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NATIVE PLANTS, NATURAL LANDSCAPES

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The Roundup Myth

AN OPINION by Maryann Whitman

Is it ever "OK" to use Roundup or other herbicides?
What do you need to know about it?
What's the fact and what is myth?

In the last issue of the *Wild Ones Journal* we spoke at length about the invasive species, garlic mustard (Alliaria petiolata). In fact, hardly an issue goes by that we don't have some mention of invasive exotics. In the November/December 2005 issue we reviewed Elizabeth Czarapata's book, Invasive Plants of the Upper Midwest. Her lists of invasive plants may be specific to the Midwest but are applicable to anywhere in the continental United States where those plants are capable of growing. She mentions that, according to a recent report from Cornell University, "Every year, the costs associated with non-native weeds approach and exceed $26 billion in the United States (including Hawaii and Alaska) alone."

It has become abundantly evident that something other than pure manpower and brute pulling force is necessary to control these interlopers. We do need to control them for the sake of a large number of natives that are being displaced by these plants, and ecosystems that are being disrupted. In order to gain control of these culprits we may need to consider the thoughtful and careful use of herbicides.
Most of our antibiotics (penicillin, tetracycline etc.,) exploit the differences among the "illness-producing" and the beneficial biota. For instance, tetracycline interrupts the action of transfer RNA of the target disease

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organism and not of the rest of the cell wherein it resides. Through this action the illness-producing organism is stopped. A similar strategy may be necessary for the control of unwanted, disruptive plants – exploit the special characteristic of the organism we wish to eliminate. Whether it be garlic mustard or any other of a panoply of exotic invasives that have arrived on our shores.

These actions are consistent with the mission of the Wild Ones, namely, to promote biodiversity and sustainable practices. We have resolved to support our native biota, and as a result we may need to be prepared to take some drastic action – we must do something to interfere with the off-continent troublesome species, just to give our continental natives a much-needed assist.

The coming of Roundup.

With the acceptance of this premise, let us consider one of our alternatives: glyphosate. Glyphosate is a broad spectrum, non-selective herbicide that interferes with the production of several amino acids that are vital to the life force of both plants and animals. Its mode of action is through the shikimate pathway. Animals do not use this metabolic pathway – we get these vital amino acids by eating plants. It was with this explanation that glyphosate was approved by the EPA, sold to the American public, and then the rest of the planet, as being safe and non-toxic.

How Does Glyphosate Work? Find out here.

The test results presented to the EPA on this herbicide involved glyphosate alone. When glyphosate was first manufactured by Monsanto in the early 1970s it came on the market in a number of formulations. The most familiar of these is Roundup. It came to the consumer pre-measured, premixed, and ready to be applied. However, in Roundup, glyphosate is combined with surfactants and adjuvants, chemicals that are mixed in to assist in the delivery of the glyphosate into plant cells. This was not pointed out to the consumer. In fact, the consumer, the end user of Roundup, has not been informed of what these additional chemicals were and continue to be. This restriction of information continues, and yet this is the formulation that has been and is being sprayed on agricultural fields around the world.

It is this lack of transparency on the part of Monsanto that has resulted in a great deal of muddled information. Most of the information that is to be had on the deleterious effects of this herbicide on fish, frogs, soil biota, and human beings is based on research using the Roundup formulation. Sometimes it is not clear whether the researcher used only glyphosate or its Roundup formulation. The two are very different products with very different properties.

Then came Rodeo and others.

Rodeo, which is another formulation produced by Monsanto, consists of only glyphosate, diluted with water. This product is intended for use in wetlands and even in water. When, in 2000, Monsanto lost the patent on glyphosate products, many other companies started manufacturing similar products. As a result the glyphosate-only formulation is readily available on the open market, for instance under the trade name Accord. A separate surfactant, of known constituents, may be mixed in to assist in the delivery of the glyphosate to the plant cells.

These actions are consistent with the mission of Wild Ones: Promote biodiversity and sustainable practices.

Whether one needs to add the surfactant depends largely on the method of application. With foliar spray the surfactant ensures that the glyphosate stays on the leaf and penetrates past the waxy protective surface of the plant. But the addition of the surfactant makes the formulation many times more toxic to other biota with which it may come in contact. Premixed formulations of glyphosate with wetland-safe surfactants may also be had, for instance under the trade name Glyphomate 41.

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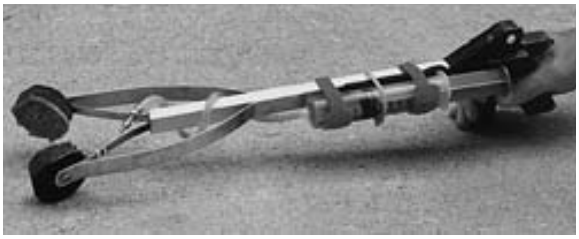
It is possible to use glyphosate "safely."

Yes. With what we know of the mode of action of glyphosate and its behavior in the environment this chemical may be of use to us with certain methods of application to individual plants:



Designed by Wild Ones member Steve Maassen, the easy-to-make Tongs of Death is very effective at applying Roundup (or other herbicide) directly to pesky weeds or invasive aliens, while leaving more desirable plants unharmed.
Read more about the Tongs of Death.

- *Cut and Daub*. The glyphosate-only product is delivered directly to the freshly cut stump of a buckthorn sapling (for instance), or a fistful of cut stumps of reed canary grass.
- *Drill and Fill*. The glyphosate is squirted into a series of holes drilled into the trunk of a large tree in a forest where it may be left standing to become a snag and eventually fall to the ground and serve as a nurse-log.
- *The Glove (and Tongs) of Death*. The glyphosate is stroked onto individual plants, by hand, in a glove soaked in the chemical. The hand is actually in a latex or rubber glove within the soaked cotton glove. The glove may also be replaced by a sponge applicator.
- *Coarse Spray.* The glyphosate product, in combination with a surfactant of known constituents, may also be applied as a coarse foliar spray in a relatively safe manner, during that period of time when native plants are dormant but the invasive plant in question is growing. These so-called "wetland-safe" surfactants may be used on upland plants as readily as on those near water.

A handheld sprayer can deliver a deadly shot of herbicide directly to the weed without wiping out everything else.

Other things to think about.
Consider this: because garlic mustard comes from a different continent (middle Europe) and a different growing environment, it has a different growing season. In fact, it continues growing during a period of time that our natives are dormant. This is the "difference" that we need to exploit. We may apply the glyphosate plus water-safe surfactant while natives are dormant and amphibians are not out and about. It would be well to remember that not all natives go dormant during the winter. For instance, some sedges continue to be green throughout the winter. Because glyphosate is a general herbicide the sedges would be affected.

Another important factor in the premeditated, careful use of glyphosate products is concentration of the applied product when diluted with water. When a little is good, a lot is not better.

When using a product that is not premixed, it is important to know the percent by volume of the active ingredient in the concentrated product. For instance, Accord comes in a concentration of 53%. That means that there are 53 parts per hundred of glyphosate and 47 parts per hundred of water in the container that comes from the store. For treatment of woody plants ("Cut and Daub" or "Drill and Fill"), a concentration of 14% by volume of active glyphosate is recommended – and for herbaceous treatment (foliar spray), a concentration of 5%. To achieve these concentrations when starting with

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53%, one would need to do the following: mix 1 part Accord concentrate with 3 parts water to get approximately 14%. Mix 1 part Accord concentrate with 10 parts water to get an approximately 5% solution of glyphosate. It's important not to exceed suggested concentrations for application. This is especially true if a surfactant has been mixed with the glyphosate as one might do for an early-winter spray application. It's been found that it's possible to chemically burn the plants before the glyphosate has been delivered into the plant body. Plants treated in this way are able to resprout from their roots.

Major Herbicide Myths Vs. Major Herbicide Facts
Find out more.

The Nature Conservancy and many foresters have discontinued using the Roundup formulation when they use herbicides, and use instead the glyphosate-only products, or with wetland-safe surfactants, (both on uplands and wetlands).

Moderation, balance, and tradeoffs.

When a little is good, a lot is *not* better.

Many things that we use every day are dangerous, or even life-threatening in some circumstances: fire, boiling water, concentrated salt solutions. But they are familiar to us – we use them with care and avoid peril. It seems that with modern technology there is available to us an ever increasing variety of things that are useful but may be dangerous if not used with awareness. We need to make ourselves aware of dangers as well as of beneficial applications.

The beneficial applications of some herbicides are evident and necessary if we are to deal with invasive plant species. We look upon infestations of non-natives and recognize their disruption of native ecosystems – systems on which our clean water and the survival of our continental native species depend. It is the pledge of Wild Ones members to do what we can to further the related causes of biodiversity, ecologically sound gardening practices, and conservation of native plant species. But we need to engage invasives with cautious, clear-headed premeditation. If you don't need to use glyphosate but can accomplish your goals by other means, do so. If you need to use glyphosate do so with awareness and care.

Roundup and Amphibians

When the fatal effects of Roundup on amphibians are pointed out, one of the defenses that Monsanto uses is that, "Roundup is not intended for use near wetlands." It has finally occurred to someone to point out that most of our amphibian species actually reproduce in big puddles. These temporary water bodies lie in shallow indentations in agricultural fields. The water lasts just long enough for most amphibians to complete their life cycles. Scientists suggest that Roundup may be implicated in the decrease in population number of amphibians around the world.

Maryann Whitman is the editor of the Wild Ones Journal. She is a member of the Oakland (MI) Chapter.

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