V. Weed Management

Weed management is more properly termed 'vineyard floor management', as distinct management strategies are implemented for the region under the trellis and the row middles. Vegetation under the trellis must be managed to minimize competition with vines from the key bloom-to-veraison growth stage, after which weed growth has less impact on vine function. Studies have shown that crop losses due to poor weed management are higher than losses due to diseases and insects combined. Row middles can be managed to influence both nitrogen and soil water availability and hence vine vigor. While frequent rainfall often promotes growth of weeds, it also permits establishment of cover crops that can help growers manage water use to limit excess vigor.

This section emphasizes the integration of mechanical and cultural practices with judicious choice and usage of herbicides to achieve a grower's management objectives. Proper choice and timing of pre-emergence and post-emergence herbicides, consideration of tillage and other non-chemical control methods, proper care and calibration of weed sprayers, and use of cover crops and mulches in row middles where appropriate are covered in this section, along with critical vine development stages (bloom to veraison) for reducing weed competition under the trellis.

As part of environmentally responsible vineyard management, it is not necessary to have pristine weed control throughout the season. The most critical time for weed control is budbreak through veraison, after which some additional weed growth is not viticulturally harmful. However, weeds should not interfere with harvest activities, contaminate harvested crop, nor be allowed to proliferate to the point that future weed control is difficult.

Weed Management

	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Is vineyard monitored and mapped for weeds?	Grower or vineyard manager monitors weeds at least 3 times during the season. Weed infestations are recorded and mapped.	Grower or vineyard manager monitors weeds periodically. Weed infestations are recorded and/or mapped.	Weeds are monitored periodically.	Weed composition monitored rarely if ever.	
	AND	AND			
The best way to prevent new weed problems is to keep good records. *Weeds of the Northeast* (Phillips 1956) is an excellent reference book for identifying weed species. Also, weed photos can easily be found on the internet. Try **http://www.wssa.net/.**					
What percent of the area between rows contains permanent ground cover? *In vineyards more than one year old.*	>75% of the area between rows contains permanent ground cover.	67-75% of the area between rows is covered.	50-66% of the area between rows is covered.	<50 % of the area between rows is covered. OR Row middles are tilled.	
The maximum amount of soil should be covered to prevent erosion and foster non-competitive species diversity.					

Weed Management

	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Are non-chemical weed management techniques being used?	Non-chemical techniques are used exclusively. Only minimally disruptive cultivation under the trellis is used. Deep cultivation or tillage is avoided. Erosion is controlled.	Non-chemical techniques are used in combination with post-emergence (foliar-applied) herbicides. Only minimally disruptive cultivation under the trellis is used. Deep cultivation or tillage is avoided. Erosion is controlled.	Herbicides are the only form of weed control under the trellis. Only minimally disruptive cultivation under the trellis is used. Deep cultivation or tillage is avoided. Erosion is controlled.	Herbicides are the only form of weed control under the trellis. Frequent, deep cultivation is used. Erosion is not controlled.	
In planning a weed control program, how are control methods and rates chosen? *From Ohmart and Matthiasson (2000).*	No herbicides are used.	Foliar-applied (post-emergence) herbicides are the only herbicides used. Herbicides are chosen based on weed species present. Rates are based on weed species and size.	Soil-applied pre-emergence herbicides are used. Rates are based on weed species and soil type.	All-purpose tank mixes and standard rates are used for all vineyard blocks.	

Weed Management

	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Are the leaching potential of herbicides and soil characteristics considered in choosing soil-applied herbicides? *From Ohmart and Matthiasson (2000).*	Simazine (Princep), diuron (Karmex), and norflurazon (Solicam) are not used.	Simazine, diuron, and norflurazon are used less than annually but are not used at all in gravelly or sandy soils with high leaching potential or in areas with high water tables.	Simazine, diuron, and norflurazon are used annually but are not used at all in gravelly or sandy soils with high leaching potential or in areas with high water tables.	Simazine, diuron, and norflurazon are used regardless of soil leaching potential.	

The above three herbicides are known to leach into ground and surface waters. Currently, simazine can be found in groundwater on Long Island and in surface waters in the Finger Lakes. Norflurazon (Solicam) is not labeled for use in Nassau and Suffolk counties.

Weed Management					
	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
What type of herbicide sprayer is used?	Application equipment that increases deposition and reduces drift is used (e.g. CDA shielded sprayer).	A standard herbicide sprayer equipped with air induction nozzles and/or a shield in order to increase deposition and reduce drift is used.		Application equipment is not designed to increase deposition or reduce drift.	
Controlled Droplet Applicators (CDAs) use a spinning disc rotary atomizer that creates a mist of similar size droplets under the dome or shield. This technology allows ultra-low volumes to be used, minimizes drift, and places the herbicide efficiently. Efficient and timely placement of postemergence materials may allow a reduction in rate of material used. Practical experience dictates that these sprayers are less effective with dense stands of weeds. Air induction nozzles (discussed in the *NY and PA Pest Management Guidelines for Grapes*) are well proven with herbicide application and are recommended.					
Is the herbicide sprayer calibrated properly?	Sprayer is serviced and calibrated before the start of each season and prior to each application during the season.	Sprayer is serviced and calibrated before the start of each season.	Sprayer is calibrated infrequently or only after repairs.	Sprayer is not calibrated.	

Weed Management

	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Are residual broadleaf and grass herbicides rotated to reduce the potential for resistant weeds?	Every third year, herbicides are rotated to another chemical family.	Every fourth year, herbicides are rotated to another chemical family.		Herbicides used are always the same.	
This is primarily a weed resistance management strategy. However, weeds can easily develop cross-resistance to substituted ureas (Karmex) and triazines (Princep). Therefore, oxyfluorfen (Goal) or flumioxazin (Chateau) should be a rotational choice. The length of control of grass weeds during the season decreases after several years of reapplication of the same material. Soil microbe populations are thought to build up over time, which consume the herbicide molecules as a food source.					
Is the amount of spring residual (pre-emergence) herbicide adjusted based on soil characteristics?	Based on knowledge of soil types within your vineyard and characteristics of soil-applied herbicides, application rates are adjusted to apply proper amounts in each vineyard block.	Based on knowledge of soil types within your vineyard and characteristics of soil-applied herbicides, application rates are adjusted to apply proper amounts for the entire vineyard.		The historical rate and/or the maximum-labeled rate are applied throughout the vineyard. Soil type and herbicide characteristics are ignored.	

Weed Management

	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
What types of post-emergence herbicide are used?		Low toxicity and/or rapid breakdown in environment (e.g. Roundup Ultra, Touchdown, Poast, Rely, Aim or Scythe).		High applicator toxicity or long soil half-life. e.g. Gramoxone (paraquat)	
Paraquat is persistent in the soil for more than one year after application. Although generally unavailable to soil microbes, some studies have found that initial application is harmful to beneficial microbes. Rely (glufosinate) is not registered for use in Nassau and Suffolk counties.					
How often are post-emergence herbicides applied?	Applied once at appropriate time or not at all.	Applied twice at appropriate times.	Applied three times.	Applied more than three times.	
Refer to the *NY and PA Pest Management Guidelines for Grapes* for appropriate timing of post-emergence herbicide application. The guidelines are available on the internet at: **http://ipmguidelines.org/grapes**					

Weed Management

	1 - Low Risk	2	3	4 - High Risk	YOUR RANK
Is spot treatment of visible weeds employed to reduce the total amount of post-emergence herbicide used?	No post-emergence herbicide is needed or applied.	Vineyard weed scouting is used to identify weed patches. AND Visible weeds are treated with a manual hand gun sprayer. OR Machine sprayer is manually turned off when no weeds are present.		Spray is applied to the entire vineyard without regard to the presence of visible weeds.	

New technology allows infrared sensors to detect the difference between weeds and bare ground. Sensors tell the sprayer to apply only to the weeds and not to the bare ground. This technology is not yet sufficiently tested in vineyards.