TOUGH TURF WEEDS IN MICHIGAN: MANAGEMENT OPTIONS

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For 50 years, broadleaf weed control has been accomplished with phenoxy herbicides such as 2,4-D, 2,4-DP, MCPA, and MCPP. Dicamba, a benzoic acid, is another traditional broadleaf herbicide. These products are the standards against which any new herbicides are measured. Mixtures of these herbicides are common and numerous. Probably the mixture most familiar to turf managers would be some combination of 2,4-D + MCPP + dicamba. This three-way mixture is inexpensive, has good cool-season turf safety, and provides control of a wide range of weeds. The predominance of three-way herbicides is easily illustrated by the following list of "difficult-to-control" weeds (Table 1). The weeds can tolerate multiple applications of three-way herbicides. The active ingredients in a 'three-way' product, for the most part, have poor or limited activity on these weeds (Table 2). It should be no surprise then that many of these weeds are considered "difficult-to-control". Management of "easy-to-control" weeds is not usually discussed because these weeds are either controlled by a traditional three-way or suppressed by management. For many of these less adapted species, weed management is best accomplished by consistent mowing and judicious fertility practices. It is estimated that 80 percent of weedy species are controlled by regular mowing. Improving site conditions in combination with a well-timed herbicide application can provide several years of relatively weed-free turfing. However, there exists a collection of weedy invaders whose names strike fear and loathing into the hearts of turfgrass managers. These persistent weeds are extremely adapted to thrive in the shady, irrigated, well-fertilized, and low growth habit environment of our backyards. They survive our best efforts at removing them and are relatively tolerant of traditional herbicidal compounds. Over the past several years, turfgrass professionals in Michigan have participated in a survey to help identify these pesky plants. Participants in the survey have included grounds, golf course, commercial sod production, and landscape managers. The respondents have helped to compile a list of difficult-to-control weeds in Michigan (Table 1).

Table 1: Difficult-to-Control Weeds in Michigan.

Common Name	Scientific Name	Lifecycle	Habitat
----------weeds listed in order of most frequent response----------			
Wild Violet	*Viola papilionacea*	Perennial	Moist fertile soils, shaded
Yellow Nutsedge	*Cyperus esculentus*	Perennial	Wet soils, poor drainage
Ground Ivy	*Glechoma hederacea*	Perennial	Moist fertile soils, shaded
Field Horsetail	*Equisetum arvense*	Perennial	Saturated conditions
Creeping Speedwell	*Veronica filiformis*	Perennial	Moist fertile soils, shaded
Crabgrass	*Digitaria ischaemum*	Annual	Full sun, near walks and drives
White Clover	*Trifolium repens*	Perennial	Low nitrogen levels
Quackgrass	*Elytrigia repens*	Perennial	Low maintenance turfs, fields
Prostrate Spurge	*Euphorbia humistrata*	Annual	Disturbed sites, dry or sandy soils
Yellow Woodsorrel	*Oxalis stricta*	Annual	All soils, recently disturbed sites
Dandelion	*Taraxacum officinale*	Perennial	All soils, all locations
Field Bindweed	*Convolvulus arvensis*	Perennial	Unirrigated sites, dry conditions
Common Purslane	*Portulaca oleracea*	Annual	Disturbed soils, tolerates drought

To this day, phenoxy herbicides and three-way herbicide combinations still dominate the weed control landscape; however, they are no longer the only game in town. Two alternatives that exist in the pyridine (non-phenoxy) family are triclopyr and clopyralid. These products are very active on a number of broadleaf weeds and are primarily used in cool-season turf. Triclopyr is used alone and in combination with other herbicides. Triclopyr is active against many weeds that are traditionally labeled hard-to-control (2,4-D didn't work). For this reason, triclopyr is probably the first alternative to try when 2,4-D or a three-way mixture has failed to provide acceptable control. Because of their complementary weed activity, combinations of triclopyr + 2,4-D can be very effective. Clopyralid, although narrow in spectrum, is extremely effective on white clover, black medic, thistles, and field bindweed. Clopyralid also has a wide window of safety on all cool-season grasses including bentgrass.

Table 2: Herbicide Activity on Persistent Weeds.

	2,4-D	MCPP	Dicamba	3-Way	MCPA	Triclopyr	Clopyralid
Ground Ivy	P[†]	F	G	G	P	E	F
Wild Strawberry	P	P	E	E	P	E	P
Spurge	P	F	E	E	P	F	P
Oxalis	P	P	F	F	P	E	P
Corn Speedwell	P	P	F	P	P	E	P
Creeping Speedwell	P	P	P	P	P	F	P
Wild Violet	P	P	P	P	P	G	P
White Clover	P	F	F	G	P	P	E
Prostrate Knotweed	P	F	G	F	P	E	F
Field Bindweed	F	P	E	E	F	--	E

[†]P = Poor, F = Fair, G = Good, E = Excellent control.

Postemergence broadleaf products are available as either a salt-based amine or an alcohol-based ester. A quick review reminds us that amine formulations are very common and have low potential for volatility. Ester formulations are more effective than amines, but high volatility potential limits their use because of increased risk for off-site damage. Factors that determine which formulations to use include the growth stage of the weeds, climatic conditions, and sensitivity of landscape plants, which was discussed earlier.

Postemergence grass herbicides are sometimes tankmixed with broadleaf herbicides to increase the range of weeds controlled by a single application (i.e. plaintain and crabgrass). MSMA is available in a prepackaged product with 2,4-D, MCPP, and dicamba. Fenoxyprop-p-ethyl (Acclaim Extra) is not commonly used with 2,4-D as this combination can result in poor weed control and significant cool-season turfgrass injury. Conversely, quinclorac (Drive) may be tank mixed with 2,4-D or products containing 2,4-D. There also appears to be synergism between 2,4-D and quinclorac. Several years of research indicate that the weed control potential (ground ivy, speedwell, violets, and clover) of several broadleaf herbicides can be dramatically increased by tank mixing them with quinclorac. Products containing 2,4-D have benefited the most from this combination. These combinations deserve consideration to be used for callbacks and mid-to-late-summer weed control applications.

SOMETIMES WAITING IS BEST

Fall is the best time to control perennial broadleaf weeds, biennials, and seedling winter annuals. As a rule of thumb, the younger a plant is, the easier it is to control. Winter annuals are easily controlled with fall herbicide applications. Established perennials are also effectively controlled in the fall because they are actively growing and storing food reserves in their roots. This increases the movement of herbicide into the underground storage parts of the plants. Non-target injury from volatility and/or spray drift is less likely to occur in the fall because ornamental plantings are hardening off for the winter and vegetable gardens have run their course. Non-target injury is most likely in the spring, when plants are breaking bud and flowering. Succulent new growth is extremely sensitive and easily injured by exposure to most postemergence broadleaf herbicides.

A PENTATEUCH OF PRINCIPLES FOR PESKY PLANTS

- Preemergence Choice – the most effective way to avoid a frustrating mid-summer postemergence duel with your nemesis weed is to prevent its establishment with a preemergence herbicide. Several preemergence crabgrass herbicides also have activity on a limited spectrum of broadleaf weeds – Spurge (dithiopyr, pendimethalin, prodiamine), Oxalis (dithiopyr, oryzalin, pendimehtalin, prodiamine), and Speedwell (dithiopyr, pendimethalin).

- Repeat Applications – one of the most effective techniques for removing "difficult-to-control" broadleaf weeds is to make repeat applications of a 3-way product on three to four week intervals.

- '10-4-good buddy' – herbicide activity goes through the roof in the fall. Using the ester version of your favorite 3-way will often provide control of the otherwise elusive perennial weeds.

- Big Guns – when repeat and fall applications of a 3-way herbicide have failed to provide acceptable result, try switching to a product that contains triclopyr (ground ivy, violets, oxalis, spurge, speedwell, and knotweed) or clopyralid (clover and thistle). The macho types can try tankmixing broadleaf compounds with quinclorac for increased broadleaf activity and crabgrass control during the less optimum summer months.

- Learn to Dig the Dogma – without this point, the rest are useless. **The weed control provided by a herbicide application will be temporary, at best, unless you correct the condition that allowed the weed to dominate in the first place.**