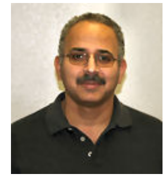
Imperial County Agricultural Briefs

From your Farm Advisors

Features

February, 2006

Water Application Rate and Conversion Factors



Khaled M. Bali

When you order 15 feet of water, how much water are you getting? The answer depends on how long is your order, 12- or 24-hour order. Water cost is based on the volume of your order and not the flow rate. If you order 15 ac-ft (acre-feet) of water to be delivered in 24 hours, then this is how much water you are getting:

Flow rate= volume/time
Flow rate=15*43,560 ft^3/(24 hrs*60 minutes*60 seconds)= 7.56 cfs (cubic foot per second)
(1 ac-ft is 43,560 cubic feet)

However, if you get the same order (15 ac-ft) in a 12-hr period, then the flow rate is:

Flow rate= 15*43,560 ft^3/(12 hrs*60 minutes*60 seconds)= 15..2 cfs (cubic foot per second)

Cubic foot per second is flow rate while ac-ft is volume. Ac-ft per time (12 or 24 hr) is flow rate. As you can see, 1 ac-ft is almost the same as 1 cfs if your order is a 12-hr order. If your order is a 24-hr hour order, then 1 cfs is almost the same as 2 ac-ft.

When you calculate the average application rate, it is much easier to use ac-ft rather than cfs. If you order 16 ac-ft to irrigate 40 acres then on average your application rate is:

16 ac-ft/40 acres= 0.4 feet or 4.8 inches.

When you have a pressurized irrigation system, it's much easier to use flow rate (cfs) than using volume.

Most flow meters give you the flow rate in cfs or gallons per minute (gpm), many flow meters give you total volume in acre-feet or other similar units. Here is a list of volume and flow rate conversion factors.

Conversion factors:

Volume

1 acre = 43,560 ft^2
1 gallon = 3.785 liters
1 ft^3 = 7.48 gallons

Flow rate

1 cfs = 449 gpm
1 cfs= 7.5 gallons per second
1 cfs= 1 acre-inch per hour
24 Hour-Run: 1 cfs ::: 2 Ac-ft per 24 hr.
12 Hour-Run: 1 cfs ::: 1 Ac-ft per 12 hr.

Empoasca spp. Leafhopper Outbreaks and Control in Sugarbeets

Eric T. Natwick

The sugarbeet crop in Imperial County can become heavily infested with *Empoasca* spp. leafhoppers, *E. fabae* and *E. mexara*, during spring and summer. Large populations of these small, green, wedge-shaped insects can cause sugarbeet yield loss. They are not known to transmit any disease to sugarbeets, as does the beet leafhopper *Circulifer tenellus*. However, with higher numbers, the *Empoasca* spp. leafhopper removes plant sap, reducing both yield and sugar while they inject a toxin that causes yellowing and necrosis. The yellowing and necrotic symptoms are called "hopperburn". Hopperburn can progress from mild stippling and yellowing to complete loss of chlorophyll and leaf death. There are several generations per year of *Empoasca* spp. leafhoppers on sugarbeets and these leafhoppers. These leafhoppers can also cause economically important damage to alfalfa, cotton and squash.

Management guidelines for sugarbeet: Sample for leafhoppers by counting the number of adults and nymphs per leaf. Examine at least 10 leaves from 10 plants in four or more areas of the field. Pick fully expanded leaves that are not in contact with the ground. Don’t pick leaves that have full sun exposure because leafhoppers try to avoid the sun. Turn the leaf over and quickly count the leafhoppers; both adults and nymphs can move very fast. Apply an insecticide treatment when leafhoppers reach 10 to 15 per leaf. Use the

lower number for fields 2 to 3 months from harvest. Do not treat within one to two weeks of harvest.

Leafhopper Control Experiment: On April 29, 2005, an insecticide efficacy trial was established at the University of California Desert Research and Extension Center near Holtville, CA on sugarbeet, var. Phoenix, using a randomized complete block experiment with four replicated comparing six insecticide treatments to an untreated control. Insecticides were applied broadcast by ground on April 29 and May 9, 2005.using a Lee Spider Spray Trac sprayer. The treatments and rates are listed in Table 1. Leafhopper adults were sampled using a standard sweep net, 25-sweeps per plot, on April 29, May 2, 9, 11, and 16, 2005. Data were analyzed using ANOVA and LSD for mean separations, P = 0.05.

Results: All insecticide treatments had significantly (P = 0.05) fewer leafhopper adults and nymphs for seasonal mean compared to the untreated control. All insecticide treatments except Lorsban 4E had significantly fewer leafhoppers than Diazinon 4E. The best treatments were Lannate LV at 32 lf oz/acre, Asana XL at 9.6 fl oz/acre, Lannate LV + Asana XL at 16 lf oz and 5.8 lf oz, per acre respectively, and Mustang at 12.9 fl oz/acre.

Table 1. *Empoasca* sp. Leafhopper Adults and Nymphs per Sweep, Holtville, CA, 2005.

Treatment	oz/acre	29 Apr	2 May	9 May	11 May	16 May	SM[z]
Untreated	---------	102.50 a	175.00 a	160.00 a	205.75 a	151.75 a	159.00 a
Lannate LV	32.0	44.50 a	49.75 cd	96.75 a	55.25 cd	45.00 c	58.25 c
Lannate LV + Asana XL	16.0 5.8	92.75 a	32.50 d	96.25 a	45.50 cd	39.75 c	61.35 c
Asana XL	9.6	96.25 a	36.00 cd	76.75 a	34.25 d	50.25 bc	58.70 c
Lorsban 4E	32.0	124.00 a	99.75 bc	99.50 a	76.00 bc	69.00 bc	93.65 bc
Diazinon 4E	16.0	113.25 a	148.00 ab	105.25 a	95.25 b	109.25 ab	114.20 b
Mustang	12.9	106.75 a	72.00 cd	83.50 a	35.50 d	37.25 c	67.00 c

[z] SM = Seasonal means.
Means within columns followed by the same letter are not significantly different, LSD (*P*=0.05)
*** Applied above labeled rate.**

Comparison of Fungicides for Control of Powdery Mildew on Muskmelon, 2005

Thomas Turini and Ronald Cardoza

Powdery mildew is an economically important disease that attacks muskmelons in Imperial County annually. The disease is characterized by ashy white to grey substance that covers the surface of the leaves. To avoid economic damage, fungicide applications may be necessary.

To compare efficacy of registered and novel fungicides against powdery mildew of cucurbits, a study was conducted at the University of California Desert Research and Extension Center in Holtville. On 12 Apr, 2005, 'Golden Beauty' casaba melons seed were sown on a Holtville clay loam. They were drip irrigated to harvest. Each plot consisted of one bed 80 inch wide and 25 feet long. Treated beds were separated by one untreated planted row and by 5 feet between plots within a row. The experimental design was a randomized complete block with five replications. On 21 May, before powdery mildew was observed, the first application was made. Additional applications were made on 7 and 18 Jun. Materials were applied in 30 gallons of water per acre with a CO_2 pressurized backpack sprayer at 30 psi. A spray boom with four Teejet 8002 flat fan nozzles spaced 18-in apart was used for all applications. On 28 Jun, powdery mildew severity was rated on upper and lower leaf surfaces on each of ten leaves per plot using a scale of 0 to 10 based on percentage of leaf surface covered with powdery mildew colonies. Leaves rated 0 had no visible powdery mildew sporulation; leaves rated 10 were covered with the fungus. Arcsine transformed data was subjected to analysis of variance. Student-Newman-Keul's Multiple Range Test on transformed data ($P \leq 0.05$) was used for mean separation. Non-transformed means are presented as a percentage of the leaf surface covered with powdery mildew.

Disease severity was high and treatment differences were present (Table 1). Pristine with Kenetic, Procure 480SC, Endura, dusting sulfur, Procure 50WS, and Quintec provided excellent control on upper and lower leaf surfaces. No symptoms of phytotoxicity were observed. Note that Quintec, V10118, Rubigan, Procure 480SC and Sovran are not currently registered for use on cucurbits in California (Read labels carefully before writing a pesticide recommendation.)

An additional consideration in writing fungicide recommendation should be resistance management. Although materials are tested by applying the same material many times, this should not be done commercially. Examples of fungicide rotation/tank mix programs appear in Table 2. Many of the fungicides that are used to control powdery mildew of melons have a moderate or high resistance risk (Table 3). Avoid sequential applications of materials with the same mode of action. Note that there are several materials registered for the control of this disease that have the same mode of action.

Table 1. Fungicide performance at University of California Desert Research and Extension Center, 2005

Treatments and rate formulated product/acre[z]	Powdery mildew on leaf surface (%)[y]			
	upper		lower	
Pristine 18.5 oz + Kenetic 16 oz	3.0	fgh[x]	3.0	f
Procure 480SC 8 fl oz	1.6	gh	3.6	f
Endura 4 oz + Kenetic 16 oz/acre	1.4	h	4.8	f
Dusting S 30 lbs	6.4	efgh	8.4	ef
Procure 50WS 8 oz	7.6	cdefg	8.4	def
Quintec 6 fl oz	6.2	defg	7.0	ef
Sonata 4 qts+ Silwett L-77 0.2 % + Procure 50WS 4 oz	6.8	defg	10.8	cde
V-10118 6.2 fl oz	12.4	cdef	12.2	cde
Microthiol 6 lbs	12.4	cdef	13.4	cde
Rally 40WP 5 oz + Latron B1956 0.06 %	10.6	cdefg	16.0	cde
Cabrio 16 oz + Latron B1956 0.06 %	17.6	bcd	16.2	cde
V-10118 9.3 fl oz	12.6	cde	17.0	cde
Topsin M 70W 0.5 lbs + Trilogy 1%	20.0	bcd	20.6	bcd
Rubigan EC 8 fl oz	16.0	bcd	22.0	bcd
Sovran 4 oz + Latron B1956 0.06 %	21.8	bc	22.8	bc
Quadris 15.4 fl oz + Latron B1956 0.06 %	20.0	bcd	23.0	bcd
Flint 2 oz	28.8	b	33.0	ab
Trilogy 1%	44.4	a	34.2	ab
Untreated control	41.6	a	37.8	a

[z] All materials were applied in the equivalent of 30 gallons of water per acre with a CO_2-pressurized backpack sprayer at 30 psi. Materials were applied on 21 May, 7 and 18 Jun.

[y] On 28 Jun, powdery mildew severity was rated on upper and lower leaf surfaces on each of ten leaves per plot using a scale of 0 to 10 based on percentage of leaf surface covered with powdery mildew colonies. Means are presented as a percentage of the leaf surface covered with powdery mildew.

[x] Means followed by the same letter do not differ significantly as determined by Student-Newman-Keul's Multiple Range Test on arcsine transformed data ($P \leq 0.05$). De-transformed means are presented.

Table 2. Efficacy of fungicide programs against powdery mildew of casaba, cv. 'Golden Beauty' at Desert Research and Extension Center in 2005

Trade name [z]	**Leaf surface covered with powdery mildew (%)**			
	29 Jun			
	upper		**lower**	
Dusting S 30 lbs **(1)** PrevAm 0.4% v/v + Flint 2.0 oz **(2)** Procure 50WS 8 oz **(3)**[y]	7.8	b	14.8	b
Quintec 6 fl oz **(1,3)** **alternated with** Rally @ 5 oz + Latron B1956 0.06 % **(2)**	10.4	b	13.0	b
Cabrio 16 oz + Latron B1956 0.06 % **(1, 3)** **alternated with** Sonata 4quarts + Silwett L-77 **(2)**	18.0	b	24.6	b
Sonata 4 qts+ Silwett L-77 6 fl oz/100 gal **(1,3)** **alternated with** Procure 50WS 8 oz **(2)**	13.2	b	12.4	b
Foliar Supreme 2 qt **(1)** Procure 50WS 8 oz **(2)** Foliar Supreme 2 qts + Flint 2 oz **(3)**	12.8	b	13.8	b
Cabrio 16 oz + Latron B1956 0.06 % **(1,3)** **alternated with** Procure 50WS 8 oz **(2)**	8.2	b	12.6	b
Sovran 4 oz + Latron B1956 0.06 % **(1)** **alternated with** Sovran 4.0 oz + Endura 5.0 oz + Latron B1956 0.06 % **(2, 3)**	7.2	b	12.8	b
PrevAm 0.4% v/v + Flint 2.0 oz **(1, 3)** **alternated with** Procure 50WS 8 oz **(2)**	6.2	b	7.8	b
Bravo Weather Stick 3 pts + Flint 2.0 oz **(1,3)** **alternated with** Procure 50WS 8 oz **(2)**	3.8	b	21.6	b
Flint 2.0 oz **(1,3)** **alternated with** Procure 50WS 8 oz **(2)**	15.4	b	19.8	b
Untreated control	41.6	a	37.8	a

[z] All materials were applied in the equivalent of 30 gallons of water per acre with a CO_2-pressurized backpack sprayer at 30 psi. Materials were applied on 21 May, 7 and 18 June.
[y] Materials separated by "+" were tank mixed. Materials followed by a number in parentheses, were applied on the corresponding date: (1) 21 May, (2) 7 June and (3) 18 June.
[x] Means followed by the same letter do not differ significantly as determined by Student-Newman-Keul's Multiple Range Test on arcsine transformed data ($P \leq 0.05$). Non-transformed means are presented.

Table 3. Properties of selected fungicides.

Group Name	**Target Site**	**Trade Names of Compound(s)**	**Resistance Potential**
Carboxamides	Complex II in fungal respiration (succinate dehydrogenase)	*Endura (boscalid)*	Moderate
DeMethylation Inhibitors (Class I of the Sterol biosynthesis inhibitors)	C14-demethylation in sterol biosynthesis	*Procure (triflumizole), Rally (myclobutanil),*	Moderate
Inorganic – Sulfur and Copper	Multiple-site contact activity	*Various*	Low
Isophthalonitrile	Multiple-site contact activity	*Various including Bravo (chlorothanlonil)*	Low
Methyl Benzimidazole Carbamates	Mitosis: β-tubuline assembly	***Topsin (thiophanate-methyl)***	High
Quinone outside Inhibitors (QoI)	Complex III of respiration: ubiquinol oxidase, Qo site	*Cabrio (pyraclostrobin), Flint (trifloxystrobin), Quadris (azoxystrobin),*	High
QoI and Carboxamide		*Pristine (pyraclostrobin and boscalid)*	

Table adapted from Fungicide Resistance Action Committee Fungicide List (2)

Hats Off To The Gambler … The American Farmer

Rick Bottoms

Following the holidays and times of reflection, there gives rise to thoughts of our unsung hero's: military, teachers, public service providers and the American farmer. With today's economy being shaken to new lows, questions of stability, the ability to rebound and some inferring similarity to earlier days and market prices reflecting times of less marginal return, the American Farmer is again a unsung hero, a symbol of what's right with our traditions and values of hard work, lifestyle, perseverance, ingenuity, adaptiveness, flexibility, optimism with a sprinkle of the reflections of a gambler.

American farmers are a diverse lot, but they share a common pursuit of a higher self-interest. They are not trying to maximize profit, but instead are seeking sufficient profit for a desirable quality of life. They recognize the importance of relationships, of family and community, as well as income, in determining their overall well-being. They accept the responsibilities of ethics and stewardship, not as constraints to their selfishness, but instead, as opportunities to lead successful lives.

Farming sustainably is no simple task. But, many farmers are finding ways to sustain a desirable quality of life for themselves and to support their local communities while being good stewards of the land and the natural environment. Where else and for so long have individuals, families, or collective groups of proud citizens toiled so long for so little fiscal return on their investment; a little over one percent? Most other businesses would have called it quits. Even the average consumer can expect a greater return on their investment from the bank, Jenny May, or even real estate. That coupled with labor issues, increased fuel, fertilizer marketing and regulatory costs have left many producers asking, "just how much crop do I grow and at what cost to myself, family, and business stability?

This last week, I reviewed excerpts from some grower publications including the Food Agricultural Policy Research Institute (FAPRI) on what producers might consider in this crop year. A less than optimistic picture for American agriculture commodity prices this year; even with new advances in technology, improved efficiency, and the ability to provide the American consumer a safe quality food supply. Ironically, these investments have provided the American consumer a terrific lifestyle having to spend only 10 cents per earned dollar for food. While consumers in the United Kingdom spend 11.5, Australia 14.6, Japan 17.8 and China 50 cents. In Canada, 9.8 cents of their earned dollar is spent on food. The U.S. imposes an average tariff on competing agricultural imports of about 12%, while U.S. goods face a global tariff average of approximately 62%.

Even neighbors to the north, Canadian Federation of Agriculture president Mr. Bob Friesen said, "When you go to a restaurant, the tip you leave is more than the farmer share of what you paid," The reality is that for the most part, people who produce resources are price takers, not price setters.

The bottom line is we want a greater return for our investment. We want to get through the growing season financially, physically and mentally unscathed. This requires a great deal of focus and some would call it stick-to-itiveness as we implement our management strategies. In doing so we usually miss opportunities to capture mental notes or pictures that can help us become even more efficient as we develop new plans that next growing season. A review of production factors that might be worth considering as you strives to impact the bottom-line.

- Fertility – with unrivaled volatility for natural gas in the market place, fertilizer prices are very difficult to predict. Your goal, of course, is to purchase your inputs as low as possible and split fertilizer applications which can help reduce risk.
- Also ask your dealer weekly, monthly for projected fertilizer prices so you can purchase at the least cost.
- Weeds - when you observe weedy out pockets in your field, try to record (notes, camera, GPS) the location and circumstances i.e. herbicide and/or application used, irrigation or precipitation, previous crop, etc. that may have contributed to the infestation.
- Disease – the all too familiar disease triangle (susceptible host, favorable environment and pathogen) similar to weeds observe and record, try to determine contributors and what might have prevented the outbreak. Can different planting dates, cultural practices, resistant varieties be considered in the future?
- Insects – Again, similar management approaches that can assist in reducing negative crop impacts should be considered. Select resistant varieties, stagger or adjust planting dates, review irrigation amounts and schedules, insecticides and rotation strategies, and previous years and/or neighboring crop/forage areas.
- Marketing – The opportunity to timely harvest, pack, bale and ship may be dependent on available labor, equipment, reduced breakdowns, contacts, farm equipment/trucking location, and selected commodity/variety.
- Land preparation – timeliness of land cultivation, soil test, fumigation, fertility applications, irrigation, planting dates, populations, and pest control/prevention and other cultural practices can contribute to success.
- Be informed – make opportunities to attend and interact with your grower associations, UC Research & Extension field days and seminars, subscribe to grower publications, and observe.

Evaluation of Tank-mix Combinations of Prefar 4-E Selective Herbicide in Melons

Ron Cardoza

A trial was conducted to determine whether pre-emergent reduced rate tank-mix combinations of Prefar 4-E provide weed control equal to, or better than high rates of Prefar alone. On February 3, 2005, in a commercial field in the Imperial Valley, 'Easy Rider' cantaloupes were planted on 80" raised beds with the seed-line located on south facing side of mid-bed trench.

The trial was a randomized complete block design with four replicates. Each replicate consisted of a 20-inch band centered over the seed-line of 25 row feet. The test materials and rates are listed on table 1.

Test materials were applied on February 10, 2005, using a pressurized CO_2 backpack sprayer (30 psi) with 2 nozzles (Teejet 8002vs) at the rate of 50 gallons per acre. Due to impending rainfall, the field was not immediately irrigated. Rainfall began within 2 hours of application, with 0.42" of rain occurring within 48 hours.

Evaluations were conducted on March 7, 12, and 17, 2005. Within each plot, four 12" x 12" areas, centered on the seed-line, were examined. The number of germinated melon plants, and the number of weeds, by species, was recorded. In addition, the percent control was determined from the treatment means using Abbott's formula:

$$100 \times \frac{(\#\text{weeds in untreated plots} - \#\text{weeds in treated plots})}{\#\text{weeds in untreated plots}}$$

Melon germination was variable, both within the test plots and in the surrounding untreated area, however, no significant differences (p=0.05) were found between treatments.

Nettleleaf goosefoot (*Chenopodium murale*) was, by far, the most abundant weed, and found within each plot. Less common weeds, not occurring in numbers allowing analysis, were little mallow (*Malva parviflora*), silversheath knotweed (*Polygonum argyrocoleon*), barnyardgrass (*Echinochloa crus-galli*), London rocket (*Sisymbrium irio*), California burclover (*Medicago polymorpha*), and annual sowthistle (*Sonchus oleraceus*).

The 6 quart per acre rate of Prefar 4-E was the most effective treatment, providing 68.4% control, compared to the untreated plots. Prefar 4-E @ 3 qts / acre + Sustain @ 8 oz / 50 gal and Prefar 4-E @ 3 qts / acre + Agri-Dex @ 32 oz / 50 gal were similarly effective (p=0.05) with 46.8 and 38.3% control, respectively. The 3 qt / acre rate of Prefar 4-E provided 34% control. Prefar 4-E @ 3 qts / acre + Coax @ 120 oz / 50 gal gave 31.9% control, but was not statistically different (p=0.05) from the untreated plots.

In conclusion, the addition of Sustain and Agri-Dex improved the performance of the 3 quart per acre rate of Prefar 4-E to a level similar to that of the 6 quart per acre rate of Prefar 4-E alone, whereas the addition of Coax did not improve performance.

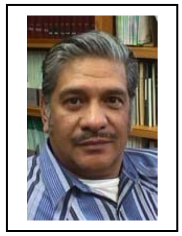
Table 1. Number of germinated melon plants and number of weeds on March 17, 2005

Rating Date Rating Unit	Mar/17/2005 #melons	Mar/17/2005 # weeds
1 Prefar @ 6 qt/acre	6.75 a	3.75 c
2 Prefar @ 3 qt/acre	6.75 a	7.75 b
3 Prefar @ 3 qt/acre +AgriDex @ 32 oz/50 gal	5.50 a	7.25 bc
4 Prefar @ 3 qts/acre + Sustain @ 8 oz/50 gal	6.25 a	6.25 bc
5 Prefar @ 3 qts/acre + Coax @ 120 oz/50 gal	6.25 a	8.00 ab
6 Untreated	7.00 a	11.75 a

Means followed by same letter do not significantly differ (P=.05, LSD)
Mean comparisons performed only when AOV Treatment P(F) is significant at mean comparison OSL.

Nitrate Toxicity

Juan N. Guerrero



Within the next several months, it will be time again to plant sudangrass. The best germination occurs when soil temperatures are ≥ 65°. This coming year however, because of expensive fuel and fertilizer costs, the minimal till option might be worth considering. Some sudangrass producers will plant the crop after a winter vegetable and not fertilize at all, using the fertilizer applied to the vegetable crop for the sudangrass. In the past, this practice of using the winter applied fertilizer for the summer sudangrass crop was justified as a measure to reduce nitrate levels in the hay.

Nitrates are a problem with all ***Sorghum*** sp. plants; sudangrass is a member of that family. One positive aspect of these plants is that they do well in a hot climate, such as ours. However, as the plants grow and absorb soil nutrients; such as the nitrate ion, NO_3; sometimes these ions accumulate in the vegetative parts of the plants when the plants are water stressed. Nitrate levels are the highest in the lower parts of the stem. Nitrates do not accumulate in the seed head. Water stress is a constant problem during the summer in the Imperial Valley. Sometimes during the summer, a sudangrass field that is near harvest might be water stressed, for whatever reason, and then irrigated. Because of the water stress, nitrates might have accumulated in the lower part of the plant. The grower, in a hurry to harvest, cuts the field in just 4 or 5 days (the ground still wet) after the irrigation. The plant has not had enough time to convert the accumulated NO_3 to plant proteins, and this particular grower has hay with elevated levels of Nitrates.

In the rumen of cattle and sheep, nitrates are converted to nitrites, nitrites are converted to ammonia, and then this ammonia is converted to microbial protein; a natural process. However, sometimes when excessive amounts of nitrates enter the rumen, toxic nitrite levels accumulate. These excess nitrites enter the blood stream from the rumen and convert the iron in hemoglobin in the blood into a form that is unable to transport oxygen. The blood is chocolate colored. The animal may die of oxygen deprivation.

One of the most confusing aspects of nitrate toxicity is that different laboratories report NO_3 in different ways and different university extension specialists have different recommendations regarding nitrate toxicity. Laboratories may report nitrate as KNO_3 (potassium nitrate), NO_3, or as NO_3-N (nitrate nitrogen). Then to further complicate matters the amounts may be reported as either a % of dry matter or as ppm. The recommendations that I follow are in Table 1. Personally, I prefer the NO_3-N ppm recommendations.

The University of Minnesota adheres to the recommendations of Table 2. Iowa adheres to the recommendations of Table 3.

Depending on climate, during the summer, three irrigations may be applied between cuttings. In the past, we have recommended about 20 lb N in the first irrigation. Also, it is very important to cut high, at least 6 to 8” to avoid NO_3 at the stem base.

Nitrate accumulation in sudangrass hay is a manageable problem.

Table 1. Hay nitrate levels

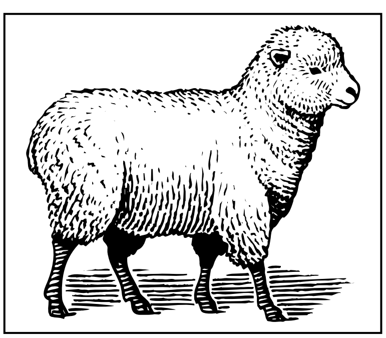
NO_3, % dry matter	NO_3-N,ppm	Recommendation
0 – 0.44	< 1000	Safe under all conditions
0.44 – 0.66	1000 – 1500	OK for non-pregnant animals. For pregnant animals use at < 50% of diet
0.66 – 0.88	1500 – 2000	Use at < 50% of diet
0.88 – 1.54	2000 – 3500	Use at 35 – 40% of the diet Do not use with pregnant females
1.54 – 1.76	3500 – 4000	Use at < 25% of the diet Do not use with pregnant females
> 1.76	> 4000	Potentially toxic, do not feed

Table 2. Nitrate recommendations, Minnesota

NO_3-N,ppm	Recommendation
0 – 1500	Safe under all conditions
1500 – 3000	Generally safe, at >2500 use at <50% of diet
3000 – 4500	Feed at <25% of diet
> 4500	Potentially toxic, do not feed

Table 3. Nitrate recommendations, Iowa

KNO_3 ppm	NO_3-N ppm	NO_3 ppm	Recommendation
≤ 10000	≤1500	≤ 6500	Generally Safe
10000 - 30000	1500 - 4500	6500 – 20000	Caution, Mix and dilute problem feed
> 30000	>4500	> 20000	Danger, do not feed, potentially toxic



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