Weed Workgroup Meeting

November 15 & 16, 2005 ■ Davis, California

Agenda

Tuesday, November 15, 2005 ■ Garrison Room @ Memorial Union, UC Davis

9:30 a.m.	Coffee and Rolls
9:30-9:40	Welcome, Overview of program
9:40-9:50	Introduction of new personnel
9:50-10:20	Herbicide injury symptoms ■ Tom Lanini, UC Davis
10:20-10:50	Open discussion: Off-target movement of herbicides during an inversion layer ■ Steve Wright, UCCE Farm Advisor
10:50-11:30	Update on glyphosate resistance (ryegrass, horsetail, & lambsquarters) ■ Tom Lanini, Anil Shrestha, and Kurt Hembree
11:30-Noon	Glyphosate Resistance ■ Chris Preston
Noon-12:55	Lunch
12:55-1:00	Interest in integrated management of soilborne pests workgroup ■ Jim Stapleton, Kearney Ag. Center
1:00-1:20	Minor Crops Symposium at WSSA ■ Steve Fennimore, University of California Davis
1:20-1:35	Syrah decline: Do herbicides play a role? ■ Kerri Steenwerth and Jerry Uyemoto, USDA-ARS, Davis, CA
1:35-1:55	Update on the use of Goal Tender in strawberries ■ Oleg Daugovish, UCCE Farm Advisor, Ventura
1:55-2:10	Update on the use of Goal Tender in onions ■ Richard Smith, UCCE Farm Advisor, Monterey, Santa Cruz, and San Benito
2:10-2:40	Group Discussion:Urbanization challenges in weed science
2:40-2:50	Break

Breakout Sessions ■ Garrison and Smith Rooms

2:50-3:50	Trees and Vines	Turf and Ornamentals
3:50-4:50*	Agronomic Crops	Aquatic Weeds

6:30 Dinner at Clyde's House

Wednesday, November 16, 2005 ▪ Garrison Room @ Memorial Union, UC Davis

7:45 a.m.	Coffee and Rolls

Breakout Sessions ▪ Garrison and Smith Rooms

8:00-9:30	Vegetable Crops	Non-crop/Rangeland
9:30-9:45	Break	
9:45-10:15	WeedRIC Update ▪ Joe DiTomaso, UC Davis	
10:15-11:15	Section Reports, future agenda and priorities, and election of new committee members	
11:15-noon	Discussion of new positions, department updates, department affiliation for advisors	
Noon-1:00	Lunch-box lunches	
1:00-2:00	Weed Susceptibility Chart ▪ Steve Fennimore, University of California Davis	
2:00	Adjourn	

Business

Funding
Weed RIC currently has $50,000-55,000. Part of this money will pay for Gale's salary.

Online courses
- WeedRIC to develop online courses to offer continuing education units
- 10-20 lectures—each approximately 30 minutes
  - Symptomology
  - Herbicide Selectivity
- Cost = $30 per lecture
- Change the selection of lectures every 6 months
- Possibility of paying honorariums
- Partnering with a commercial host (Kim Crum's organization)
- Gale will search for a model and format for online course (Larry Schwankl at LAWR has worked on one.)

Website
- Make Weed RIC website more visible

- Suggest having Weed RIC website demonstrated at conferences—California Weed Science Society Conference, January 16-18, 2005, Ventura, CA
- Susceptibility chart—work in progress (Steve Fennimore and Jerry Schmierer)
  - Move susceptibility chart link up one layer of the website
- Discussed listing Farm Advisors (linking to ANR or county website) and their specialties
- Request other weed websites to link to http://wric.ucdavis.edu
- Workgroup to develop 1-page "hot topic" information sheets to post on website

Positions

1) Farm Advisor

a) **Central region**–Madera/Merced Agronomist in Weed Science

i) *Specialization*: Agronomic crops including alfalfa, corn, cotton, cereal grains, rice and sugarbeets, and weed control

ii) *Position Description*

(1) General Description: Agronomic crops in Madera and Merced counties occupy a quarter million acres with a combined value of over $300,000,000.00. Agronomic crops are under combined pressures from factors such as escalating input costs, labor costs and availability, competition for available, good quality farmland and commodity price pressure associated with domestic and foreign competition. Environmental challenges include developing production systems that address air and water quality. Ground water protection areas have been identified which limits the use of certain herbicides requiring development of alternative control measures.

(2) Production systems that retain options for large acreage annual crops, including crops such as alfalfa and cotton, help avoid over-production of higher value permanent crops and provide some flexibility to address problems such as water use, sensitivity to different soil types, salinity and microclimates. A long-term vision for California agriculture is that we need a diversified agriculture to maintain a viable economy and service in the market place.

(3) The farm advisor will conduct an extension research and education program in agronomic crops, including alfalfa, cotton, field corn, cereal grains, rice and sugar beets and weed control in all crop and non-crop areas in both Madera and Merced Counties. The advisor fills an essential role in a four advisor, one specialist team with primary programmatic responsibilities for cotton applied research and education programs in the state. The advisor will identify problems and initiate, plan and conduct applied field research and demonstration studies independently and/or in cooperation with specialist, department faculty, other farm advisors, industry researchers and growers. A wide range of disciplines including agronomy, weed control, entomology, plant pathology, soil and water and economics will be addressed. Support for applied field research will be obtained from competitive grants and commodity and industry funding.

iii) *Specific Problems to be Addressed*: ANR has identified specific core issues in agricultural productivity and pest management that will be addressed by this program.

(1) Sustainability and viability of agronomic crops including biotechnology, organic production systems and development and evaluation of new varieties.

(2) Pest management issues including management of weeds, integrated control systems or IPM and alternatives to chemical pesticides.
(3) Development of cropping systems that incorporate conservation tillage practices in an effort to address and mitigate dust and PM_{10} emissions into the atmosphere. Development of best management practices to meet Conservation Management Practices (CMP) plans.
(4) Surface and ground water quality will be addressed. Best management practices to reduce contamination from nitrates, pesticides and silt.
(5) Herbicide resistant weeds. The number of herbicide resistant weeds in California continues to grow with the recent conformation of glyphosate resistant horseweed in the Central San Joaquin Valley. Erratic control of other weed species such as lambsquarters and pigweed with glyphosate have been reported. Herbicide resistant weeds will be an important area of concern that needs to be addressed, especially as the acreage of glyphosate tolerant crops (cotton, corn and alfalfa) continues to increase.

iv) *Expected Contributions*
(1) Funding: There is a healthy various donors account that supports in cooperation with two farm advisors in Madera County, a SRA II position, two Lab Assistant positions and college students during the summer in conducting the applied field research. The current SRA has worked in Madera County conducting applied field research in agronomic crops, viticulture and pest management for the past 15 years. The SRA has developed considerable research expertise, works with little supervision and will provide tremendous research support for this position.

v) *Justification Relative to County/Region Priorities*: There is a large northern SJV agronomic crop production area (275,000 acres) in Madera and Merced counties that will be difficult for UCCE research and extension efforts to adequately serve if this position is not approved. The Cotton and Alfalfa Workgroup strongly recommends and supports the need to fill this position. I have discussed the need for this position with Maxwell Norton, Agricultural Productivity Program Leader and he supports the position.

vi) *Logistics*
(1) County Funding and Support: This position is housed in Madera County with strong support by the Board of Supervisors and County Administrative Officer. Office space and supplies, clerical staff, and a vehicle is provided for this position. Merced County provides mileage reimbursements for work in Merced County as well as secretarial support in duplicating and mailing newsletters.

b) **Southern region**–Turf and ornamental urban interface person (Carl and Michelle will prepare write up)

c) **Northern region** Farm Advisor with emphasis on Tree and Vine Weed Control
In the Sacramento Valley, trees and vines are currently the most important agricultural crops in terms of acreage and economic value, and their importance will likely increase in the future, as urban sprawl and competition for water and land will result in the reduction in low value crops. Weed control in tree and vine crops is essential, as weeds can act as alternative host to other pest (Glassy-wing sharpshooter, olive fruit fly, etc.), can compete

with young trees and vines for limited resources, and can interfere with harvest (i.e. almonds and walnuts). Methyl bromide has historically been used to treat soils prior to new plantings, but environmental problems will soon eliminate this option, and thus new methods of preparing soils for planting will need to be explored. Herbicides are commonly used to control weeds in tree and vine crops, but the number and types of herbicides available for use in tree and vine crops is very limited compared to other crops. Limited availability of herbicides has resulted in repeated use of the same herbicides and subsequently, herbicide resistant weeds have developed. Additionally, tree and vine growers are encountering more regulation on the use of herbicides (groundwater protection, surface water protection, urban/agriculture interface and issues concerning drift, etc.), and thus are interested in exploring reduced chemical or non-chemical options. Currently, there are no Farm Advisors in the Northern Region working on tree and vine weed control. With the current level of importance of these crops, it is critical to hire a Farm Advisor with responsibilities in the area of weed management.

d) **Regional advisor**–Invasive Plants, Central California Coast (Santa Barbara, San Luis Obispo, and Monterey Counties)–a proposal for a new position by the Weed Workgroup

Non-native invasive plants are now in the spotlight as a major environmental issue throughout California. The UC-ANR Weed Science Program has been devoting more of its resources to invasive plants, but there are significant gaps that should be filled in order to increase the ability of the division to address this problem effectively. The priority position that we suggest is a regional advisor on invasive plants to be located on the central coast. This position would be similar and complementary to the regional advisor position in southern California. The advisor would work with other advisors, specialists, and campus faculty on invasive plants.

Some of the key rationales for this position include:

i) Invasive plants are an important environmental issue in coastal California, second to loss of natural habitat to development.
ii) Advisors in the three counties have strong programs in natural resources, but no one is devoted specifically to invasive plants.
iii) There are large sources of grant support available from propositions, foundations, and other sources.
iv) The clientele for this position would include several important environmental organizations (i.e. CNPS, Sierra Club, Audubon Society, Weed Management Areas) and governmental agencies (CA DFG; Cal-Trans; State, local, and federal parks; flood control, US-Fish and Wildlife Service, BLM, National Parks, Department of Defense, etc.) that do not know about ANR and have not previously utilized our resources.
v) Academics at non-Experiment Station campuses (UCSB + UCSC) and the state university system (Cal Poly SLO, Cal State Monterey) are studying this issue, which creates new opportunities for collaboration.
vi) There is an existing group of ANR academics (CE specialists, advisors, faculty) working on this issue that could provide support and collaboration.

2) Specialists

Replacement for Clyde and Dave Cudney still the highest priority. Perennial crops in Davis and ornamental, turf person in Riverside.

3) Academic Senate faculty

Weed Reproductive Biology, someone focusing on population dynamics. This could be ecology, ecophysiology, or physiology.

Commodity Reports

Trees and Vines Breakout Session–submitted by Anil Shrestha

It was mentioned that Rimsulfuron was being tested as a new product in tree crops. Based on his experience in tomatoes, Kurt Hembree expressed concern that it was essential to have rain within 10 days of application of this product for it to be effective. He also brought up the issue of drift with Chateau and the need to emphasize the importance of sprayer clean up.

Ramon Leon was planning to look at steam as a weed control tool in vineyards and to compare economics of weed control. He has also planned new trials on effect of weed competition in trees and vines.

Ron Vargas is comparing Matrix and Chateau to several standard treatments. He mentioned that one of the major issues affecting weed control in trees and vines was the Groundwater Protection Areas as cost of alternatives was very high for growers. He also suggested that the irrigation practices suggested in these areas were pretty impractical.

Kurt Hembree also suggested that most of the mitigation practices were not feasible. He has found that microsprinkler irrigation has reduced the effectiveness of products like diuron. He mentioned that a drop in simazine use in various counties was because of the new regulations. He felt that if growers were not over-irrigating, these products could be safely used in some areas. Kurt has also initiated a new 5-7 year on-station study on critical weed free period in table grapes. He has compared nozzle types, glyphosate and glufosinate for hairy fleabane control in table grapes. He was able to control fleabane with half the labeled rate of a mixture of these products with a twinjet nozzle. He is also planning to look at reduced rates of glufosinate and glyphosate for resistance management.

Mick Canevari submitted a written report on various trials on winegrapes.

Richard Smith has been working on a long-term trial comparing 3 different weed management strategies: i) Simazine + Goal, ii) Clements cultivator + hand weeding, and iii) all post emergence products. He mentioned that purslane was a problem and it was very competitive for moisture. He found that postemergence mixtures of glyphosate and Goal provided good weed control. The most expensive treatment was the cultivator and the cheapest was the all post emergence. He mentioned that he was initiating a new trial with cover crops under the vine instead of the middles. Tom Lanini suggested that subclover may be a good choice for such as system. Anil brought up the issue of herbicides and VOCs and suggestions were made from the

group that Goaltender may be a better product to address this issue or to look at split applications.

Oleg Daugovish has been working on the use of cover crops for weed control.

Turf and Ornamentals Breakout Session–submitted by

Agronomic Crop Breakout Session–submitted by Anil Shrestha

Jerry Schmierer emphasized the importance of control of Malva in alfalfa. The key to control was getting at seedling stage in Fall and early Spring.

Dan Marcum mentioned that Cinbar may be re-registered in California for weed control in mint.
Doug Munier has been working on Ignite in Liberty-Link cotton and has found excellent control on common lambsquarters. He is also working on site-specific control of Johnsongrass and velvetleaf. He has achieved good results in the control of Johnsongrass over four years but there seemed to less effect on velvetleaf.

Ron Vargas has also been working on Liberty-Link cotton for the last four years and has found excellent results. He suggested that the initial formulation of Ignite was as effective but the new formulation was providing good results. Weed size in cotton has been an issue for successful weed control. In Roundup Ready cotton, he has found that glyphosate could be applied up to the 14^{th} node stage without compromising cotton yields. He believes that this will give more flexibility to the growers. A question was raised on 'why the need for Liberty-Link cotton?', the general consensus of the group was it was useful to have more arsenal for herbicide-resistance management. Ron also mentioned that Roundup Ready Pima cotton was being introduced. In California, acreage of Acala cotton was going down and will mainly be replaced by Pima. He stated that Pima pays $0.70/pound more than Acala at present. In another trial along with Kurt Hembree and Steve Wright, Ron tested a pH adjusting buffering product named 'Indicate 5' in combinations with other herbicides for field bindweed control in Western Fresno. They found excellent control of field bindweed with this product when mixed with herbicides like glyphosate. However, it is not known if this product was registered in California.

Kurt Hembree has been screening Chateau and Raptor of weed control in blackeye beans. He reported good control of annual morningglory with Chateau when the weed was less than 4 inches long.

Steve Wright reported his work with Prowl H_2O in cotton and is trying to get this product registered. He has also tested Puma, Shark, and Osprey as tank mixes in wheat. He found that Shark was good and safe on wheat, Puma + Shark was also safe but Osprey injured wheat. Osprey, however, provided good control of chesseweed and chickweed.

Mick Canevari has been testing Chateau (PPI) and Rimsulfuron in lima beans. He found these herbicides were safe as they did not cause girdling of the beans. There were some leaf spots with these products but no yield loss. In alfalfa seedling establishment trial, he tested acetic acid and found very poor control of weeds with this product whereas, Prowl H_2O and Raptor provided

good control of dodder. He suggested that Chateau was a good preemergence product for alfalfa and can be a relief for growers in Ground Water Protection areas because it is an environmentally safer product. He is trying to fast track the registration of this product.

Steve Orloff has been working on Roundup Ready alfalfa and testing various rates and application times of herbicide to see injury in alfalfa. He found that at higher rates and frequent applications, alfalfa yield was reduced. He compared Raptor as a standard treatment with glyphosate.

Tom Lanini provided an update on his studies on various herbicides on beans. Over the top application of Sandea was safe on kidney and lima beans but not in blackeye beans.

Aquatic Weeds Breakout Session–submitted by

Vegetable Crops Breakout Session–submitted by Oleg Daugovish

Tom Lanini

- Evaluated dodder resistant tomatoes, identified 9, including 7 from Seminis Seed. Lignification of tissue at the site of dodder penetration takes places in these resistant varieties. Also continues work with *Cuscuta* spp. identification
- Displayed girdling of beans from Chateau injury, reported temporary weed control with Matran and good control with Valent product V 10142
- Sulfentrazone was unsafe on direct seeded tomatoes and destroyed 80-90% of the crop, while sulfosulfuron provided selective , long-lasting weed control (and also had good selectivity ion peppers)
- Dual magnum caused about 25% injury on emerging melons (intended pre-emergence) but plants ourgrew the injury.

Steve Fennimore

- Evaluated plant back injury for several vegetable crops:

V-10142 had up to 4 months residual activity and caused injury in broccoli, lettuce and spinach. Carrots and onions minimally or not affected by previously applied Chateau or V101142.

- Prowl H2O (pre and post-emergence, 1-3 leaf stage) was safe and effective for weed control in cilantro, Goaltender was safe over the top of kale or collards; Fargo was safe on spinach but did not control pigweed.

Richard Smith

- Trialate did not control little mallow or nightshades (warm season weeds)
- Compared Basamid and Vapam
- Dual Magnum controlled weeds in spinach but was injured crop at the high rates
- Continue working with EcoDan–a presicon guided cultivator, a good tool, especially in organic weed control systems.
- Chateau applied with fertilizer granules for onions, post-emergence–spotted weed control/crop injury

Kurt Hembree

- Continues work with Kerb chemigation. It was very effective for control of shepherdspurse and London rocket and did not injure lettuce even after crop emergence
- Goaltender provided good weed control in onions and was safe.

Michelle LeStrange

- Pre-transplant Goaltender and Dual Magnum controlled weeds in peppers; however, wet spring allowed weed growth and following disturbance reduced effectiveness of Goaltender. Outlook provided good control but both Dual and Outlook resulted is some phytotoxicity.

Oleg Daugovish

- Continue evaluation of Goaltender in strawberries, good control, safe when tarp is installed prior to transplanting, reduces weeding costs significantly, controls mallow well but full rate needed for clover control. Summary presented in a program talk.
- Broccoli was injured by Outlook and Chateau (pre-transplant) but outgrew Chateau injury, while crop setback by Outlook allowed surviving weeds to gain competitive advantage and accumulate biomass similar to untreated control. Goaltender and Chateau provided best weed control, Dacthal post-transplant provided partial control of shepherspurse, sowthistle and pigweed.
- 3 seasons of evaluations (7 herbicides) for celery, in parallel with Richard Smith and Steve Fennimore are completed in Ventura County. Chateau is the best replacement for prometryn for broadleaf weed control and is equally effective/safe or better than Caparol. Dual Magnum is the best yellow nutsedge control material (pre-transplant) but highest rates needed for high population and at those moderate crop injury occurs (celery outgrew it in all 3 years in Oxnard study). Tank mix of Chateau and Dual was effective and may allow single pre-plant application to control both: broadleaf weeds and yellow nutsedge in celery.

Non-Crop Breakout Session–submitted by Joe DiTomaso

Steve Orloff	a) Looking at the control of yellow starthistle and fiddleneck (*Amsinckia* spp.) using Transline and Telar combinations (works well) and aminopyralid. b) Hoary cress- Plateau (imazapic) failed both in spring and fall applications. Telar looked good though. Dyer's woad control was good with Plateau and Telar, but takes multiple applications.
Jodie Holt	a) *Arundo donax*- graduate student working with Arundo. Any plot with *Baccharis salicifolia* was competitive with Arundo. Mixtures with shrubs repelled native colonizers and Arundo. Cut and paint glyphosate treatments on Arundo then plant with black willow stems. Control worked well, best in August, but poor time to pole plant willows. This is a new project. b) *Brassica tournefortii- Brassica* germinates sooner and sets seed earlier. No evidence yet of impact on natives. This is a new project.

c) *Cynara cardunculus* (artichoke thistle)–seed dispersal up to 40 m in open environment, but very short dispersal with competing vegetation.

Carl Bell

a) Fennel (*Foeniculum vulgare*)- used a combination of glyphosate and triclopyr for control. Spring treatments were excellent. Early spring does not do that much damage to *Nassella pulchra*. Spot spray not as good as broadcast. More escapes and had to use more herbicide. Looking at better application technology.
b) Mediterranean annual grasses and forbs are main issue in Southern California. Light rates of glyphosate and triclopyr early in the season works well and allows natives to get established afterwards. Natives germinate later than non-natives, in general.
c) Fire brochure coming out soon. Mostly about post-fire effects.

Anil Shresthra

a) *Conyza* on roadsides and irrigation canals. 700 miles of bank in his area with *Conyza* on much of it. Some, maybe even most, may be glyphosate resistant. Only herbicide that is allowed is glyphosate, which will further select for resistant biotypes. Scraping banks removed *Conyza* seedbank, but creates dust problem.

Wendy West

a) Working with Scott Oneto on an outreach paper on tree-of-heaven (*Ailanthus altissima*).

Claudia Luke

a) Trials with removing nutrients from soil and examining responses of exotics and natives at Bodega Bay. Also studying soil community effects, including mycorrhizae, etc. This may be responsible for rapid spread of *Holcus lanatus*. Also doing *Lupiinus arboreus* work. Studying the tropic cascade associated with bush lupine. Very complex interactions that they are trying to tease out.

Joe DiTomaso

a) New publications coming out next year, one on using fire for control of invasive species and another one that is a Yellow Starthistle Management Guide.
b) Medusahead–Fire worked great in 4 of the 5 counties that we tried it in, but did not work in Lassen County. This is similar to the results reported by Jim Young in the 1970s. Probably due to the lack of much thatch in this area. The fire moved quickly and was likely not as hot so it did not kill the seeds.
c) Artichoke thistle–Found that glyphosate worked quickly but lead to bare ground and rapid recovery of new rosettes, probably from seed germination. Aminopyralid and clopyralid worked great, but were slow. Prevented new seed production. No new seedlings was a benefit.
d) Starting a project looking at the combined effect of the newly released *Puccinia* rust for yellow starthistle control and the established insect biocontrol agents. Will be studying the effects on root growth, seed production, and competition with annual grasses.

e) Aminopyralid expected to be registered in California end of 2006. Works excellent on Russian knapweed, yellow starthistle, Canada thistle, artichoke thistle, and other problematic thistles. Can also control fiddleneck when applied early.

Oleg Daugovish was selected as chair of the 2005-2006 Executive Committee.

The current executive committee is as follows:
Group 1: **Anil Shrestha** (through Nov. 2006) and **Tom Lanini** (through Nov. 2008)
Group 2: **Albert Fischer** (through Nov. 2006) and **Marie Jasieniuk** (through Nov. 2008)
Group 3: **Oleg Daugovish** (through Nov. 2006) and **Steve Wright** (through Nov. 2008)

34 people attended the meeting.

The next Weed Workgroup meeting will be on November 14-15, 2006 at UC Davis.