

# Managing Weeds in New York Vineyards

## II. Chemical Control of Vineyard Weeds

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There are many herbicides registered for vineyard use in New York. Current recommendations for herbicides used in New York vineyards are given in Cornell Cooperative Extension's *Pest Management Recommendations for Grapes* for the present year. Space limitations, however, prevent the listing of all labeled herbicides and the publication lists only the most commonly used materials. This series of Fact Sheets provides more complete information regarding use of herbicides in New York than can be contained in the Pest Control Guide.

Weeds, in a general sense, are defined as plants growing where they are not wanted. In the vineyard, most weeds that are encountered are short-lived, wild species well adapted to the bare ground under the trellis and between the rows. Their genetic diversity, prolific seed production, and vigorous growth characterize them as "weedy." Table 1 lists many of the weeds species found in New York vineyards.

In order to develop a successful weed management program, the vineyard manager must have a working knowledge of both chemical and non-chemical control options and how and when to legally and efficiently use them. Fact Sheet #1 of this series covers general strategies for vineyard weed management. This publication gives principles of chemical control and sheets Numbers 3 and 4 document detailed information

regarding herbicides that may be used in New York vineyards.

Pre-emergence herbicides are applied in early spring so that the chemical will be in contact with the germinating seeds of summer annuals as they emerge in April, May, and June. Many of the most troublesome grasses and broad-leaf weed species have a **summer annual** life cycle, meaning that they complete the cycle of seed-to-seed within one growing season. **Winter annual** weeds also complete their life cycle within one calendar year, but germination begins at the end of the summer in late August or September. Winter annuals overwinter as small, quiescent green plants. As the temperature rises and days lengthen in the spring, they are stimulated to produce flowers and seed. Winter annuals can be controlled in the spring with post-emergence herbi-

cides or by cultivation. Control measures should be applied early in the spring, before the weeds begin to grow too vigorously. **Biennial** weeds have a life cycle similar to that of winter annuals, except that they germinate earlier in the summer. The time of control is the same as for winter annuals. In some cases, biennial and winter annual vineyard weeds are best controlled by fall application of a post-emergence herbicide.

Perennial weeds, as the name suggests, can survive for more than two years. **Simple perennials** such as dandelion and plantain will reproduce by seed even though individual plants can survive for several years. **Creeping or compound perennials**, such as goldenrod, Canada thistle, yellow nutsedge, and wild onion will also reproduce by creeping underground stems, roots, tubers, or bulbs. Most, but not all of the pre-emergence herbicides are ineffective in controlling **established** perennials. Post-emergence control of perennials begins in the early spring and continues through the growing season, depending on the weed species and the herbicide being used.

A good weed management program also requires that the grower scout the vineyard during the summer and again after harvest to identify and inventory weeds that have escaped the cur-

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rent control practices. Only by doing this will the manager be able to make rational decisions about changes that may be needed in the weed management program. The key to an effective management program is to have a good idea of what is or may later be growing under the trellis

Herbicides are commonly defined by their mechanism of action. *Pre-emergence herbicides* are applied before weeds emerge. They usually provide residual activity which kills seedlings as they germinate. *Post-emergence herbicides* are used to control established weeds and are either *contact* or *systemic*. Contact herbicides kill only the portions of the weeds that are contacted by the herbicide. This burndown activity may kill annual weeds, but many perennial weeds will regrow from underground plant parts. Systemic herbicides are absorbed by plants, usually through the leaves, and are into areas of the plant not directly contacted. Properly applied, systemic herbicides can kill entire plants, including the root system.

*Selectivity* defines which weeds are controlled by specific herbicides. Certain herbicides are more effective in controlling (monocotyledons), while others are more effective in controlling *broadleaf weeds* (dicotyledons). The selectivity of herbicides is one of the most important factors to consider when planning an effective weed control strategy.

The appropriate rate of herbicide to apply depends on several factors. Pre-emergence herbicides are soil active, and the effective

concentration to use depends upon soil type. Generally, more pre-emergence herbicide is needed to control weeds on finer texture soils (clays and silts) than on coarser soils (sands and gravels). For some herbicides, the rate should be increased when the soil has a high organic matter content. The proper rate of both pre- and post-emergence herbicides to be used is also influenced by the species of weeds to be controlled.

The correct timing of herbicide application also depends on several factors. Some herbicides, such as diuron, are more soluble than others, and move more quickly through the soil. More soluble herbicides should be applied just prior to weed emergence in the spring; fall application might result in movement in the soil below the weed seed germination zone. On the other hand, less soluble herbicides benefit from earlier application which allows rainfall to move the herbicide into the soil. Early spring application is normally recommended for most pre-emergence herbicides, but ongoing research is attempting to define the best application time for specific herbicides. The timing of post-emergence herbicides depends on the height and growth stage of specific weeds and on stage of vine development. Consult the label for the best timing to achieve control of specific weeds.

Some weed species are inherently tolerant of certain herbicides. For this reason, combinations of pre-emergence herbicides are often applied to complement each other and to broaden the spectrum of weeds that can be controlled.

Useful combinations in the spring consist of herbicides which control grasses well, such as oryzalin (Surflan), norflurazon (Solicam), and napropamide (Devrinol) combined with those which provide good broadleaf weed control such as simazine (Princep) or diuron (Karmex). Post-emergence herbicides are also added to these combinations in the spring to control the existing vegetation.

In contrast, some weeds which are usually well controlled by a class of herbicides, may suddenly appear to have developed complete *resistance*. This is not a result of herbicide-caused mutations, but rather the continual use of a herbicide over several years eliminates the susceptible portion of the population and allows the very small portion of the population which is truly resistant to multiply. In order to prevent resistant populations from building up in the vineyard, the grower should alternate herbicides from year to year or use combinations of herbicides. Cultivation and spot herbicide treatments will also help in preventing tolerant weed species from invading and becoming established.

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**Table 1. Weeds of New York Vineyards<sup>1</sup>.**

**Broadleaf weeds**

**summer annuals**

buckwheat, wild	mustard, black	purslane, common
cocklebur, common	mustard, hedge	radish, wild
copperleaf, virginia	mustard, wild	ragweed, common
galinsoga, hairy	nightshade spp.	smartweed, pennsylvania
ladythumb	pigweed, redroot	spurry, corn
lambsquarters, common	pigweed, smooth	velvetleaf
morningglory, tall	pigweed, tumble	woodsorrel, yellow (oxalis)

**winter annuals**

burdock	hoary cress	pepperweed, virginia
chickweed, common	horseweed (maretail)	pineappleweed
filaree, redstem	knawel	shepherdspurse
groundsel, common	lettuce, prickly	sowthistle, annual
henbit	mayweed (dog fennel)	speedwell, corn
hoary alyssum	pennycress, field (fanweed)	speedwell, purslane

**biennials**

carrot, wild	mallow, common	sweetclover spp.
chamomile, corn	mullein, common	teasel
cockle, white	mullein, moth	thistle, bull
eveningprimrose, common	parsnip, wild	yellow-rocket
goatsbeard, yellow		

**simple perennials**

bedstraw, smooth (cleavers)	dandelion, common	plantain, buckhorn
chickweed, mouse-ear	dock, broadleaf	pokeweed, common
chicory	dock, curly	vetch, common (spring vetch)
daisy, english	plantain, broadleaf	vetch, hairy

**creeping perennials**

aster spp.	healall	St. Johnswort
bindweed, field	horsenettle	tansy
bindweed, hedge	milkweed, common	thistle, canada
dogbane, hemp	mugwort	toadflax, yellow(butter and eggs)
goldenrod spp.	nettle, stinging	yarrow, common
ground ivy	sorrel, red	
hawkweed spp.	sowthistle, perennial	

**woody or semiwoody perennials**

brambles	poison-ivy	sumac, staghorn
creeper, virginia		

**Grasses**

**summer annuals**

barnyardgrass	foxtail, giant	goosegrass
crabgrass, large	foxtail, green	panicum, fall
crabgrass, smooth	foxtail, yellow	witchgrass

**winter annuals**

brome, downy	cheat	ryegrass, annual
bluegrass, annual		

**perennials**

fescue, tall	quackgrass	timothy
johnsongrass	ryegrass, perennial	wirestem-muhly
orchardgrass		

**Non-grassy monocots**

**perennials**

garlic, wild	nutsedge, yellow (nutgrass)	onion, wild
horsetail, field		

<sup>1</sup> Source: Special Report, August 1985. Assessment of Pests - Losses they Cause and Pest Management Strategies for Great Lakes/Eastern Grapes. R.C. Pearson, R. C. Seem and S. P. Eisensmith