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RESULTS OF LETTUCE DOWNY MILDEW VARIETAL SUSCEPTIBILITY TRIAL

Thomas A. Turini

Downy mildew of lettuce, caused by *Bremia lactucae*, is favored by cool damp conditions and this pathogen can attack at any stage of plant development. Although it is not an annual problem in Imperial County, *B. lactucae* can cause substantial losses when weather conditions favor disease development.

During the 2002-2003 growing season, disease susceptibility of lettuce cultivars that are commonly grown in Imperial County were compared in an experiment conducted at University of California Desert Research and Extension Center in Holtville, CA. The seed of 18 lettuce varieties listed in Table 1 were sown and the field was irrigated on 20 November 2002.

The experimental design was a randomized complete block with 4 replications. Each plot was a 25-foot long section of one bed. On 18 March, downy mildew lesions were counted on each of 10 plants and averaged for each plot. An analysis of variance was performed and LSD (P=0.05) is presented.

Under the conditions of this study, varieties with the lowest downy mildew severity included Ventana, Two Star, GL-11 and Tehama green leaf varieties. Conquistador and Green Towers romaine varieties and Cool Guard and Kofa iceberg varieties also had low disease severity (Table 1).

Table 1. Downy mildew severity on lettuce varieties at Holtville, CA in 2003.

Variety [y]	**Type**	**DM lesions/plant** [z]	**Diseased plants (%)**
Ventana	Green leaf	0.1	5
Two Star	Green Leaf	0.5	20
GL-11	Green Leaf	1.5	38
Tehama	Green leaf	2.2	53
Green Towers	Romaine	2.3	73
Cool Guard	Head Lettuce	3.4	73
Conquistador	Romaine	3.7	68
Kofa	Head Lettuce	5.2	80
Vulcan	Red Leaf	5.7	90
Desert Spring	Head	6.1	85
Winterhaven	Head Lettuce	7.6	88
Bubba	Head Lettuce	8.5	93
RC 74	Head Lettuce	8.5	93
Cervia	Butter	10.7	90
Red Rage	Red Leaf	10.8	70
Optima	Leaf	11.9	95
Wolvarine	Head Lettuce	12.5	98
Coyote	Head Lettuce	20.1	100
	LSD (P=0.05)	5.4	30

[y] Lettuce was seeded and irrigated on 20 November.

[z] On 18 March, downy mildew lesions were counted on each of 10 plants per plot. Averages are presented.

TARPING HAY

Juan N. Guerrero

So far, the 2003 hay season has not been very productive. In comparison to past years, hay prices this year have been rather dreary. As the hot weather abates and the winter wet season starts, several measures may be taken in order to protect stacked hay from the elements. December is the rainiest month of the year, the long-term mean monthly precipitation for December being 0.52 in. The long-term mean monthly rainfall for January is 0.42 in. Storing alfalfa hay during rainy periods is a problem that all growers must resolve. Remember, during February and March, quality dairy hay is usually in short supply, and any grower that has quality hay during this critical period may benefit. Top bales from uncovered stacked hay often become wet and mold during the winter, and hay often has to be thrown away or be sold at a lower price because it is rain-damaged.

One method of storing alfalfa hay throughout the US during rainy periods is to place the hay in hay barns. Some local producers, indeed, do have hay storage barns to protect valuable alfalfa hay. Unfortunately, most local alfalfa growers do not have hay barns for protecting alfalfa hay quality during rainy periods.

Plastic tarps may be used to protect hay quality during inclement weather. During rainy periods, the top level of hay bales in an uncovered stack is exposed to rainfall and often during the winter turns black with mold. Bottom bales also absorb ground moisture during wet weather and mold. Covering winter hay with a plastic tarp is a cheap way to conserve both hay quality and yield.

There are several methods used to tarp hay. I am not aware of any scientific data regarding different tarping methods. Some growers only tarp top bales, leaving the rest of the stack exposed. Other growers tarp the top ½ of the stack (Figure 1). Still other growers tarp the entire stack, covering even the bottom bales. Since rainfall does not always fall at a 90° angle, I would advise covering at least the top ½ of the haystack. The plastic tarp should also be securely tied down to the stack so that it doesn't blow away. Protecting winter hay with plastic tarps not only prevents mold growth but prevents bleaching as well. Even during the winter, exposed hay will bleach. Green, soft, hay in February and March, is highly valued by the dairyman.

Several different types of plastic tarps are commercially available. Woven plastic tarps are available also. Plastic tarps come in several different colors. I am not aware of published scientific research comparing the different types of plastic tarps, so I have no advice regarding which kinds of tarps are better than others. In my experience, the plastic should be thick so that it doesn't tear easily when wind-blown. I am not aware of information stating that plastic tarps used during winter are the most appropriate for summer. I have tarped hay for 20 weeks during the summer. For hay baled at 14% moisture in May, after 20 weeks, tarped hay still had about 10% moisture; the untarped hay had shrunk to 5% moisture levels. Even if there is a scarcity of scientific data regarding the use of plastic tarps for hay quality protection; from the limited data available, I wholeheartedly advise their use.

Figure 1. Tarped hay.

INSECTICIDE EFFICACY FOR BEET ARMYWORM AND CABBAGE LOOPER CONTROL IN LETTUCE, 2002.

Eric T. Natwick

A stand of head lettuce was planted October 1, 2002. Plots measured 50 ft x 13.33 ft on 4-beds per plot. The experiment consisted of 14 treatments in a randomized complete block design with 4 replicates. Foliar spray treatments were applied on 25 October and 15 November with a Lee Spider Spray Trac at 35 psi and 53 gpa using 3 ConeJet TXVS-8 nozzles per bed. Beet armyworms and cabbage loopers were counted on 20 plants per plot on 26, 29 October, 5, 13, 19, November, and 3 December 2002.

All insecticide treatments had significantly fewer (*P*=0.05) beet armyworms than the check except zeta-cypermethrin at 0.18 lb AI/acre (Table 1). The check had significantly more cabbage loopers than any of the insecticide treatments. There were no differences among the treatments for marketable heads, worm damaged heads, nor percentages of marketable heads.

Table 1. Seasonal Means for Larvae of Beet Armyworm and Cabbage Looper Larvae per Twenty Lettuce Plants, Numbers of Marketable Heads, Numbers of Worm Damaged Heads, and Percentages of Marketable Heads per 0.001 Acres, Brawley, CA 2002.

Treatment	lb AI/acre	Beet Armyworm	Cabbage Looper	Marketable Heads	Worm Damage	Percentage Marketable
Check	------	1.0 a	5.5 a	19.8 a	2.8 a	87.2 a
Intrepid 2 SC	0.125	0.3 cd	0.5 e	20.8 a	1.5 a	93.0 a
gama-cyhalothrin	0.01	0.3 cd	2.3 b	20.3 a	1.3 a	93.4 a
Intrepid 2 SC + gama-cyhalothrin	0.094 + 0.01	0.0 d	0.4 e	21.8 a	0.5 a	97.9 a
Success 2 SC	0.078	0.3 cd	0.5 e	22.3 a	1.3 a	94.7 a
Kryocide	7.7	0.4 bcd	1.3 cd	20.3 a	2.3 a	90.0 a
Kryocide + Microthiol	4.8 + 4.0	0.5 bc	2.3 b	22.5 a	1.8 a	92.4 a
Avaunt 30 WG	0.065	0.2 cd	0.7 de	19.0 a	1.0 a	93.4 a
Avaunt 30 WG	0.089	0.3 cd	0.5 e	23.3 a	1.0 a	95.7 a
Avaunt 30 WG	0.11	0.1 cd	0.3 e	20.3 a	1.8 a	93.1 a
Proclaim 5 SC	0.0075	0.5 bc	0.5 e	22.5 a	1.0 a	95.5 a
Warrior T + Lannate L	0.03 + 0.9	0.2 cd	1.4 cd	22.5 a	1.3 a	94.6 a
zeta-cypermethrin	0.018	0.8 ab	1.8 bc	23.0 a	1.3 a	94.8 a
zeta-cypermethrin	0.025	0.3 cd	1.8 bc	20.3 a	2.0 a	91.1 a

Mean separations within columns by LSD (*P*# 0.05).

NEONICOTINOID INSECTICIDES FOR APHID CONTROL IN LETTUCE, 2002.

Eric T. Natwick

A stand of Romaine leaf lettuce, Green Towers, was established at the Imperial Valley Research Center, Brawley, California on November 1, 2002. Five insecticide treatments for aphid control and an untreated control were replicated four times in a randomized complete block design experiment. The insecticides were all neonicotinoid insecticides. Admire 2 F at 0.375 lb AI/acre and Platinum 2 SC at 0.141 lb AI/acre were applied in-furrow on October 31, 2003 two inches below the seedlines. Provado 1.6 F at 0.05 lb AI/acre, Actara 25 WG at 0.047 lb AI/acre, and Assail 70 WP were applied as foliar sprays on February 19, 2003. Potato aphids on ten plants per plot were counted on January 22, March 3 and March 6, 2003.

There were no differences among the treatments on January 22. The untreated control had more (*P*= 0.05) potato aphids per plant than any of the insecticide treatments and Admire and Platinum had significantly fewer aphids than any of the foliar spray treatments on March 3. Only Provado and Assail had significantly fewer aphids than the untreated control on March 6.

Table 1. Numbers[y] of Potato Aphids per Plant on Various Dates and Seasonal Means, Brawley, California, 2002/03.

Treatment	lb(AI)/acre	22 January	3 March[z]	6 March[z]	Seasonal Mean
Untreated	------	0.00 a	88.15 a	64.30 a	57.17 a
Admire 2 F	0.375	0.00 a	3.88 d	27.70 ab	11.28 c
Platinum 2SC	0.141	0.10 a	2.57 d	64.69 a	27.18 b
Provado 1.6 F	0.05	0.00 a	20.74 b	6.16 c	10.80 c
Actara 25 WG	0.047	0.03 a	5.05 cd	82.11 a	31.98 b
Assail 70 W	0.05	0.00 a	9.38 bc	14.54 bc	11.06 c

[y] Mean separations within columns by LSD (*P*# 0.05). [z] Log transformed data used for analysis; reverse transformed means reported.

SOIL QUALITY UPDATE

Herman Meister

When we think about the important role that soil plays in the production of food and fiber for the world's population, we realize that it is an irreplaceable resource that must be protected. Soil is the medium that supports plant growth and the source of most plant nutrients. Soil water and the soil atmosphere bathe the roots and keep the above-ground plant healthy and growing. A healthy soil environment is in everyone's interest.

Many people have attempted to define soil quality by measuring various soil characteristics and relating these to different management practices, such as productivity, environmental quality, or plant disease. But soil quality means different things to different people, depending on its intended use. For example, farmers generally want a soil that supports ideal crop growth year after year with a minimum of inputs. A highway construction engineer is looking for very different soil properties for building freeways.

Farmers realize that balanced crop fertilization increases yields and farm profitability. At the same time, enhanced crop productivity increases the amount of organic matter that can be returned to the soil. Organic matter can positively influence soil properties such as structure, tilth, bulk density, and irrigation infiltration rates.

A recently published article from the University of California reported on changes in soil quality that have occurred in the last 45 to 55 years (Declerck, Singer and Lindert. 2003). Soil samples collected primarily in 1945 were compared with samples collected at the same locations in 2001. These 125 sampling locations represented four major land uses throughout the state: tree crops (25 sites), row crops (44 sites), rangeland (48 sites), and vineyards (8 sites). Although these sites represent only a proportion of California agriculture, analysis of these historic samples provides an insight into changes in soil quality that have occurred throughout the state.

Soil pH: The average soil pH in 1945 was 6.9 compared with a value of 7.1 in 2001. This slight increase in pH is well within the acceptable range for plant growth and indicates no extreme changes towards acidification or alkalization as a result of production practices.

Soil Salinity: The average soil salinity at the 125 sites significantly decreased during the 56-yr period from 0.85 dS/m in 1945 to 0.44 dS/m in 2001. The largest decrease in salinity occurred in soil used for row crops. This 48% average decrease in soil salinity likely reflects an improvement in irrigation management practices and reflects an improvement in soil quality.

Soil Phosphorus: Concentrations of plant-available P (sodium-bicarbonate extractable) increased approximately 20% during this period, with significant increases occurring in land used for tree crops, row crops, and vineyards. The average P concentration in 1945 was 72 ppm and is now 85 ppm. The improved fertility status that has occurred will enhance the inherent productivity of the soil and increase the amount of crop residue that can subsequently be returned to improve the soil.

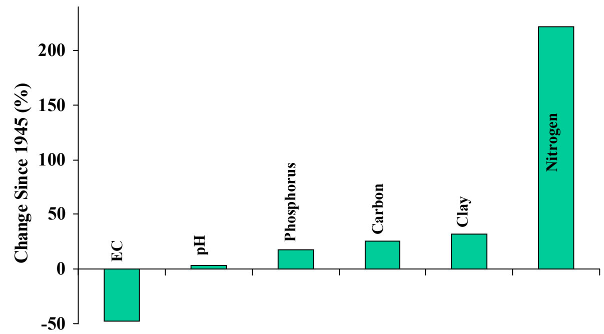
Soil Nitrogen and Carbon: The amount of total nitrogen and carbon significantly increased between 1945 and 2001- reflecting an accumulation of soil organic matter. Average soil nitrogen concentrations increased from 0.09% to 0.29% and soil carbon increased from 1.06 to 1.34% between 1945 and 2001. These changes in soil organic matter are typically reflected in better aggregate stability and water infiltration.

Soil Texture: The clay content of the samples consistently increased from an average of 10% to 13% for the period between 1945 and 2001. This increase in clay content may be a sign of accelerated soil erosion, which would have a negative impact on soil quality. While this increase in clay content is not great, erosion of topsoil can have very negative effects on crop production and water quality. Efforts to minimize soil loss should always be part of a farm management plan.

Impact? These results indicate that soil quality has generally been maintained or improved over the last 50 to 60 years of intensive management and cropping. It also shows that continued efforts must be made to minimize soil erosion. The documented improvements in soil chemical properties and fertility reflect the stewardship of farmers and industry, UCCE education programs, and the NRCS.

Efforts to maintain high yields and soil quality are essential for long-term sustainability. Careful management and utilization of modern technology will accomplish this. The technology available in 2003 is beyond the wildest dreams of the farmers in 1945. For instance, the use of satellite-aided precision agricultural tools, computer-controlled water management, improved soil-testing techniques, rapid assessment of plant tissue samples… all can aid in protecting the quality of the precious soil resource and the environment.

Condensed from "California Soil Quality: a Closer Look" California Agriculture, April-June 2003. Also excerpts from the "News and Views", June 2003.



MEETING NOTICE

33rd California Alfalfa & Forage Symposium

WHEN & WHERE – The 33rd California Alfalfa & Forage Symposium, sponsored by:

University of California Cooperative Extension, will be held at the Doubletree Hotel in Monterey, California December 17 - 19, 2003. Please make your travel plans to Monterey.

HOTEL – Room reservations can be made by calling the Doubletree Hotel at:

(831) 649-4511 or 1-800-222-8733 (toll free)

Be sure to mention the California Alfalfa & Forage Symposium to obtain the group rate of:

$99 for Single/Double occupancy. This rate can be extended for reservations through December 21, 2003 for those who wish to stay through the weekend.

Please note that guest parking is $13 per day, $15 per day for Valet service.

Room reservations must be made prior to November 16, 2003 to obtain group rate. After November 16, regular rates apply

PROGRAM – Please take a look at the program and print a copy. The 33rd California Alfalfa & Forage Symposium is a comprehensive educational program covering all aspects of irrigated alfalfa production with 32 speakers that are scheduled for this meeting.

REGISTRATION

Pre-Symposium Tour (includes lunch)	$45
Pre-Registration (before December 1, 2003)	$150
Late Registration (after December 1, 2003 or walkup)	$180
Registration Single Day Only (12/18 or 12/19)	$80

WEB SITE

http://alfalfa.ucdavis.edu/subpages/2003Symposium/2003CASHome.html

- Registration Forms
- Exhibitor Information
- Sponsorship Information
- Registration Form
- Hotel Web Site

CIMIS REPORT

Khaled Bali and Steve Burch*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of October 1 to December 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Irrigation Management Unit (339-9082).

The Irrigation Management Unit (IID) provides farmers with a weekly CIMIS update. Farmers interested in receiving the updated CIMIS report on a weekly basis can call the IID at the above number. Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (visit http://tmdl.ucdavis.edu and click on the CIMIS link).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	October		November		December	
	1-15	16-31	1-15	15-30	1-15	16-31
Calipatria	0.23	0.19	0.14	0.10	0.07	0.07
El Centro (Seeley)	0.23	0.17	0.13	0.09	0.06	0.06
Holtville (Meloland)	0.23	0.18	0.13	0.10	0.06	0.06

* Irrigation Management Unit, Imperial Irrigation District

Eric T. Natwick
County Director