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University of California
Agriculture and Natural Resources
Making a Difference for California
Cooperative Extension Sutter-Yuba Counties

Sacramento Valley Walnut News

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Walnut Blight Management

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Our most current information indicates the section 18 for ethylene bis-dithiocarbamate materials (Manzate flowable or Manzate Pro-stick) for walnut blight control are on track with issuance expected about March first. We have not seen the actual 2012 section18 but expect similar wording and restriction as in previous years.

Copper tank mixed with Manzate flowable or Pro-stick is currently the most effective spray choice. Good quality copper products are all effective for controlling walnut blight. Follow label rates because metallic rates and copper availability vary depending upon product. Full coverage at full material rates is recommended.

Walnut Blight (*Xanthomonas arboricola pv juglandis*) bacteria over winter in the outer bud scales or cataphylls. Within the dormant bud, the inner leaf tissue and flowers are pathogen free. As the shoot grows through the infected outer bud scales, bacterial have the opportunity to move and infect developing leaves, shoots and flowers. Infection occurs when rainfall and/or wet conditions transport blight bacteria to developing tissue. The probability of infection depends upon how much pathogen exists on individual buds and environmental conditions favoring bacterial spread and infection. First walnut blight sprays are timed to coincide with early shoot emergence. This places a protective layer of bactericide on leaf tissue. If bacteria are splashed from the out bud scales to developing shoots and flowers, the bactericide barrier prevents infection and subsequent blight lesions. Since all walnut shoots do not emerge at the same time, the first protective spray is applied when 40% of the shoots are elongating and before leaves expand. This is usually referred to as the "prayer" stage since the unfolded leaves resemble hands held in prayer. A second spray is applied about 7 to 10 days later and is designed to protect the remaining opening buds. Additional spray decisions are based upon measurements of infected buds, disease history, weather conditions and variety.

Many walnut growers wonder if they need to blight spray Chandler or other late leafing varieties. We have measured over 50% crop damage on Chandler walnuts when overwintering bud populations were high and spring weather favored disease. Conversely, we have measured little to no blight on Chandler

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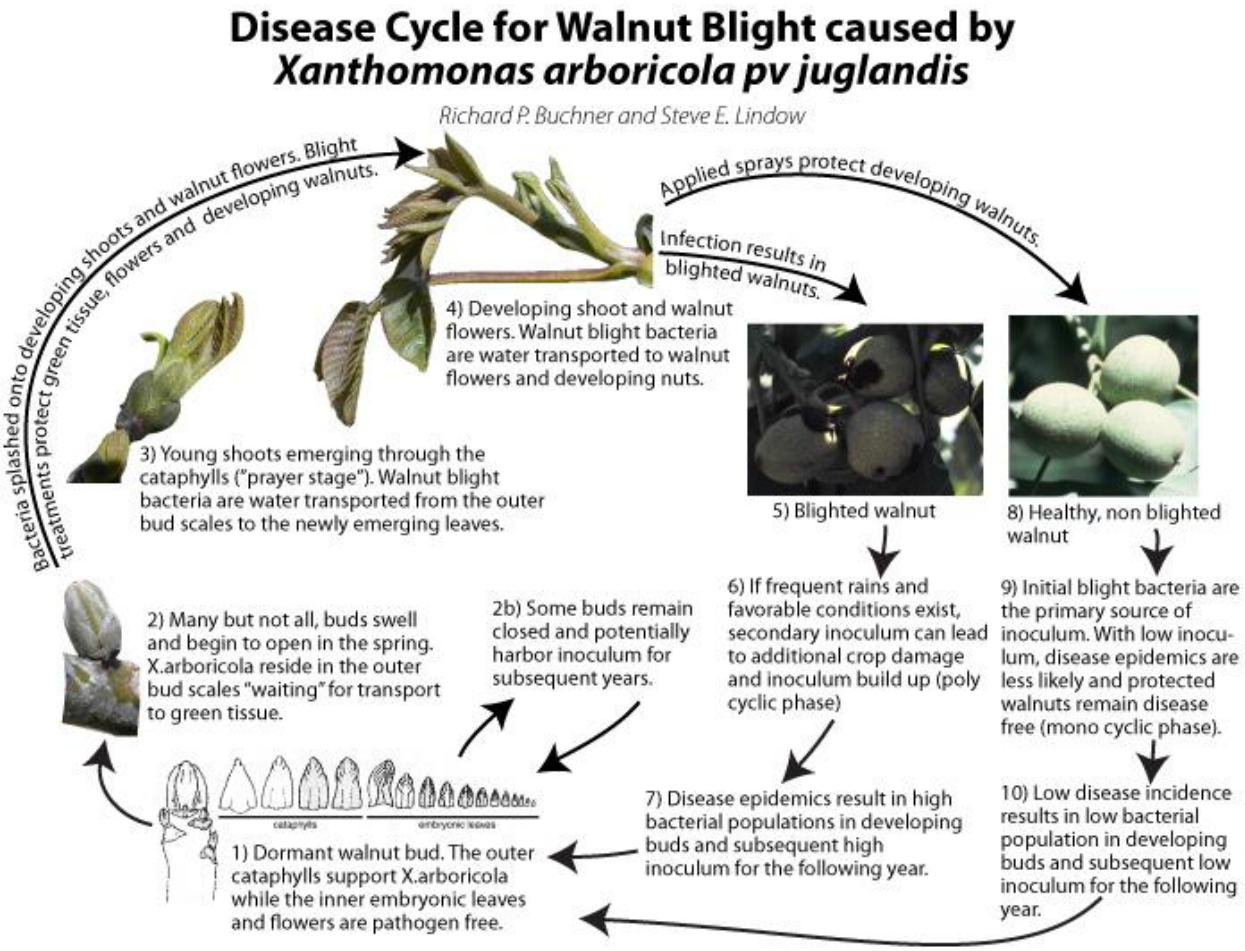
walnut with low to zero bud population levels even when wet spring weather favored disease. Late leafing walnut varieties have less opportunity time to build high walnut blight populations in dormant buds. As a result, initial inoculum levels are low. This does not eliminate, but reduces the probability of disease incidence. A good late leafing strategy would be to apply the first two applications with the intention of maintaining low inoculum levels.

Bud pathogen information, disease history and weather conditions can be used to improve spray decision accuracy. The California Seed and Plant Lab, 7877 Pleasant Grove Road, Elverta, California, 95626 (916-665-1581) is available to evaluate dormant walnut buds for blight bacteria. The sampling technique is available at cetehama.ucdavis.edu. Click on orchard crop, click on walnuts and scroll down to "sampling dormant walnut buds."



Training and Pruning Young Walnut Trees

Carolyn DeBuse, Farm Advisor, Yolo & Solano Counties;
Janine Hasey, Farm Advisor Sutter & Yuba Counties;
and Bruce Lampinen, Extension Specialist, UC Davis

Training and pruning young walnut trees is done in the first 5-6 years of the life of the tree. Traditionally it has been done in a modified central leader pruning style. The height of the first branch, the amount of branch thinning, number of scaffolds chosen and the amount of wood taken off when heading cuts are made differs for hedgerow (132+ trees per acre) and traditionally spaced orchards (e.g. 48-80 trees per acre). However, the basics behind the modified central leader pruning style are similar for hedgerow and traditionally spaced orchards. A current trial at Nickels Soil Lab in Arbuckle is looking at three different styles of pruning in a hedgerow Chandler orchard; heavily pruned, minimally pruned, and no pruning. Minimal pruning is what we have recommended for years for most lateral bearing walnut varieties. The heavily pruned style is not recommended for most varieties but is seen in some orchards. The no pruning style (or lack of pruning) is very new. It has been getting a lot of attention from growers and researchers alike. This article summarizes our findings and discusses factors that should be taken into account when choosing a pruning style for your next orchard.

The Trial Summary

The objective of this trial is to consider different training styles for hedgerow Chandler walnuts with the goal of creating strong trees, early yields, reduced pruning cost, and prolonging the time to the first hedging. The trial was planted in 2008 and is going into its fifth growing season. The trees are planted on berms at a 15 x 22 ft. spacing. The soil is Hillgate loam and Arbuckle sandy loam. The trial is a comparison of three styles of pruning: heavily pruned, minimally pruned and unpruned or no pruning. They are described in detail in the table on the next page. The simplest way to describe the difference between heavily pruned and minimally pruned is that the heavily pruned has branches removed if they are competing with selected scaffolds and all branches are headed in the first three years. In minimally pruned trees, the competing branches are typically left in the canopy but not headed to develop fruitwood and the chosen scaffolds are headed in years two through four. In both pruning systems, the leader is headed and left as the longest limb.

At this point of the trial the orchard is not yet at full canopy, but light interception data shows no significant difference between treatments except the minimally pruned treatment was slightly larger when measurements were taken in July. The heavily pruned treatment had statistically less crop in the second year of harvest and less cumulative yield for the last two years compared to the minimal and unpruned treatments. Visual observations at this point show more fruiting wood developed in the unpruned and the minimally pruned trees. Unpruned trees produce extension growth every other year with fruiting spurs forming on this extension growth in the following year. Yield efficiency (yield per unit canopy light intercepted) is highest in the unpruned treatment. This means that more nuts are being produced for the size of canopy formed in the unpruned trees. Data from a previous 7 year long trial of pruning versus no pruning on Howard walnut (http://walnutresearch.ucdavis.edu/2010/2010_117.pdf) showed that although the yield in the early years tended to be higher for unpruned trees, by the time the trees had filled in their allotted space, there were no differences in cumulative yield or quality for the pruned and unpruned treatments.

Take Home Lesson

This trial is not complete nor have we answered some very important questions. We do not know how the pruning treatments will affect limb breakage when the trees come into full bearing. We also do not know if the same response would be observed on different soil types, tree spacing, or irrigation methods. A side trial containing the same treatments on different varieties: Gillet, Forde, and Tulare, is showing similar trends in yield and growth. We also have not answered the question: 'will an unpruned orchard need to be hedged earlier or later than the other pruning treatments?' If you are interested in trying a new training/pruning style in your own orchard it would be a good idea to start small and see how your orchard practices work with a more minimal style of pruning. It has been found that once you start a pruning style you should continue with the same style until the trees are mature. Changing midstream is not recommended.

Factors that may affect the pruning style you choose

- Variety of walnut and rootstock: more vigorous scions and rootstocks can create more problems with blind wood and excessive in-season branching with heavy pruning.
- Soil and irrigation: vigor is also affected by soil and water management practices.
- Tree spacing: ideally your overall management (pruning, irrigation and nutrition) should encourage the tree to fill the space allotted without excessive crowding. We may find that higher yield efficiency and more fruiting wood in the early years will be better in the long run. Stay tuned for the answer.

Notes on the Forde Variety

The new Forde variety has been found to be a very vigorous tree and in our pruning trial the heavily pruned Forde trees had many of the side buds break in the current season and form groups of thin branches, also known as "witches broom". These problems have also been observed by a number of growers. At this point we suggest only minimal pruning for Forde with no heavy pruning or heading of the scaffolds. (Full report at http://walnutresearch.ucdavis.edu)

Notes on the Chandler Variety

Although the research trial in Arbuckle is a Chandler hedgerow, Chandler's vigor, growth and fruiting habit is typically best suited to planting it in a traditionally spaced orchard for long term productivity. What we are learning on growth response to pruning or no pruning during the training stage however, applies to Chandler growing in either configuration.

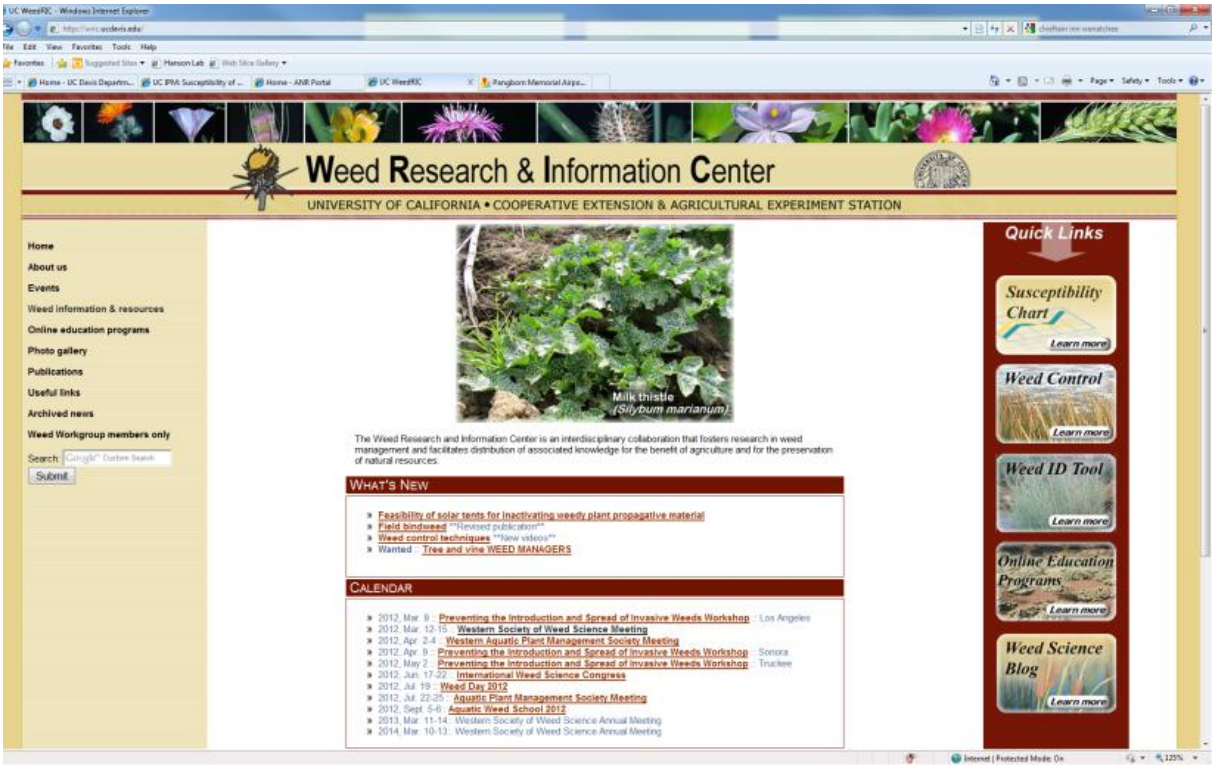
Description of the Three Training/Pruning Styles Compared in the Chandler Hedgerow Trial

	Heavily Pruned	Minimally Pruned	No Pruning (or heading)
At planting 2008/first growing season	Trees in all treatments were planted and headed at 4-5 healthy strong buds above graft union on the scion. One strong leader was selected for the trunk and tied to a short stake (4.5 feet above soil). A few lower shoots above the graft union were kept shorter than the leader but allowed to grow longer than is typical to take some vigor from the leader to avoid breakage. (Note: if trees had been traditionally spaced, they would have been planted with 10 foot stakes where 2 feet of stake is in the ground)		
First year Dormant pruning 2009	At the end of the dormant season in March, the leader was headed at 6 feet. Lower limbs below 3 feet were removed.	At the end of the dormant season in March, the leader was headed at 6 feet. Lower limbs below 3 feet were removed.	At the end of the dormant season in March, the leader **was not** headed. Lower limbs below 3 feet were removed. A long stake extension was placed to support the unpruned leader.
Second year delayed dormant pruning 2010	Selected and headed a central leader by 1/3 of length of current growth. Selected 4-6 primary scaffolds and headed each by 1/3. Heights of scaffolds were maintained below the height of the central leader. All unselected branches were removed if they were likely to compete with chosen scaffolds. Forked branches were reduced to a single branch. All remaining branches were tipped or removed. Lowest branch left at about 4 feet above berm in the row.	Central leader selected and 1/3 of current growth was removed. 4-6 primary scaffolds were selected and headed below the height of the central leader. These heading cuts removed 1/4 to 1/3 of the length of current growth. Forked branches on chosen scaffolds were reduced to a single branch. Remaining unselected branches and small caliper fruit wood were left unpruned and unheaded to create early fruiting wood. Lowest branch left at about 4 feet above berm in the row.	No pruning or heading unless lower branches needed to be removed for reasons of safety or ease of maintenance and harvest.
Third year delayed dormant pruning 2011	The central leader from previous year was examined and if chocked out by a stronger branch, a new central leader was chosen. The chosen central leader had 1/3 of the growth from current year removed. Branches that were competing with the leader were removed. In season branching points were removed in secondary scaffolds. Secondary scaffolds were chosen in all directions and headed by 1/3 making sure no secondary scaffold was taller than central leader. All twisted, crossed or rubbing branches were removed.	The strongest, tallest scaffold was chosen as the leader and 1/3 of the current growth was removed. Other scaffolds were left alone if they were growing in a vertical position. One or two strong scaffolds were chosen on the sides of the canopy, one in each cardinal direction was headed removing 1/3 of the current growth. Forked branches were left but twisted, rubbing or overlapping branches were removed.	No pruning or heading unless lower branches need to be removed for reasons of safety or ease of maintenance and harvest.

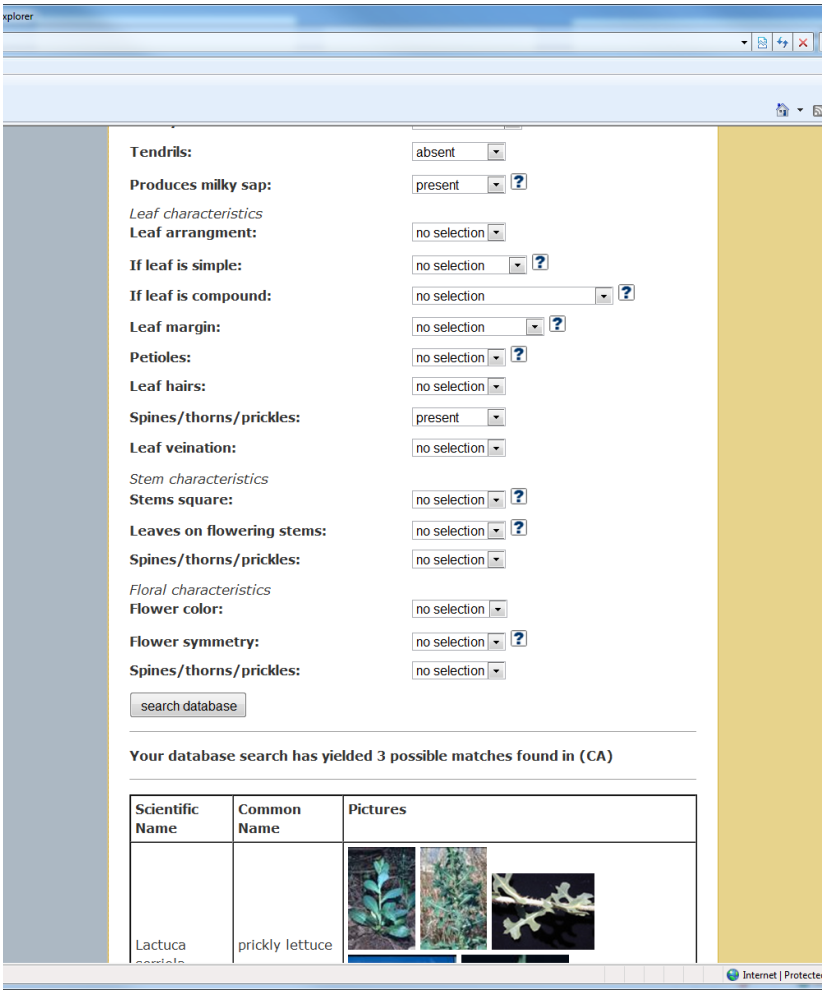
Tools for Weed Management Decisions in Orchard Crops

Brad Hanson, UC Extension Weed Specialist, Davis

Weed control issues and management tools sometimes seem like a constantly moving target. Weed species shift as orchards age, new species sometimes appear, and herbicide resistant species have occurred in some cases. Similarly, herbicide options can vary significantly among crops and occasionally vary year-to-year as new herbicides are registered or old material are no longer supported by the manufacturer or allowed for use in certain crops. Fortunately, a few tools are available to help California crop producers make informed weed control decisions.

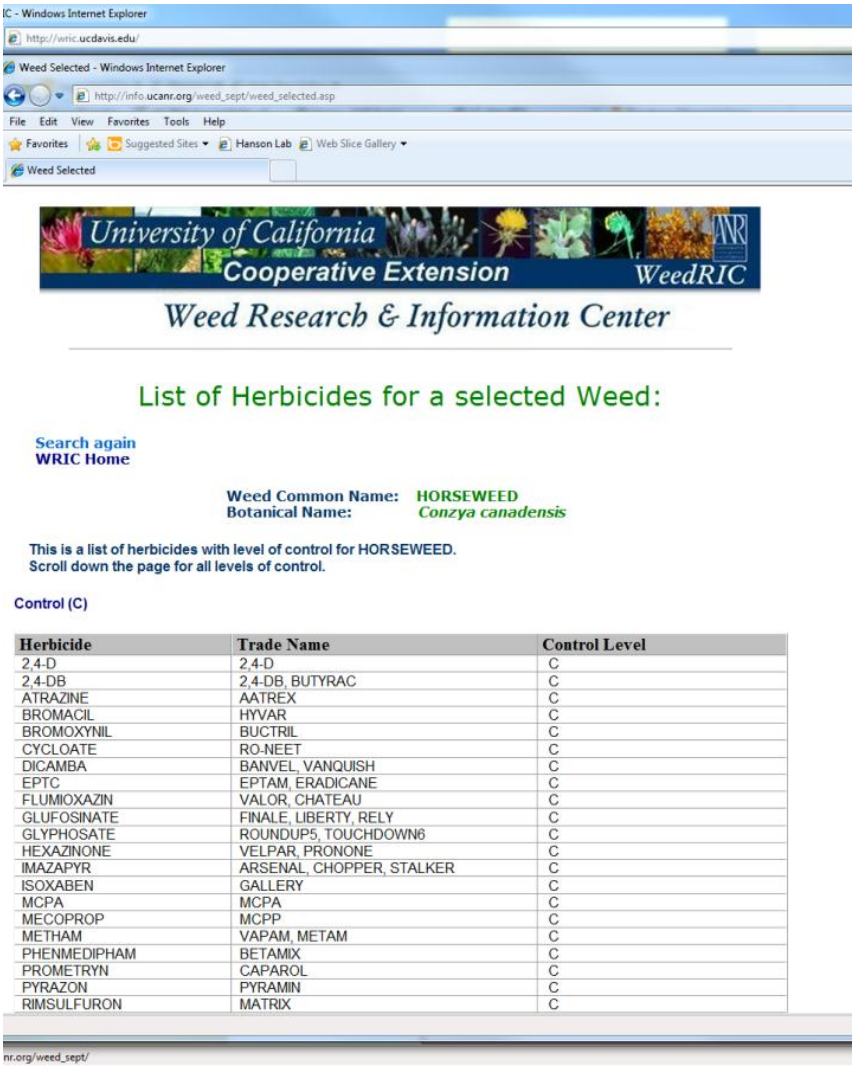


Weed ID: First, to make an informed weed control decision, it is important to understand what weed species you are trying to control. One easy (and free) online resource for identifying weeds is available at the University of California Weed Research and Information Center (http://wric.ucdavis.edu/). From the main page, go to the "quick links" on the right side of the screen and click on the Weed ID Tool. The first step is to identify if you have a broadleaf or a grass-like weed. Once you've selected one of those, you are brought to a series of pull-down menus that allow you to narrow down a list of common weeds based on physical characteristics. This Weed ID Tool is designed for those of us who may not be expert botanists so if you don't have a plant part, or if you don't understand the botanical term, you can simply skip that characteristic. Once you've made your selections, click the "search database" button to look at the narrowed down list of plants remaining in the database.



Herbicide Susceptibility: Next, now that you've identified the weed(s) you are trying to control, it's nice to have some idea of what herbicides have activity on that species. Another quick link at the Weed Research and Information Center leads you to the "Susceptibility Chart" that is actually a searchable database. Here you can get weed control information in several ways such as looking up weeds that are controlled by a specific herbicide, finding herbicides with activity on specific broadleaf or grass weeds, or by linking to UC IPM Pest Management Guidelines for your crop of interest. We are planning an update of this information in 2012 but it is still a great resource that I use almost daily.

Current Registrations: Finally, you've identified your weed and you know what herbicides should be effective; however, you still must make sure that that the herbicide is registered for use in your crop. The California Tree and Vine Herbicide Registration table may be a good resource for this and I've attached the most recently updated version of that table below. It is also available at the Weed Research and Information Center or on the UC Weed Science blog (URL below the chart). Before making any applications, always verify the most current herbicide label as registrations do change. This recent version of the T&V Registration table includes information on herbicide site-of-action groups that may be useful in planning herbicide rotation for resistance management. The online version of the table has further explanations of the various herbicide site of action groups.



IC - Windows Internet Explorer
http://wric.ucdavis.edu/
Weed Selected - Windows Internet Explorer
http://info.ucanr.org/weed_sept/weed_selected.asp
File Edit View Favorites Tools Help
Favorites Suggested Sites Hanson Lab Web Slice Gallery
Weed Selected

University of California Cooperative Extension WeedRIC

Weed Research & Information Center

List of Herbicides for a selected Weed:

Search again
WRIC Home

Weed Common Name: HORSEWEED
Botanical Name: *Conzya canadensis*

This is a list of herbicides with level of control for HORSEWEED.
Scroll down the page for all levels of control.

Control (C)

Herbicide	Trade Name	Control Level
2,4-D	2,4-D	C
2,4-DB	2,4-DB, BUTYRAC	C
ATRAZINE	AATREX	C
BROMACIL	HYVAR	C
BROMOXYNIL	BUCTRIL	C
CYCLOATE	RO-NEET	C
DICAMBA	BANVEL, VANQUISH	C
EPTC	EPTAM, ERADICANE	C
FLUMIOXAZIN	VALOR, CHATEAU	C
GLUFOSINATE	FINALE, LIBERTY, RELY	C
GLYPHOSATE	ROUNDUP5, TOUCHDOWN6	C
HEXAZINONE	VELPAR, PRONONE	C
IMAZAPYR	ARSENAL, CHOPPER, STALKER	C
ISOXABEN	GALLERY	C
MCPA	MCPA	C
MECOPROP	MCPP	C
METHAM	VAPAM, METAM	C
PHENMEDIPHAM	BETAMIX	C
PROMETRYN	CAPAROL	C
PYRAZON	PYRAMIN	C
RIMSULFURON	MATRIX	C

nr.org/weed_sept/

Resistance Survey: One last online resource to share in this newsletter – this one is for weed research and extension program planning. Herbicide resistance is becoming a serious issue in some cropping systems and we are conducting a survey determine grower, applicator, and pest control advisor perceptions and experiences related to herbicide-resistant weeds in perennial cropping systems. This research is being conducted as a part of a larger project (Evolution and Management of Herbicide Resistant Weeds) which involves several UC Davis, UC Cooperative Extension, and Fresno State University faculty.

Please consider taking the short survey online at: http://ucanr.org/hrwsurvey before the end of February and get in the drawing for several UC weed, IPM, or tree and vine publications.

More information on weed control, integrated pest management, and herbicide resistance:

UC Weed Research and Information Center	http://wric.ucdavis.edu/
UC Weed Science blog	http://ucanr.org/blogs/UCDWeedScience/
UC Integrated Pest Management Program	http://www.ipm.ucdavis.edu/
Hanson Weed Lab	http://ucanr.org/hanson_lab

California Herbicide Registration on Horticultural Tree and Vine Crops - (updated January 2012) - UC Cooperative Extension

	Herbicide-Common Name *(example trade name)*	Site of Action Group[1]	Almond	Pecan	Pistachio	Walnut	Apple	Pear	Apricot	Cherry	Nectarine	Peach	Plum / Prune	Avocado	Citrus	Date	Fig	Grape	Kiwi	Olive	Pomegranate
			----- tree nut -------				- pome -		---------stone fruit ---------												
Preemergence	dichlobenil *(Casoron)*	L / 20	N	N	N	N	R	R	N	R	N	N	N	N	N	N	N	R	N	N	N
	diuron *(Karmex,Diurex)*	C2 / 7	N	R	N	R	R	R	N	N	N	R	N	N	R	N	N	R	N	R	N
	EPTC *(Eptam)*	N / 8	R	N	N	R	N	N	N	N	N	N	N	N	R	N	N	N	N	N	N
	flumioxazin (Chateau)	E / 14	R	NB	R	R	R	R	R	R	R	R	R	NB	NB	N	NB	R	N	NB	NB
	indaziflam (Alion)	L / 29	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	N	N	N	N
	isoxaben *(Trellis)*	L / 21	R	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	N	NB	R	NB	NB	NB
	napropamide *(Devrinol)*	K3 / 15	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	R	R	N	N
	norflurazon *(Solicam)*	F1 / 12	R	R	N	R	R	R	R	R	R	R	R	R	R	N	N	R	N	N	N
	oryzalin *(Surflan, Farm Saver)*	K1 / 3	R	R	R	R	R	R	R	R	R	R	R	R	R	N	R	R	R	R	R
	oxyfluorfen *(Goal, GoalTender)*	E / 14	R	R	R	R	R	R	R	R	R	R	R	R	NB	R	R	R	R	R	R
	pendimethalin *(Prowl H_2O)*	K1 / 3	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	R	N	R	R
	penoxsulam (*Pindar GT*)	B / 2	R	R	R	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	pronamide *(Kerb)*	K1 / 3	N	N	N	N	R	R	R	R	R	R	R	N	N	N	N	R	N	N	N
	rimsulfuron (*Matrix, Mana*)	B / 2	R	R	R	R	R	R	R	R	R	R	R	N	R	N	N	R	N	N	N
	simazine *(Princep,Caliber 90)*	C1 / 5	R	R	N	R	R	R	N	R[2]	R	R	N	R	R	N	N	R	N	R	N
	thiazopyr *(Visor)*	K1 / 3	NB	N	NB	NB	N	N	NB	NB	NB	NB	NB	N	R[2]	N	N	NB	N	N	N
Postemergence	carfentrazone (Shark, Rage)	E / 14	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	clethodim *(Prism)*	A / 1	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	N	R	N	N	NB	N	NB	N
	clove oil (*Matratec*)	NC[3]	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	2,4-D *(Clean-crop, Orchard Master)*	O / 4	R	R	R	R	R	R	R	R	R	R	R	N	N	N	N	R	N	N	N
	diquat (*Diquat*)	D / 22	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
	d-limonene (*GreenMatch*)	NC[3]	R	R	R	R	R	R	R	R	R	R	R	N	R	N	R	R	R	N	N
	fluazifop-p-butyl *(Fusilade)*	A / 1	NB	R	NB	NB	NB	NB	R	R	R	R	R	NB	NB	NB	NB	NB	N	NB	NB
	glyphosate *(Roundup)*	G / 9	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
	glufosinate *(Rely 280)*	H / 10	R	R	R	R	R	N	N	N	N	N	N	N	N	N	N	R	N	N	N
	halosulfuron *(Sandea)*	B / 2	N	R	R	R	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
	paraquat *(Gramoxone Inteon)*	D / 22	R	R	R	R	R	R	R	R	R	R	R	R	R	N	R	R	R	R	N
	pelargonic acid (*Scythe*)	NC[3]	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	N
	pyraflufen (*Venue*)	E / 14	R	R	R	R	R	R	R	R	R	R	R	N	N	R	R	R	R	R	R
	saflufenacil (*Treevix*)	E / 14	R	N	R	R	R	R	N	N	N	N	N	N	R	N	N	N	N	N	N
	sethoxydim *(Poast)*	A / 1	R	R	R	R	R	R	R	R	R	R	NB	NB	R	NB	NB	R	N	NB	NB

Notes: N = Not registered, NB = nonbearing, R = Registered. This chart is intended as a general guide only.

Always consult a current label before using any herbicide as labels change frequently and often contain special restrictions regarding use of a company's product.

Weed susceptibility information and the most up to date version of this table can be found at the Weed Research and Information Center (http://wric.ucdavis.edu)

[1] Herbicide site of action designations are according to the Herbicide Resistance Action Committee (letters) and the Weed Science Society of America (number) systems.

[2] Simazine is registered on only sour cherry in CA. Thiazoypr is registered on orange and grapefruit only.

3 NC = no accepted site of action classification; these contact herbicides are general membrane disrumptors.

Also available online at: http://ucanr.org/sites/wric3/?blogpost=6524&blogasset=32026 (UCD Weed Science blog post 1-15-2012)
or http://wric.ucdavis.edu/PDFs/herbicide_registration_on_horticultural_tree_and_vine_%20crops_2012_01.pdf (UC Weed Research and Information Center)