Imperial ***AGRICULTURAL BRIEFS***

February 2005

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On-Farm Composting
Juan N. Guerrero

Every year thousands of tons of unsold hay remain in roadside stacks. Either the grower waited too long for a price increase to cover costs, poor quality hay, or the grower just couldn't sell the stored hay. This winter, with all the rain we have had, much untarped hay became spoiled. After about one year in storage, hay loses nutritional value. Feeding old hay, greater than 18 mo. old, to livestock is not a good practice.

So what do you do with old hay that is not marketable? One possible way to get rid of old hay is to compost the hay. Composting is ancient agricultural art that still remains valid. Composting is easy, cheap, and compost returned to farm ground increases soil fertility.

A few composting guidelines –

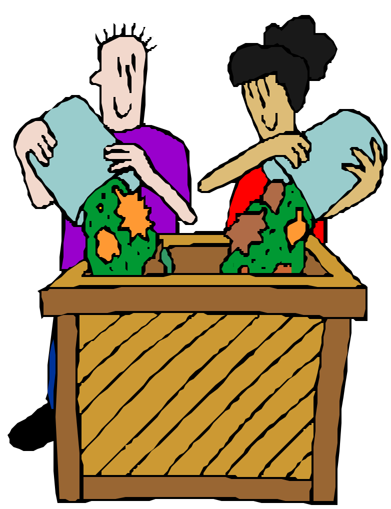
1. What can you compost? Just about anything – old asparagus ferns, old hay, livestock manure, home garbage, grass clippings, brush clippings, unsold vegetables, old animal feed, restaurant garbage, supermarket waste, etc.
2. Do you need expensive composting equipment? No. You can make compost in piles, in wire bins, with pallets, in pits, in about anywhere you want. See Figure 1 as an example of an on-farm compost bin.
3. What is the proper compost recipe? There is a 30:1 carbon:nitrogen ratio that should be maintained, but "eyeballomomotry" is good enough. Any nitrogen source will do; manure or a few scoops of urea will suffice. Simply piling on heaps of old hay in pile is okay, if mixed with manure. If the compost ingredients are chopped, the composting chemical reaction (fermentation) will go faster, but chopping is not essential. You have to keep the compost pile wet. Pour on enough water to keep the pile at about 50% moisture.
4. Let the compost pile cook (ferment). The compost pile should heat up to about 140°.
5. Turning over the compost pile will decrease compost time because more of the pile will be exposed to air. It is not essential to turn the pile over, but very helpful.
6. When the compost pile is reduced to about 25 to 40% of its original volume, it's done. When the compost no longer heats when turned over, it's done. Well-made compost is dark colored, moist, and not bad smelling.
7. During the summer, composting time will only be about two to three weeks. During the winter, composting time may take two or three months in the Desert Southwest.

8. Letting the compost pile dry out, is perhaps the greatest mistake that composters make.
9. Spreading compost on ground and then incorporating the compost into the soil improves soil fertility. Composted material in soil also improves soil tilth.

Unless the amounts of compost made are excessive, greater than 2500 $yards^3$, on-farm composting is not regulated. If you start to make great volumes of compost, you must then obtain a permit from the Regional Water Quality Control Board. Composting is an ancient way of turning farm waste into a useful fertilizer product.

An excellent resource for composters is a website sponsored by the California state government, http://www.ciwmb.ca.gov .

Figure 1. – On Farm Compost Bin



Results of Cantaloupe Varietal Comparison, 2004
Tom Turini

The response of 16 cantaloupe varieties to Monosporascus vine decline, caused by *Monosporascus cannonballus,* was compared at the Desert Research and Extension Center in Holtville, CA. On 12 Mar, seeds were sown on 80 inch beds and irrigated with underground drip. Varieties evaluated appear in Table 1. The experimental design was a 4 replication randomized complete block. Each plot consisted of 25 ft of one bed.

On 2 June, early symptoms of Monosporascus vine decline were observed on some varieties, which included triangular dead areas on the leaves extending from the petiole, wilted leaves and brown lesions on roots. In addition, the fungal structures (perithecia) that are diagnostic for this fungus were found on the roots. Without the aid of magnification, these structures can be seen as small, black, round structures protruding from dead root tissue.

On 7 June, vine collapse of each melon variety was rated on a scale of 0 to 10 based on the percentage. A plot rated 0 would appear healthy with no collapsed vines and no foliar lesions. A plot in which vines are completely collapsed would receive a 10 rating.

On 7 July, 3 root systems from each plot were carefully dug with shovels. These roots were rated for disease severity on a scale of 0 to 10. This scale was based on the percentage of the root system that was covered with brown lesions that characterize this disease. The means are presented as percentages below.

At full slip, fruit were harvested from 20 ft of each plot on 7, 9, 11, 16 and 25 June. Fruit were weighed individually. Based on the weight, the fruit were placed in 5 categories related to the number of fruit that would fit into a standard cantaloupe carton. Fruit per carton is equivalent to fruit weight, as determined by Keith Mayberry, as follows: 23 fruit/carton = 720 to 853 g, 18 = 854 to 1056 g, 15 = 1057 to 1293 g, 12 = 1294 to 1800 g, 9 > 1800 g**.** Data is presented as the number of cartons per acre harvested over the season.

The field in which this study was conducted had a history of vine decline. Monthly low and high soil temperatures (^{o}F) were 62 to 73 in April, 70 to 77 in May and 75 to 82 in June. Monthly low and high air temperatures (^{o}F) were 49 to 98 in Apr, 51 to 91 in May and 61 to 108 in June.

High temperatures favor the growth of this fungus and vine collapse. Optimum temperatures for *M. cannonballus* vegetative (hyphal) growth are from 77^{o} to 95^{o}F, and from 77^{o} to 86^{o}F for spore (ascospore) production. The plant produces blockages (tylosis) in response to the combination of a *M. cannonballus* infection and plant stress. The stress may be caused by high temperatures, too little or too much water, heavy fruit load, insect infestations, or a combination of these factors.

On 7 June, vine decline severity was numerically lowest on Esteem, which was not significantly different from El Comino, Western Gold, and HMX 8586 (P 0.05). Western Gold produced the highest yields, numerically; however, they were not significantly different than the yields of Sol Doardo or El Camino. Esteem produced fewer very large fruit than the varieties with higher carton/acre production. Although HMX 8586 was among the varieties with the bwest vine decline severity on 7 June, few fruit were mature at the time that the vines collapsed. All varieties had severe root rot by 7 July and perithecia were detected on the roots of all varieties.

Table 1. Vine decline and root lesions on cantaloupe varieties at Desert Research and Extension Center at Holtville, CA in 2004.

Variety (source)	Vine decline (%)[z]	ROOT ROT (%)[y]	Yield (cartons per acre)[x]					
			9	12	15	18	23	TOTAL
Western Gold (Sakata)	20	85.5	457.4	217.8	26.1	7.3	2.8	711.4
Sol Dorado (Rogers)	28	96.5	101.6	228.7	213.4	61.7	34.1	639.5
El Camino (Rogers)	20	93.7	116.2	266.8	113.2	36.3	5.7	538.2
Esteem (Rogers)	8	91.5	21.8	217.8	130.7	50.8	22.7	443.8
Sol Real (Rogers)	35	92.5	94.4	130.7	61.0	32.7	11.4	330.2
Caravelle (Seminis)	25	100.0	21.8	130.7	34.8	10.9	2.8	201.0
Mission (Seminis)	23	98.3	14.5	76.2	69.7	21.8	8.5	190.7
Zeus (Seminis)	30	100.0	137.9	38.1	4.4	3.6	0.0	184.0
RML 0009 (Rogers)	30	100.0	7.3	98.0	52.3	3.6	2.8	164.0
Zodiac (Harris Moran)	33	99.8	87.1	38.1	21.8	10.9	0.0	157.9
HMX 8586 (Harris Moran)	18	97.3	36.3	49.0	30.5	14.5	2.8	133.1
Magellan (Seminis)	25	100.0	7.3	49.0	17.4	14.5	5.7	93.9
Gold Rush (Harris Moran)	25	100.0	7.3	70.8	0.0	10.9	0.0	88.9
HMX 2583 (Harris Moran)	35	100.0	0.0	43.6	26.1	7.3	5.7	82.6
Rocket (Harris Moran)	28	98.3	21.8	32.7	21.8	0.0	0.0	76.3
Laredo (Seminis)	28	100.0	0.0	10.9	13.1	3.6	0.0	27.6
LSD (P=0.05)[w]	14	11.29	92.7	100.7	67.82	33.22	17.30	207.62

[z] On 7 June, vine collapse of each melon variety was rated on a scale of 0 to 10 based on the percentage. A plot rated 0 would appear healthy with no collapsed vines and no foliar lesions. A plot in which vines are completely collapsed would receive a 10 rating.

[y] On 7 July, 3 root systems from each plot were carefully dug with shovels. These roots were rated for disease severity on a scale of 0 to 10. Means are presented as percentage of the root system that is affected.

[x] At full slip, fruit were harvested from 20 ft of each plot on 7, 9, 11, 16 and 25 June. Fruit size is presented by the number of fruit that fit into a standard cantaloupe carton. Data is presented as the number of cartons per acre harvested over the season.

[w] Means within a column that differ by the LSD (least significant difference) or more, are statistically different (P 0.05)

Aphid Control in Alfalfa
Eric T. Natwick

Several aphid species are pests of alfalfa in the United States requiring management for successful alfalfa hay production. Spotted alfalfa aphid, *Therioaphis maculata*, pea aphid, *Acyrthosiphon pisum*, blue alfalfa aphid, *Acyrthosiphon kondoi*, and cowpea aphid, *Aphis craccivora* Koch must be managed in the low desert region of southern California and Arizona. Considerable progress has been made toward the control of the aphid pests via host plant resistance. All varieties of alfalfa grown in the Southwestern United States have some resistance to spotted alfalfa aphid. Resistant varieties along with aphid predators and parasites have reduced spotted alfalfa aphid to a minor pest. Host plant resistance has not been as complete to pea aphid and blue alfalfa aphid, which commonly build to potentially damaging numbers each spring requiring insecticide applications to manage these pests. Research to develop alfalfa host plant resistance to cowpea aphid is ongoing at the University of California, but no new varieties have been released to date. Several insecticides are available to alfalfa hay growers for aphid control.

Although several resistant varieties have been developed and released, resistance levels have been low and variable. Insecticides still have a major role in the alfalfa insect pest management. The blue alfalfa aphid, cowpea aphid, pea aphid and spotted alfalfa aphid are commonly controlled in low desert alfalfa with chlorpyrifos or dimethoate when aphid populations reach damaging levels. Other insecticides used in alfalfa that provide aphid control include: carbofuran, several pyrethroid insecticides or malathion. Insecticides are applied a large portion of the alfalfa acreage in the low desert region of the Southwestern United States each year for aphid control.

An insecticide efficacy experiment was established on a stand of alfalfa, var. CUF101, for cowpea aphid, pea aphid, blue alfalfa aphid, and spotted alfalfa aphid control at the University of California Desert Research and Extension Center on March 4, 2004. Nine insecticide treatment and an untreated treated control were arranged in a randomized complete block design experiment with 4 replicates. Foliar sprays were applied with a tractor mounted spray rig on March 4, 2004. A pre-treatment samples consisting of 10 sweeps per plot with a standard 15 inch diameter insect beating net were taken prior to insecticide applications on March 4, 2004. Sweep samples were bagged, labeled and frozen for later counting and data recording. Post-treatment samples were taken in the manner described for the pre-treatment sample 4, 7, 14, and 21 days after treatment (DAT). Only the post treatment means are included in Table 1.

All of the insecticide treatments, except

Renounce 20W, had cowpea aphid means that were lower than the untreated control (P 0.05) on March 8, or 4 DAT. All of the insecticide treatment provided control of cowpea aphid 7 DAT with means lower than the control. Between the 7 DAT sample and the 14 DAT sample the cowpea aphid population in the untreated control crashed. As a result, there were no differences among the treatments for numbers of cowpea aphid 14 DAT. All of the insecticide treatment had means lower that for the untreated control cowpea aphid 21 DAT (P 0.05). Imidan 70W plus Dimethoate E267, Furadan 4F and Furadan 4F plus Dimethoate E267 had the lowest post treatment means, Table 1.

All of the insecticide treatments, except Renounce 20W, had pea aphid means that were lower than the untreated control (P 0.05) on March 8, or 4 DAT. All of the insecticide treatment provided control of pea aphid 7 DAT with means lower than the control. Between the 7 DAT sample and the 14 DAT sample the pea aphid population in the untreated control. As a result, there were no differences among the treatments for numbers of cowpea aphid 14 DAT and 21 DAT. Furadan 4F at 1.0 lb active ingredient per acre had the lowest post treatment means that were significantly lower, Table 1.

All insecticide treatments, except Renounce 20W, had lower blue alfalfa aphid means than the untreated control (P 0.05) on March 8, or 4 DAT. All of the insecticide treatment had means for blue alfalfa aphid that were lower than the untreated control 7 DAT. Between the 7 DAT sample and the 14 DAT sample the blue alfalfa aphid population in the untreated control crashed. There were no differences among the treatments for numbers of blue alfalfa aphid 14 DAT and 21 DAT. Furadan 4F at 1.0 lb active ingredient per acre had the lowest post treatment means that were significantly lower, Table 1.

All insecticide treatments, except Renounce 20W, had lower spotted alfalfa aphid means than the untreated control (P 0.05) on March 8, or 4 DAT. All of the insecticide treatment provided control of spotted alfalfa aphid 7 DAT with means lower than the control. Between the 7 DAT sample and the 14 DAT sample the spotted alfalfa aphid population in the untreated control crashed. As a result, there were no differences among the treatments for numbers of blue alfalfa aphid 14 DAT and 21 DAT. Furadan 4F at 1.0 lb active ingredient per acre had the lowest post treatment means that were significantly lower, Table 1.

There are resistant varieties for pea aphid, blue alfalfa aphid and spotted alfalfa aphid that should be planted as a first line of defense against these pests. Occasionally, populations of one or more of these species of aphids will buildup in an alfalfa stand and may require an insecticide treatment to prevent damage. Treatment thresholds have been established and published for each of these pests and are available online at: http://www.ipm.ucdavis.edu/PMG/selectnewpest.alfalfa-hay.html .

Treat with an insecticide registered for aphid control in alfalfa when the treatment threshold is reached.

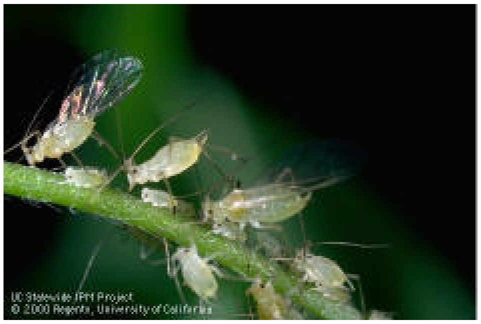


Table 1. Post Treatment Mean Numbers [y] of Aphid per Sweep, Holtville, CA, 2004.

Treatment	lb ai/acre	Cowpea Aphid[z]	Pea Aphid[z]	Blue Alfalfa Aphid[z]	Spotted Alfalfa Aphid
Untreated	------	39.17 a	2.30 a	8.28 a	1.98 a
Steward 1.25 SC + Lorsban 4E	0.025 + 0.125	3.16 de	0.11 ef	0.62 ef	0.66 bc
Steward 1.25 SC + Lorsban 4E	0.045 + 0.125	5.51 c	0.39 bc	1.21 d	0.58 c
DPX-KN128 1.25 EC + Lorsban 4E	0.045 + 0.125	5.47 c	0.26 cd	1.06 d	0.57 c
Renounce 20W	0.0413	24.65 b	1.48 a	4.33 b	0.97 b
Steward 1.25 SC + Dimethoate 267E	0.045 + 0.375	4.25 cd	0.22 cde	0.86 de	0.15 d
Steward 1.25 SC + Malathion 8	0.045 + 1.000	5.88 c	0.67 b	2.60 c	0.62 bc
Imidan 70-W + Dimethoate 267E	1.429 + 0.375	1.96 f	0.17 de	0.47 f	0.07 de
Furadan 4F	1.000	2.92 e	0.05 f	0.10 g	0.02 e
Furadan 4F + Dimethoate 267E	0.500 + 0.375	2.82 e	0.18 de	0.49 f	0.06 e

[y] **Mean separations within columns by $LSD_{0.05}$.**
[z] **Log transformed data used for analysis; reverse transformed means reported.**

2004 Pix Research and Summary
Herman Meister

The cotton variety DP 555BR was irrigated to stand on March 26 2004. Stand counts indicated a final plant population of 55,500 plants per acre. It was sidedressed with 300-lbs. urea (34% ammonium nitrate) on May 5 and May 18. Six more irrigations were applied to alternate furrows on the following dates: May 7, May 19, June 9, June 18, (critical time –irrigation missed) July 2, and July 9.

Petiole samples for nitrate N were collected 3 times during the season: May 17 (23,640 ppm), June 8 (18,370 ppm), June 21 (11,402 ppm).

Insect Control:

Plots were monitored weekly after emergence for mites, beet armyworms, lygus bugs, silver leaf whitefly (SLW). On June 28, SLW reached an economic threshold and the plots were sprayed on June 28 and July 13.

Pix treatments and application dates:

1)Multiple applications of Pix.
 a) 4 oz at match head square (May 17)
 b) 8 oz at first bloom (June 5)
 c) 16 oz at peak bloom (June 21)

2) Pix at 16 oz applied at First Bloom on June 5

3) Pix at 16 oz applied at Peak Bloom on June 21

4) No Pix applications.

Treatments were randomized and replicated 4 times. Plots were 100 feet long and 4-40 inch beds wide. Pix treatments were applied with a CO_2 hand-held boom equipped with two 8002E FF nozzles, one located over the center of each row. Pix was applied in 25 gpa of water using 40 psi. Rates were calculated at 50 % field coverage.

Field Sampling

The plant mapping process was conducted in the field by selecting 5 plants from the middle two rows of the plot designated for sampling. The remainder of the plot area was set aside for collecting yield data. The selected plants were cut off at the soil line and examined for plant height, nodes, fruit retention, nodes above white flower, and internode distance between the 4th and 5th nodes.

The crop was defoliated with Ginstar at 8 oz per acre on July 24. Samples for cotton yields were collected by handpicking 13.1 row feet (one-thousandth acre) from each of the two center rows of each plot on August 25. Samples were weighed and hand ginned to determine % turnout.

Results

The following tables show the results of the Pix treatments on plant growth.

Table1. Cotton Growth Measurements Using the H:N Method.

Date	5-25	6-5	6-18*	7-2*	7-16*
Multiple Pix	1.05	1.32	1.49 a	1.54 a	1.54 a
Pix H:N 1.2	1.05	1.40	1.49 a	1.54 a	1.50 a
MID 5.0 cm	1.03	1.38	1.61 b	1.67 b	1.64 b
Check	1.07	1.46	1.64 b	1.74 b	1.70 b

LSD .05

Table 2. Growth Measurements Using the Maximum Internode Distance Method in Centimeters.

Date	6-5	6-18	7-2*	7-16*
Multiple Pix	5.2	4.8 a	4.1 a	3.8 a
Pix H:N 1.2	5.9	4.3 a	4.2 a	3.9 a
Pix MID 5.0 cm	5.8	5.6 b	5.0 b	4.5 b
Check	5.9	5.7 b	5.0 b	4.6 b

*LSD .05

Table 3. Percent Fruit Retention.

Date	6-17	6-30	7-15	7-29
Multiple Pix	28	53	60	41
Pix H:N 1.3	29	48	59	42
MID 5.0 cm	27	51	54	47
Check	27	50	54	52

Table 4. Nodes Above White Flower (NAWF) Evaluation.

Date	7-2	7-29
Multiple Pix	4.2	.8
Pix H:N 1.2	4.4	.8
Mid 5.0 cm	5.5	1.0
Check	5.9	1.2

Table 5. Average yields from handpicked samples converted to Bales/Acre.

Treatment	Lbs. seed cotton	% Turnout	Lbs. lint	Bales / Acre
Multiple Pix	2932		1290	2.58
Pix H:N 1.2	3120	45	1404	2.80
MID 5.0 cm	3052	44	1343	2.68
Check	3210	44	1412	2.82

No significant difference between treatments.

Table 6. Percent Height Reduction on July 15th for 3 years

Date	2002	2003	2004	Mean
Multiple Pix	19	21	14	18
Pix H:N 1.2	13	13	13	13
Pix MID 5.0 cm	9	11	12	11
Check				

Results and Discussion

The data on June 18 shows that both methods measured the impacts of the 8-oz Pix application applied at first bloom on June 5(Tables1 & 2). The data on July 2 and 16 show that both methods did not measure the growth suppressionary effects of the 16-oz Pix application June 21st. The lack of any measurable difference between the Pix treated and the untreated plots was most likely due to a missed irrigation during peak bloom. This is due to a delay by the construction company that was installing a new water delivery system at the Desert Research and Extension center. This missed irrigation created a drought stress on the cotton plant that forced it into a premature cutout and over-shadowed any effects of the 16-oz Pix treatment.

There were no significant differences in the treatments in relation to percent fruit retention (Table 3).

There were no differences in NAWF on both sample dates (July 2 and 16). The missed irrigation forced the cotton in premature cutout resulting in little growth in the untreated and practically none in the Pix treated plots.

Yield samples from all the plots indicated that there were no significant differences in yie lds between treatments. Petiole samples collected at various stages of growth indicated more than adequate nitrogen was present to sustain the crop.

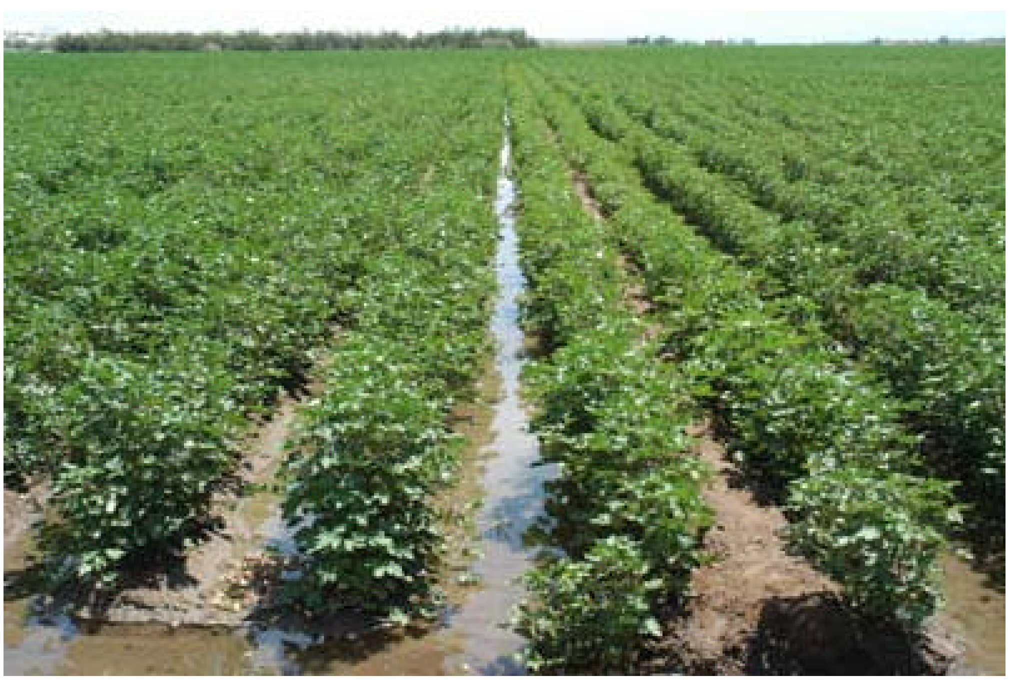
Conclusion

There were multitudes of problems each of the 3 years of this project (2002, 2003, and 2004). There were issues with irrigation timing, plant populations, and fertility.

In spite of the problems, we can conclude that the Maximum Internode Distance method appears to more accurately measure the growth responses of the cotton plant to Pix applications for mid and late season evaluations. The H:N method measures the growth of the plant the entire season and may not be as suitable for mid and late season evaluations. The H:N methods is excellent for monitoring plant growth early in the season.

Table 6 summarizes the growth suppressionary effects of the Pix application of the 3-year period. The multiple Pix applications reduced the growth by 18 %, while the 8-oz at first bloom and the 16-oz at peak bloom were basically the same at 13 and 11 % respectively. The overall plant height ranged from approximately 3 feet in 2002 to almost 4 feet in 2004 in the untreated checks.

Unfortunately, we were not able to gain any increases in yield with the use of Pix under the test conditions in the Imperial Valley during this time period.



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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 February 1 to April 30 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	February		March		April	
	1-15	16-28	1-15	15-31	1-15	16-30
Calipatria	0.12	0.15	0.18	0.22	0.26	0.29
El Centro (Seeley)	0.12	0.14	0.16	0.20	0.24	0.28
Holtville (Meloland)	0.12	0.14	0.17	0.21	0.25	0.28

Eric T. Natwick, County Director