Cooperative Extension • Monterey County

Crop Notes

September/October, 2007

WINTER COVER CROPS: STRATEGIES FOR INCLUDING THEM IN SALINAS VALLEY VEGETABLE ROTATIONS

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Cover crops included in Salinas Valley vegetable rotations help to address both production and environmental issues. The Salinas Valley is richly endowed with many soil types that lend themselves to the intensive crop production that has become standard practice in our industry. However, the intensity and expense of production no longer allows for growers to rotate with crops such as winter cereals that utilize residual soil nitrates and that leave large amounts of crop residue that is high in carbon and lignin which helps build soil organic matter, increase water infiltration and improve soil tilth. For instance, after harvest lettuce and broccoli residue may only return one to two tons of biomass to the soil, respectively. The residue of these two crops is highly succulent and low in lignin content (the building block of soil organic matter) and may not greatly increase soil organic matter content. By contrast, rye cover crops typically produce 3-4 T/A of biomass.

Cover crops help to manage the loss of key nutrients such as nitrogen (in the form of nitrate) and phosphorus. Cover crops help to minimize the leaching loss of nitrate in two ways: 1) winter cover crops can absorb 65-70% of excess nitrate from the soil and to maintain this nitrogen in the cover crop biomass during rain events and 2) cereal cover crop residues have been shown to incorporate nitrogen contained in their residues into the soil organic matter where it is less likely to be immediately lost by leaching, but rather becomes steadily available for crop growth as the organic matter mineralizes.

Cover crops have important water quality benefits. In studies that we have conducted during the past two years we have observed that full cover winter cover crops reduce sediment losses by 76 - 84% compared to uncover cropped fields.

In spite of the benefits of growing winter cover crops, the reality is that they are difficult to schedule into rotations given that cover crops tie up high rent ground; also cover crops increase the risk of missing planting schedules in the spring if rains preclude opportunities to incorporate them into the soil in a timely manner. As a result, winter cover crop use in the Salinas Valley probably comprises no more than 5% of the acreage in any given year.

Alternative Cover Crop Strategies

The critical issue with cover crops in the Salinas Valley is figuring ways to practically and economically include this important cultural practice into our crop rotations. We have tried to address this issue over the past two years by looking at alternative cover crop strategies. One idea that we examined was planting cover crops on the furrow bottom of winter fallow production fields. The goal of these studies was to examine if furrow bottom cover crops could filter runoff from winter storm events and reduce sediment and nutrient losses from fallow production fields. The cover crop species that we chose for this technique was Trios 102 which is a winter dormant triticale. The rational for this choice was that this species would germinate, grow enough to cover the furrow bottom, but not continue to grow vigorously during the winter and create a residue problem in the spring that would impede bed shaping and planting.

In the evaluations that we conducted we observed that Trios 102 was later than Merced rye but it maintained higher nitrogen content in its tissue (Table 1). As a result, in spite of lower biomass production than the full cover Merced rye, the furrow bottom Trios absorbed higher relative quantities of nitrogen which would be important with regards to nitrate trapping. Furrow bottom Trios cover crops produced less biomass than full cover Merced rye in both 2006 and 2007 (Table 1). The lower biomass production is important however, in assuring that there was not too much cover crop biomass present to impede bed shaping and planting operations in the spring. We did not formally test bed preparation in the spring, but informally we observed that Trios was easily killed with glyphosate. We also evaluated rototilling the furrow bottom cover crop, but did not have good success with a hand operated rototiller. However, there are tractor mounted units that are available that, in conjunction with chisel shanks, may provide better control of the cover crop. Trios comes out of dormancy by late February and it

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In This Issue:

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will be important to control its growth at this time so that it does not produce too much residue to restrict bed shaping and planting operations.

Water Quality Evaluations of Winter Cover Crops

We compared several strategies for managing storm water run-off from vegetable fields in replicated trials conducted at the USDA Spence research farm during the winters of 2006 and 2007. Treatments included: 1) an unplanted (bare) control, 2) Rye planted on the listed beds and furrow bottoms (full cover crop), 3) Trios 102 planted only in the furrow bottoms, and 4) furrows that were diked using a tillage implement (Soil-prop).

Results from the 2007 winter demonstrated that the cover cropped and diked treatments reduced run-off compared to the unplanted control treatment (Table 2). The cover cropped treatments almost completely eliminated storm water run-off at Spence farm in a previous trial conducted in 2006 season when the cover crop was established early (November 2005) and had a high biomass when the rains occurred (data not shown). Concentrations of sediment, total nitrogen, nitrate-nitrogen, and total phosphorus were reduced in run-off from the cover crop treatments. The highest reductions in concentrations of these constituents compared to the untreated control were in the full cover crop of rye. The diked furrows reduced run-off and suspended sediment concentrations, but had had almost no effect on nutrient concentration of the run-off (Table 2).

Summary

The goal of this work was to evaluate the potential of using cover crops to provide soil health and water quality benefits in fallow vegetable production fields. It is clear that cover crops can reduce sediment and nutrient losses from vegetable production fields during winter storm events which is increasingly important in order to comply with water quality regulations. Presumably, full cover crops can provide the maximum benefits for building soil organic matter, for controlling storm water run-off, and for minimizing nitrate leaching, but their high biomass may impede spring planting. Low-residue, furrow-bottom cover crops produced only 0.29 to 0.82 T/A of biomass in these studies and are an intermediate step to provide water quality and soil health benefits in a manner that fits into the intensive vegetable production systems on the Central Coast. It is unclear which, if any, of the other benefits described above that cover crops provide can be achieved by the low-biomass furrow cover crops. We intend to follow-up on these studies with other evaluations of low-biomass cover crops and evaluate their impacts on soil, crop production and environmental benefits. At present, with intense interest in improving the quality of water leaving production fields, it appears that low-residue, furrow-bottom cover crops provide a useful option for reducing sediment and nutrient losses.

The goal of these studies was to examine if furrow bottom cover crops could filter runoff from winter storm events and reduce sediment and nutrient losses from fallow production fields.

Furrow bottom Trios cover crops produced less biomass than full cover Merced rye in both 2006 and 2007 (Table 1). The lower biomass production is important however, in assuring that there was not too much cover crop biomass present to impede bed shaping and planting operations in the spring.

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Table 1. Cover crop biomass, percent nitrogen (N) in biomass, N content in biomass and carbon (C) content in biomass on February 20, 2006 and March 5, 2007

Treatment	Biomass (Tons/A)		Percent N in tops		N in Biomass (lbs/A)		C in Biomass (lbs/A)	
	2006	2007	2006	2007	2006	2007	2006	2007
'Merced' rye Full cover	2.48	0.97*	2.13	2.28	105.8	44.2	---	843.9
'Trios 102' triticale Furrow bottom	0.29	0.82	4.16	3.76	24.1	60.9	---	589.7
LSD (0.05)	0.31	n.s.	1.31	0.54	16.2	n.s.	---	n.s.

* - grew poorly due to late planting date

Table 2. Average sediment and nutrient concentrations in run-off from storm events occurring between February 12 – March 12, 2007

Treatment	Total Suspended Solids	Turbidity	Total Phosphorus	Soluble Phosphorus	Total Nitrogen	Ammonum Nitrogen	Nitrate Nitrogen	Run-off	Sediment loss per inch of run-off
	ppm	NTU[x]	ppm					% of rainfall[z]	lb/acre
Bare (control)	1419	4449	4.4	1.57	8.0	0.12	7.48	44.9	320.5
Full cover (Rye)	342	917	1.9	1.12	3.0	0.07	0.37	32.5	77.3
furrow bottom (Trios)	841	2377	3.3	1.70	5.7	0.34	2.29	27.9	166.2
furrow dike	978	4296	4.5	1.76	7.9	0.10	6.55	22.6	220.8
F-test (p > F)[y]	0.012	0.001	0.001	0.0002	0.004	0.023	0.001	0.038	0.006

[x] low NTU (Nephelometric turbidity units) indicate less turbidity

[y] probability of obtaining an F-statistic greater than the computed value

[z] total rainfall was 1.8 inches.

THE AMERICAN CROW
Paul Gorenzel, SRA, UC Davis

The American crow is a common bird in California. It is large, conspicuous, and easily observed. Some people, based on everyday observations, think that the number of crows has increased in recent years.

Data from the Breeding Bird Survey (BBS), conducted by the U.S. Geological Service, Patuxent Wildlife Research Center, verify that crow numbers have increased substantially in California. The BBS is conducted every spring. Trained observers travel along fixed routes in the spring, stopping frequently at set locations to record all birds seen or heard. Results from these surveys from 1966 – 2003 indicate that statewide crow numbers increased an average of 2.8% per year. This rate of increase nearly triples the crow population. The amount of increase varies from region to region in California. The Central Valley had an annual increase of 4.6%. Surveys in Carmel Valley, Monterey County, showed increases of 1.8% annually.

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The increasing number of crows is thought to be related to the nighttime roosting habits of crows. Crows, particularly in winter, flock to large, communal roosts for the night. These roosts, up until the 1960s, were located primarily in rural settings. Starting in the 1960s, there was a gradual shift in roost locations, from rural to suburban and urban locations. This shift occurred not just in California, but across the nation. This shift resulted in improved survival for crows. Crows at rural roosts were often subjected to harassment, shooting, and predation from great horned owls. At suburban or urban roosts, crows were no longer hunted and great horned owls were mostly absent. In addition, due to the urban heat island effect, the new roosts were also warmer at night, which decreased energetic needs during cold nights.

In 2002 West Nile Virus (WNV) entered California. Crows are highly susceptible to WNV. Crows bitten by an infected mosquito will die. The spread of WNV across the state was at first uneven. Now with WNV well established throughout the state, it is likely that in some locations in California crow populations have declined. Unfortunately, data from the BBS for the past few years are not yet available online. Until then, it will be an opportunity for keen observers to note if there has been a decline in crow numbers.

For more information about the BBS for crows and other species of birds, go to: http://www.mbr-pwrc.usgs.gov/bbs/bbs.html

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FARMERS, RANCHERS AND AG. PROFESSIONAL ELIGIBLE FOR GRANTS OF $15,000 TO $30,000

DAVIS -- Farmers, ranchers and agricultural professionals are eligible for funding from the U.S. Department of Agriculture's Western Region Sustainable Agriculture Research and Education (SARE) program.

Grant recipients receive up to $15,000 as individuals and up to $30,000 for groups of three or more working together on a project. Funding can be requested for projects related to production practices and marketing alternatives, according to Western SARE representatives at UC Davis.

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"Projects to consider might be small research trials, demonstrations, farmer or rancher workshops or market surveys," said David Chaney, education coordinator for the University of California's Sustainable Agriculture Research and Education Program and the Western Region SARE representative. "We want to alert growers and ranchers in the Western United States that Dec. 7 is the deadline for these very useful grants."

Dec. 7 is also the deadline for "Professional Producer" grant proposals. Under those grants, agricultural professionals such as Cooperative Extension educators or Natural Resources Conservation Service employees, coordinate the projects with farmers or ranchers serving an advisory role. The same funding levels apply depending on the number of producers involved.

Recent grant recipients in California include:

* Brigitte Moran, Marin Farmers Market Association, for a project on "Farm Direct Distribution"

* Deborah Giraud, UC Cooperative Extension in Humboldt County, for a project on "Management Challenges for Dairy Goat Sustainability"

Calls for proposals are available on the Web at http://wsare.usu.edu or by calling the Western SARE office at Utah State University, (435) 797-2257.

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USDA's SARE program helps advance farming systems that are profitable, environmentally sound and benefit communities through a national research and education grants program. The program, part of USDA's Cooperative State Research, Education and Extension Service, funds projects and conducts outreach designed to improve agricultural systems.

WORKSHOPS

Hands-on Irrigation Workshops for Growers, Foremen and Irrigators in October

Hands-on training means teaching by doing. We teach irrigation and fertigation skills through a series of training exercises using a small drip system. All workshops will have 2.5 to 3.5 hours of water quality educational credits from the Central Coast Regional Water Quality Control Board and DPR education hours. The workshops will accommodate Spanish speakers, so please encourage foremen and irrigators that are interesting in improving their skills to attend these workshops. Due to the hands-on approach of these trainings, space is limited to 35 participants. Please register by calling the contacts listed below. Registration is free! Breakfasts/snacks will be provided at the beginning of the workshops.

Contact:
Monterey County
UC Cooperative
Extension Office:
759-7353

Fertigation/Chemigation workshop, October 10th 8:30 am -12 pm
Location: 1432 Abbott St., Salinas. (Field behind the UC Cooperative Extension Office)
Program highlights: Irrigation uniformity—learn how to balancing drip systems to maximize irrigation uniformity. Dye demonstration — see how fast chemicals travel through drip systems. Injection methods—compare techniques for injecting fertilizer into drip systems.

Fertigation/Chemigation workshop, October 18th 8:30 am -12:15 pm
Location: 445 Green Valley Road, Watsonville (fallow field)
Program highlights: Irrigation uniformity—learn how to balancing drip systems to maximize irrigation uniformity. Dye demonstration — see how fast chemicals travel through drip systems. Injection methods—compare techniques for injecting fertilizer into drip systems.

Contact:
Chris Goodson,
831-227-5404,
chris.goodson@
agwaterquality.org

Drip Irrigation Workshop: Achieving Uniformity on Sloped Fields, October 24th 8:30 am -11:30 pm
Location: Kitayama Ranch, 481 San Andreas Road, Watsonville, just south of Sunset Beach Road
Program highlights: Become familiar with pressure regulators for small and large systems and how to use them for managing pressure in manifolds and drip tape on sloped fields. Compare uniformity of pressure compensating and non-pressure compensating drip tape. See a demonstration of how to manage drain-down on sloped fields.

Joint Train-the-Trainer Workshop for Pesticide Safety Educators in California, Arizona, Mexico and Tribal Communities

A Workshop for Worker Protection Standard (WPS)
Pesticide Safety Trainers

October 23 - 24, 2007 (English)
October 25 - 26, 2007 (Spanish)
San Marcos (San Diego County), California

Please send youistration form by Friday, October 19, 2007

The Arizona Department of Agriculture reserves the right to cancel any classes if there are not enough participants registered by the cut off date. You will be notified in such case at the e-mail, fax or mailing address provided by you on your registration form

Taller de capacitación en la seguridad de los pesticidas agrícolas entre California, Arizona, México y las tribus

Un taller para entrenadores de la Norma de Protección
para el Trabajador (WPS)

23 al 24 de octubre del 2007 (inglés)
25 al 26 de octubre del 2007 (español)

San Marcos (Condado de San Diego), California
Por favor, mande su forma de inscripción antes del viernes, 19 de octubre del 2007

El Departamento de Agricultura de Arizona se reserva el derecho de cancelar cualquier clase debido a la falta de participantes inscritos or registrados para la fecha limite. En dado caso que la clase se cancelará, se le avisará a través del correo electrónico o dirección que usted proveyó en su forma de inscripción.

Contact:
Jennifer Weber
Arizona Department of Agriculture
Fax:
(602) 364-0830
Phone:
(602) 542-0985
E-mail:
jweber@azda.gov

Salinas Valley Weed School 2007

Wednesday, November 7
8:00 a.m. to 12:00 noon
Spreckles Veterans Memorial Building
(5th and Llano, across from Spreckles Elementary School)

8:00 **Registration (no fee required), Coffee and Herbicide Symptom Exhibit**

8:30 Onion Weed Control Studies
Richard Smith, Vegetable Crop and Weed Science Farm Advisor, Monterey County

9:00 Goal Soil Residues and Implications for Carryover
Richard Smith, Vegetable Crop and Weed Science Farm Advisor, Monterey County

9:30 Transplant vs Direct Seeded Lettuce – Implications for Weed Control Options
Steve Fennimore, Extension Vegetable Weed Specialist, U.C., Davis, Salinas

10:00 **Break and Herbicide Symptom Exhibit**

10:30 Precision Cultivation: New Application of Technology
Dave Fountain, Solex Corp., Dixon, CA

11:00 Precision Cultivation on 80 inch Beds
Christina George, Graduate Student, UC, Davis

11:30 Precision Cultivation of Lettuce: Economic Implications
Laura Tourte, Agricultural Economics Farm Advisor, Santa Cruz County

12:00 **Conclusion and Lunch Sponsored by CAPCA**

4.0 Continuing education credits have been requested.

For more information call
Richard Smith
(831) 759-7357.

Lunch and afternoon session sponsored by the Monterey Bay Chapter of CAPCA

Please call ahead for special accommodations.

2007 Plant Disease Seminar

Tuesday, November 13, 2007
8:00 a.m. to 12:00 p.m.
****County of Monterey Agricultural Center****
Richard W. Nutter Conference Room
1432 Abbott Street, Salinas, California

This seminar will focus on a broad range of topics dealing with plant pathology and food safety research and information.

8:00 – 8:30	**Registration for morning session (no charge).**
8:30 – 9:00	Salinas Valley disease summary for 2007 Steve Koike. UC Cooperative Extension
9:00 – 9:30	Plant breeding for disease resistance Ryan Hayes. USDA-ARS, Salinas
9:30 – 10:00	Pre-plant soil fumigation now and in the future Mark Bolda. UC Cooperative Extension
10:00 – 10:30	Break: Sponsored by CAPCA, Monterey Bay Chapter
10:30 – 11:00	Seedborne E. coli: prospects and possibilities Trevor Suslow Lab. Dept. of Plant Sciences, UC Davis
11:00 – 11:30	Field studies on E. coli survival in commercial field settings Mike Cahn. UC Cooperative Extension
11:30 – 12:00	Wild animals and possible implications for food safety Rob Atwill. School of Veterinary Medicine, UC Davis

Continuing education credits have been requested.

For more information, contact
Steven Koike
831-759-7350
1432 Abbott Street,
Salinas, CA 93901

Afternoon session hosted by CAPCA, Monterey Bay Chapter.

Please call ahead (at least 24 hours) for arrangements for special needs; every effort will be made to accommodate full participation.

2007 Entomology and Integrated Pest Management on Vegetables Seminar

Friday, November 30th, 2007
7:30 AM - 12:00 Noon; CAPCA* 1 - 3 PM
****County of Monterey Agricultural Center****
Richard W. Nutter Conference Room
1432 Abbott St, Salinas, CA 93901

This seminar will include two sessions.

The first session will focus on the biology, identification, quarantine, eradication, and management of the light brown apple moth, which is a newly introduced insect pest in California.

The second session will focus on the research of integrated insect pest management on vegetables.

Registration is from 7:30 to 8:00 AM.

Continuing education credits will be requested.

For more information, contact
Frankie Lam at
(831) 759-7359
or wflam@ucdavis.edu,
1432 Abbott St,
Salinas, California
93901

Afternoon session hosted by CAPCA, Monterey Bay Chapter

Please call ahead (at least 24 hours) for arrangements for special needs; every effort will be made to accommodate full participation.

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Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Staff Personnel Services Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, 6th Floor, Oakland, CA 94612-3550, (510) 987-0096.

MONTEREY COUNTY

Crop Notes

September/October, 2007

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

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