsen the problem. Following up by spot-spraying or hand-pulling resprouts can solve this problem.

Many invasives succeed because they produce vast quantities of seeds and/or their seeds are long-lived. Seeds of some, such as multiflora rose, may remain viable and able to germinate for five to 10 or even 20 years. If an infestation covers acres, the labor required to hand-pull, dig, weed-whack, or chop the invasives is prohibitive. Mowing may not be time-consuming, but it is not selective and is impractical in a forest.

Here follows descriptions of how to effectively attack invasive plants by mechanical and manual methods. Let your particular situation be a guide to the feasibility of employing these methods.

Hand-pulling and Digging

Hand-pulling works best with small plants, small areas of infestation, and new invasions. *Your goal is to remove all of the roots*, so try to work when the soil is moist and roots are less likely to break off in a tug-of-war. Grasp the plant's stem close to the soil and pull steadily. Annuals, such as Japanese stiltgrass, usually come out of the soil readily; shrubs and perennials can be deep-rooted and more difficult, especially if they are several years or more old.

If the pulled plants are not in flower or have not yet set seeds, you can leave them on the ground. However, if they have set seeds, then put them directly into a plastic bag and dispose of them in a landfill, otherwise the seeds will fall to the ground and continue the infestation. If flowering, some invasives such as garlic mustard, continue to set seeds after being hand-pulled. It is best to not



Removing even the tiny seedlings of wavyleaf grass, an invasive perennial, is necessary to stop it from spreading.



When hand-pulling a perennial such as wavyleaf grass, shown here, all the roots must be removed or the plant will regrow.

leave these pulled plants on site, but to bag them and burn them later or dispose of them in a landfill.

You can use a *shovel* to dig invasive shrubs or perennials – be sure to get as many of the roots as possible. A tool called a *Weed-Wrench®* is used like a lever to yank large shrubs from the ground – it takes less strength than a shovel, but is heavy to haul through the woods.

Cutting, Weed-Whacking, Mowing, etc.

You can kill some invasives, especially annual ones such as mile-a-minute, stiltgrass, and perilla mint, by cutting them to the ground just before they begin to flower. Other invasives are perennials and they will resprout if cut to the ground. These can be exhausted by *repeat cutting* over a single season, although some need to be cut repeatedly for years to kill them.

Weed-whackers with **string trimmers** can be used to cut herbaceous invasive plants to the ground. Woody shrubs and vines require a *steel blade* on the trimmer. Weed-whacking, however, may



A weed-whacker fitted with a steel blade cuts through stout Japanese honeysuckle vines climbing small trees.

harm desirable plants in the process. You may be better off using a *clipper, lopper, handsaw or chainsaw* to cut individual woody shrubs, vines, and saplings to ground level. *Resprouts will need to be cut back repeatedly*, because cutting back most woody invasives stimulates the root system to send up numerous new sprouts. Applying herbicide to the resprouts should kill them. **Mowing** is impractical in a forest setting. It makes sense only in limited circumstances, such as in a field where you might want to cut invasive grasses or woody invasives at a certain time of year to prevent flowering and seed set. You will need to mow, or **bush-hog**, several times during the growing season for several to many years to kill most woody invaders.

Biocontrol

Because nonnative invasive plants originate in other continents, no natural enemies keep them in check in North America. This lack of enemies allows them to grow rampantly. Scientists are studying insect pests and disease pathogens from different invasive plants' native environments to see if they can be introduced into an invasive population as a biological control. Biocontrol methods offer the possibility of highly-specific, nontoxic control. Several important criteria must be met for a biocontrol agent to be approved for release. The biocontrol agent must:

- ❖ Significantly check the invasive's growth and spread, but not entirely wipe it out, because sufficient host population is needed to perpetuate the biocontrol agent.
- ❖ Be highly host-specific and not harm native or other desirable plants.
- ❖ Survive and reproduce from year to year in the new environment to provide continual control.
- ❖ Be able to be grown in a laboratory and successfully and efficiently released where needed.

In developing a biocontrol agent, scientists study what keeps an invasive plant in check in its native territory and then try to isolate the insect or disease, grow it in a laboratory, and test it to see if it is safe to unleash in the environment. This may require five or more years of rigorous testing. Often an agent under

study falls short in one or more of the above-listed criteria. Because numerous natural enemies, such as caterpillars, beetles, and fungal diseases, are interdependent upon a host plant, releasing only one biocontrol agent may not keep the plant in check compared to what happens in the plant's native environment. Despite the fact that all invasive plants have natural enemies that feed on and thus regulate them where they natu-



Fungal disease on tree-of-heaven.

rally grow, approved biocontrols are available for only a few invasive species. Right now, only the mile-a-minute beetle is available as a biocontrol for any of the most serious invasives in the Blue Ridge. A naturally-occurring fungal wilt of tree-of-heaven is being studied at Penn State and VA Tech to see if it could make a feasible biocontrol agent.

Goat Grazing

Native wildlife, such as deer, don't usually eat nonnative plants, perhaps because they're not in their "genetic diet." Goats, however, usually eat anything if they are hungry enough, invasives and desirables alike. They can be grazed to clear invasive plants, but must be *carefully trained and managed* so they eat the invasives first, and then they must be quickly moved to another site before they begin eating the desirable plants. The plants they graze on depend on many factors, such as the breed of goat and how hungry they are. They may go for Japanese honeysuckle and multiflora rose first, because these are high-protein plants, but then they move on. Goats do not eat plant roots, so the woody plants they graze are likely to resprout. The cost to hire goats is about \$1,000/acre, and you must care for them and their guard dogs while they are working on your property.

Combination Methods

Using manual or mechanical methods to reduce the mass of an invasive plant's foliage before spraying it with herbicide is one way to limit the amount of herbicide you use, while still effectively dispatching the invasive plants. This method also reduces possible collateral damage to nearby desirable plants, because the area treated with herbicides will be smaller.



A father and son teamed up on a winter invasive volunteer workday at a neighborhood park. They cut large Oriental bittersweet vines at head height and ground level to create a "window" in the hanging vines. In spring, a contractor will treat the leaves that resprout with herbicide.