

When the word “herbicide” is used it is often in reference to agriculture. Weed competition with crops is often a concern for producers. However, weeds can also interfere with the aesthetics of a person’s yard (figure 1 and 2). In fact, although I predominantly spend my time looking at weed management strategies for corn, soybean, and pastures, when I am sitting on a plane or socializing, I seem to always get asked how to control something in the homeowner’s yard.



Fig 1 Yellow nutsedge on a grass/flower bed boarder.

In many cases the odd weed can be pulled. If an annual, hand pulling might be all the control technique you need. If it is a perennial it will probably grow back. If you should happen to have a good sized infestation other means of control may be necessary.



Fig 2 Spurge growing in a crack in the sidewalk.

Mowing, mulches, and plastic liners can all inhibit or stop weed growth. Certain ornamentals with dense canopies can be selected that can shade out emerging weeds. In addition to the above methods, a weed management plan for the yard may also include herbicides as an option.

There are several herbicides labeled for lawns. Acclaim Extra, Balan 2.5G, Banvel, Confront, Simazine 90DF, and Sterling are some examples of products available for lawn weed control. For controlling brush, Arsenal, Crossbow, Roundup WeatherMax, and Tordon RTU can be used to name a few. Several herbicides can be used in vegetables. However, in many cases these products all require a little application savvy. You also

have to be certified to apply these products to assure their safe use. They also need to be applied using some form of application equipment.

Always read and follow label directions when using

herbicides, because they are not all labeled to be used in the same way, place, or control the same plants. Some injury to desired plants can also occur if improperly used. If the injury is extensive enough, herbicides can kill you favorite ornamental or your lawn. The next question may be, "is there some thing that I can get at the local garden center? Something that I can just squirt and go?"

Recently I was allowed to take an inventory of home use products at a local Wal-Mart¹ garden center. Some of the products available are offered in several different concentrations and container sizes. Table 1. is a list of the products that are available and below is a summary of components that actually control the weeds. Inventories will vary depending on supply, time of season, and demand. There are other products available that are not mentioned in this article.

¹ I would like to thank the Manager and Employees of the State Highway 26 Wal-Mart, Lafayette Indiana, for allowing me to take an inventory of their home used herbicides.

The products available use several different active ingredients that have activity on certain plants. Many of the compounds have been selected due to their lack of activity on grasses, such as 2,4-D and dicamba, and others due to fact that they are non-selective and have a wide spectrum of activity (glyphosate).

2,4-D:

2,4-D is extensively used as a herbicide. The fact that it has been around for a long time, one of the first herbicides available, and its low cost makes it popular in both the agronomic and home sectors. It is used in many herbicides on the market by many different companies. One of the practical reasons that it is used for home lawns, corn, pastures, and wheat production is that it has little, if no activity on monocots (grasses), but controls a broad spectrum of broadleaf plants. Because it has activity only on emerged growing weeds, applications before a weed has emerged will not be effective. Some of the plants that it can control are chickweed (suppression), dandelion, plantain, lambsquarter, shepherdspurse, and wild carrot. For some weeds repeated applications may be required. A member of the phenoxy family of herbicides, its mode of action mimics growth

hormones in the plant. This irregular growth will eventually disturb the flow of the plants vascular system leading to the death of the weed. Small amounts of 2,4-D can cause foliar symptoms on several broadleaves, particularly roses, tomatoes, and grape vines. Be careful that 2,4-D does not come in contact with desired trees and plants. If it does come in contact with desired plants you may see leaves cupping or strapping (Figure 3). In many cases this symptom does not mean permanent damage.



Fig. 3 Cupping of broadleaves from growth regulator injury. (Plant Pathology Diagnostic Lab, Purdue)

Dicamba:

Similar to 2,4-D, dicamba also affects the growth of broadleaves. However, dicamba is a benzoic acid and can have more activity on many of the weeds. It has activity on pigweeds, lambsquarters, black medic, carpetweed, chickweeds,

ground Ivy, dandelion, knotweed, henbit, some thistles, and partial control of yellow woodsorrel. The activity on the weed is similar to 2,4-D. The symptoms that can be seen on desired plants are also similar; however, dicamba generally will cause more cupping than strapping of leaves.

Dichlorprop and Mecoprop:

This active ingredients belongs to the phenoxy chemical family and similar to 2,4-D and dicamba in how they interfere with the growth of the weed. Dichlorprop is often used in brush control along the fence, utility right-of-ways and other places where vegetation control is required. It is used in the control of several hardwood and coniferous species. Mecoprop was used in established turf and monocot (grass) crops for the control of broadleaf weeds. Mecoprop can control chickweeds, clovers, plantains, knotweeds, ground Ivy, and pigweeds.

Diquat:

This active ingredient is often used in aquatic weed control. Diquat belongs to the bipyridilium chemical family. It works by forming highly charged and reactive molecules with in the weed. These molecules, termed 'free radicals', rapidly disrupt cell

integrity in the weed. Activity is quite fast, starting with wilting and ending in complete desiccation. For this herbicide to be effective sunlight is needed. Brome, buttercups (*Ranunculus* spp.), henbit, aquatic weeds, and Carolina geranium are some of the plants that diquat can control.

Fluazifop:

This active ingredient is used in many broadleaf crops including soybeans and cotton. It belongs to a family of graminicides (control grasses) called the Aryloxyphenoxy propionates. It has activity on foxtail species, quackgrass, johnsongrass, shattercane, and several annual and perennial grasses. The activity of this herbicide is to inhibit the acetyl-CoA carboxylase (ACCase) enzyme. What this does is interfere with the production of phospholipids in the susceptible weed. Phospholipids are used in building the cell membranes of the plant cell, this in turn interferes with the growth of the weed.

Glyphosate:

Ubiquitous, glyphosate is used in many products by many companies and in many places. Although not placed into a family, it is often referred to as a glycine. Anything with this in it is NOT to be used on desired

plants, such as your lawn or desired ornamentals while they are growing. To do so would result in injury of the desired plant for glyphosate is non-selective, meaning that it has activity on many plants. In some cases 'spot treatments' can be used. A 'spot treatment' is referred to an application in a small isolated area. This non-selectivity makes products with glyphosate in it, great for general vegetation control. Glyphosate inhibits the production of three aromatic amino acids, tryptophan, tyrosine, and phenylalanine. Several broadleaf and grass weeds are controlled by glyphosate.

MSMA (monosodium methanearsonate):

MSMA is an organic arsenical. This compound is applied in turf for the control of crabgrass, dallisgrass, foxtails nut sedge, and some broadleaf weeds, such as pigweeds. Plants that have been sprayed with MSMA become chlorotic and necrotic. The mode of action of MSMA is not well understood.

Triclopyr:

A member of the pyridinecarboxylic acid chemical family, it functions in a similar way to the phenoxys (2,4-D and dicamba). It is also termed a growth regulator. It is often

used on right-of-way (under power lines, pipelines) and railroads for tree and brush control. Triclopyr is also used in pastures, rangeland, and turf due to the fact that it has little if no activity on grass species. Being highly effective on woody species, care should be taken to make sure it is not applied near desirable trees. Some of the weeds that it can control are black medic, dandelion, ground ivy, burdock, plantains, and poison ivy.

Trifluralin:

Trifluralin is a member of the dinitroaniline chemical family. Like 2,4-D, trifluralin has been used as a herbicide from quite some time. It is used in many crops, ornamentals, and several

non-crop situations. Due to its volatility it usually needs to be incorporated into the soil either by mechanical means (tillage) or by water incorporation. It has activity on annual grasses and some small-seeded broadleaf weeds. However, it will not control anything that is already emerged. Trifluralin interferes with the development of microtubules in the cells of the plant. Microtubules are used in to line chromosomes up in cell division and cell wall formation. A symptom often seen from the use of dinitroanilines is the swelling of the root tips, giving them a club shaped appearance.

Always remember to read and follow label directions before using any pesticide.

Table 1. Home use products available at your local garden center

Brand name	Active ingredient	Container size	Company
All – In – One Weed Killer for Lawns	0.36% monosodium acid methanearsonate 0.12% 2,4-D 0.06% mecoprop-p 0.02% dicamba	1 gal 24 fl oz pump actions	Bayer
All – In – One Weed Killer for Lawns Concentrate	9.81% monosodium acid methanearsondate 3.18% 2,4-D 1.6% mecoprop-P 0.79% dicamba	32 fl oz concentrate	Bayer
Brush – B – Gone RTU ²	0.70% triclopyr	24 fl oz pump action	Ortho
Eliminator Weed and Grass Killer RTU	0.75% glyphosate	1 gal 24 fl oz	Gro Tech Inc.
Garden Weed Preventer	1.47% trifluralin + 9-17-9 fertilizer	5 lb bags	Miracle Grow
Grass – B – Gone Grass Killer	0.48% fluazifop-p-butyl	24 fl oz pump action	Ortho
Green Sweep	2.29% 2,4-D 2.30% mecoprop 2.26 dichloprop	1 qt hose attachment	Scotts
Preen	1.47% triflualin	5 lb 15 lb bags	Greenview (Seaboard Corp)
Preen'n Green	0.74% triflualin + 9-17-9 fertilizer	6 lb 22 lb bags	Greenview (Seaboard Corp)
Roundup Weed and Grass Killer RTU	1.92% glyphosate	24 fl oz 1 gal pump 1.33 gal	Monsanto
Roundup Weed and Grass Killer Concentrate	25% glyphosate	16 fl oz 32 fl oz 64 fl oz	Monsanto

Roundup Weed and Grass Killer Super Concentrate	50.2% glyphosate	32 fl oz	Monsanto
Systemic Grass and Weed Killer	0.18% diquat 0.06% fluazifop	1 gal	Spectrum Group (Div. of United Ind.)
Systemic Grass and Weed Killer Concentrate	2.3% diquat 0.75% fluazifop	16 fl oz 40 fl oz	Spectrum Group (Div of United Ind.)
Weed and Grass Preventer	1.47% a,a,a,-trifloro-2,6-dinitro-N, N-dipropyl-p-toluidine	5 lb	Gro Tech
Weed B Gon RTU	0.20% 2,4-D 0.20% mecoprop	32 fl oz 1 gal	Ortho
Weed B Gon Weed Killer for Lawns Concentrate	3.05% 2,4-D 10.6% mecoprop 1.3 dicamba	32 fl oz hose attach 32 fl oz 1 gal	Ortho
Weed B Gon Poison Ivy, Poison Oak, Brush Killer	8% triclopyr	16 fl oz	Ortho
Weed Preventer and Plant Food	0.74% trifluralin + 9-17-9 fertilizer	22 lb bag	Miracle Grow
Weed Preventer	1.47% trifluralin	15 lb bag	Miracle Grow
Weed Stop Weed Killer for Lawns	0.593% 2,4-D 0.287% mecoprop 0.06% dicamba	24 fl oz pump action	Spectrum Group (Div of United Ind.)
Weed Stop Weed Killer for Lawns Concentrate	7.59% 2,4-D 3.66% mecoprop 0.84% dicamba	40 fl oz	Spectrum Group (Div of United Ind.)

¹RTU stands for Ready to Use. This generally means that there is no diluting or mixing required.

Complete list of Ortho Products: <http://www.ortho.com/content/products/>

Complete list of Bayer Products: <http://www.advancedgarden.com/>
or http://bayeradvanced.com/l/1_index.html

A handy source for information on lawn care and gardening products by Scotts: <http://www.scotts.com/lawncare/controls.cfm> and <http://www.scotts.com/gardening/Gardening.cfm>

For information on Monsanto products:

<http://www.monsanto.com/monsanto/layout/products/default.asp>

Some of the information above was referenced from the “Herbicide Handbook” (2002) 8th ed. from the Weed Science Society of America.

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Information listed here is based on research and outreach/extension programming at Purdue University and elsewhere. The use of trade names is for clarity to readers of this site, does not imply endorsement of a particular brand nor does exclusion imply non-approval. Always consult the herbicide label for the most current and update precautions and restrictions. Copies, reproductions, or transcriptions of this document or its information must bear the statement ‘Produced and prepared by Purdue University Extension Weed Science’ unless approval is given by the author.