Imperial AGRICULTURAL BRIEFS

COOPERATIVE EXTENSION
UNIVERSITY OF CALIFORNIA

FEATURES

MARCH 2004

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COTTON PLANTING

Herman Meister

More farmers will be planting cotton this season with the market price increases in recent months. Some of you may not have grown cotton in a few years. Some key points to consider to assure a good cotton stand are seed bed preparation and soil temperature at planting.

Seed Bed Preparation

Pre-irrigation of cotton beds followed by a lilliston cultivation helps forms a crumbly seed bed adequate for germination and destroys the first crop of weeds. A rough seedbed consisting of large 1-inch clods does not assure proper wetting of the seed for good germination. Cottonseed that is not covered adequately will dry out or germinate with out properly hooking into the soil. Planting seed too deep (over 1 inch) will delay emergence and predispose seedlings to pathogens.

Seed Bed Temperature

Once the beds have been pre-irrigated and lilliston cultivated, 3-4 days of soil temperatures > 60 ^{o} F and a favorable 4-5 day forecast will pave the way for a good stand. Historically, favorable soil temperatures for planting usually will be attained by mid March. In general, cotton can be planted up until mid April with no loss of yield due to planting date.

Plant Population

Many farmers do not thin cotton due to the cost of labor. Some plant more seed early in the season in anticipation of inclement weather. An easy way to determine your plant population is to count the number of plants per foot in six areas of the field to get an average number of plants per foot. One plant per foot on 30 and 40-inch rows is 17,525 and 13,144 plants per acre respectively. By multiplying the average number of plants per foot times the plants per acre in one foot will provide the plant population per acre. For example, an average of 3.25 plants per foot times 13,144 equals 42,718 plants per acre on 40-inch row spacing. Plant populations ranging from 35 to 45 thousand plants per acre will produce optimum yields. Plant populations in higher ranges will require careful management to produce adequate yields in most cases.

Cotton planting seed historically has been sold in 50 lb. bags. Starting in 2004, cotton planting seed from Delta Pine will be sold in bags containing 250,000 seeds per bag. If a farmer decides to plant 5 seeds per foot, what will his eventual stand be? Assuming 90% germination and 10% loss, he would have 4 seeds per foot. How many acres will 5 seeds per foot plant on 40-inch beds? Five seeds times 13,144 feet per acre on 40-inch beds results in 65,720 seeds per acre. Two hundred fifty thousand seeds divided by 65,720 results in 3.8 acres per bag.

For more UCCE information on cotton production, check the web site http://cottoninfo.ucdavis.edu/ The Arizona web site is http://ag.arizona.edu/crops/

HAY QUALITY OPTIONS

Juan N. Guerrero

As we move to the most productive alfalfa hay-producing part of the year, it is always important to remember that hay quality and availability determine hay price. The California Hay Consortium has described a number of hay terms that may be used to describe the different kinds of hay that are found in California. The use of these terms will help to reduce any misunderstandings that might occur regarding the marketing of hay.

1. Alfalfa hay – on a dry matter basis at least 90% of the plant material is alfalfa. This allows a significant amount (10%) of the dry plant material to be weeds or other plant material and still be counted as “alfalfa hay.”

2. Mixed alfalfa hay – on a dry matter basis at least 50% of the plant material is alfalfa. This type of hay includes mixtures of grasses, other weeds, or other mixed forage species. Hay with less than 50% alfalfa should be designated with the dominant forage specie (e.g. Oats, mixed grass, etc.).

3. Grass hay – on a dry matter basis at least 90% of the plant material is grass. Specific

grass specie should be designated, (e.g. Sudangrass, oats, ryegrass, mixed grass, etc.).

4. Mixed grass hay – on a dry matter basis hay containing mixtures of alfalfa, clover, grasses, weeds, or other plant material; however at least 50% of the dry matter must be grass. The grass specie must be designated, this specie must be from 50 to 90% of the dry matter composition of the hay.

Alfalfa Hay Quality Categories

EXTRA PREMIUM or SUPREME – exceptional hay expected to have very high feeding value. Hay is completely free of grasses and weeds, soft, highly palatable, and is typically cut in the vegetative or early bud stage of growth. On a dry matter basis, hay if high in crude protein and has less then 27% ADF. Only "alfalfa hay" can be classified as 'SUPREME." This hay is intended only for high producing dairy cows. This hay may be produced in early spring cuttings. This type hay typically is less than 10% of the total hay harvest.

PREMIUM – this hay has a slightly higher fiber content than "SUPREME" but it is still excellent quality hay intended for high-producing dairy cows. The ADF content is from 27 to 29% (100% DM). Since some grasses and weeds have excellent quality feeding value, weeds may be allowed into this category, given that the weeds are low in fiber, high in crude protein, and do not have any toxic forage factors. The weeds must not be noxious or be unpalatable. Typically, this hay is cut in the prebud, bud, or early bloom stage of growth.

GOOD – this hay has a medium fiber content (ADF from 29 to 32%, 100% DM), good leaf attachment, and be mostly free of weeds and grasses. This hay is intended for medium to high producing dairy cows, dry cows, or for growing ruminants. This hay has soft stems, is well-cured, and is cut from the early to mid-bloom stage of growth.

FAIR – coarse stemmed hay, lower in crude protein and higher in fiber (ADF from 32 to 35%, 100% DM). May have poor leaf attachment and moderate weed content. No noxious weeds. May be used by low producing dairy cows, dry cows or for growing livestock. This hay may be cut from the early to late bloom stage of growth.

LOW – this hay has serious faults. This hay has a high fiber content (ADF > 35%, 100% DM), may have rain damage, may have noxious weeds, may have a large proportion of low quality weeds, has a low crude protein content, may be moldy, may be poorly cured or have other serious defects. This hay is not intended for lactating cows.

As growers attempt to maximize profit/acre, both hay price and hay yield must be considered. To produce Supreme quality means that hay yields will be sacrificed. To produce maximum hay yields means that hay will be swathed at full flower, but hay quality will decrease. To determine when to swath, the price spread of the different hay qualities must be known. For example, if the price spread between Supreme and Premium is $10-15 per ton, then it might be worth it to produce Supreme quality hay, otherwise make a lower quality because the higher yields will compensate for the lower price. Often during the year, the spreads between Supreme, Premium, and Good quality hays are not great. If the price spreads are not great, then go for tons/acre as the most profitable hay-producing strategy.

RECOGNITION OF POTATO DISEASES

Thomas A. Turini

In Imperial County, potatoes climbed from 16th to 8th place ranking in from 2001 to 2002 in terms of gross crop value. In 2001, less than 3,000 acres of potatoes were grown in Imperial County. In 2002, this number grew to over 5,000. Rapid and accurate diagnosis of potato diseases can be critical in avoiding economic damage.

Late blight is a devastating disease of potatoes caused by *Phytophthora infestans.* The disease is favored by cool (50° to 78°F) wet (over 95% relative humidity) conditions. Although it is likely to be an infrequent occurrence in the low desert, it could cause substantial damage very quickly under cool wet conditions. On leaves, symptoms initially appear as irregularly shaped water-soaked areas with yellow margins. These water soaked areas will turn dark brown to purple as the tissue dies. Brown to black

lesions may also appear on stems and petioles. On the tubers, the pathogen will cause firm brown lesions that can extend into the tissue up to ½ inch. When the disease first appears in the field or in nearby plantings, apply fungicides as soon as possible.

Dark brown, angular or circular lesions on the leaves and a dry rot on the tubers characterize early blight (*Alternaria solani*) symptoms. This disease is favored by warm wet conditions and will usually occur on older or stressed leaves. Early blight can be reduced by properly irrigating, fertilizing and managing any other pests that may compromise the health of the plant. If the foliar lesions appear early in the season, fungicides applications are justified.

Common scab (*Streptomyces spp.*) and powdery scab (*Spongospora subterranea*) cause development of brownish, rough, raised growths on the surface of the tuber. Common scab can be suppressed by maintaining adequate soil moisture during tuber initiation and the following 4 to 6 weeks. If the field is infested with the powdery scab pathogen, incidence and severity of this disease can be reduced with a pre-plant treatment of metam sodium.

Rhizoctonia solani can cause cankers on stems and stolons and can produce small, dark-brown, irregularly shaped fungal structures on the surface of the tubers. Fungicide treatment of seed tubers can reduce levels of seed-borne inoculum.

Black leg of the potato stem, caused by *Erwinia carotovora* var. *atroseptica,* and tuber soft rot, caused by *E. carotovora* var. *carotovora* and *E. chrysanthemi,* are favored by warm wet conditions. Plants with blackleg will be stunted and foliage will be chlorotic. An inky black decay of the stems characterizes this disease. The base of the stem is often severely rotted. Tuber symptoms include a soft wet rot that is cream to tan in color. The margins between infected and healthy tissues are sharply delineated by dark brown to black margins. Tuber symptoms of tuber soft rot are similar to those of black leg.

Nematodes that are potentially injurious to potatoes include root knot (Meloidogyne incognita), lesion (*Pratylenchus penetrans* and *P. neglectus*) and stubby root (*Paratrichodorus sp.*). Pre-plant treatments with metam-sodium are used to reduce nematode populations. Metam sodium applications are applied water-run in a flood irrigation prior to listing the beds or as a direct injection normally done by a custom applicator.

A few general disease control techniques can help reduce incidence of several of these diseases. Planting disease free seed tubers can reduce incidence of bacterial soft rot, powdery scab, common scab, late blight and *Rhizoctonia* potato diseases. Using certified planting material can minimize the chances of introducing nematodes to a clean field. Crop rotations are effective in controlling common scab, powdery scab and *Rhizoctonia* potato diseases. Avoiding over-irrigating can reduce severity of bacterial soft rot and powdery scab.

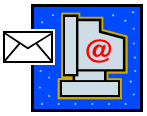
AG BRIEFS ON-LINE

Herman Meister

Ag Briefs can be found on-line at our website http://ceimperial.ucdavis.edu. Once you are at the website, click on Ag Briefs Newsletter and it will take you to the latest editions. You may also subscribe to the newsletter by entering your email address and editions will be sent to you as soon as they become available. Also available is cost of production information for field and vegetable crops, tillage rates, and the Ag Commissioners report just to name a few. Surveys will be sent out this spring to begin the updating of the "Cost of Production" guidelines.

If you would like to be immediately notified of any pertinent information that could affect your farming operations, please email me at hmeister@ucdavis.edu and I will gladly add your address to the Agronomy Alert notification program.

We also maintain an alert program for PCA's. If have not been receiving alerts, then your email address is not on the list. If you would like to be notified about impending situations regarding crop protection issues, please email me to add your address to the list.



EVALUATION OF NEW INSECTICIDES FOR WHITEFLY CONTROL IN COTTON IN 2003.

Eric T. Natwick

A stand of cotton, *Gossypium hirsutum* L. var. DPL 448B, was established at UC Desert Research & Extension Center 1 April 2003, Imperial Valley, CA. Twelve insecticide treatments and an untreated control were replicated four times in a randomized complete design. Each plots was 15 m long and 4 m wide. Insecticide treatments by registered trade name, or experimental number or name, are listed in Table 1. Each insecticide treatment was applied weekly from June 11 through July 29, 2004 for a total of eight applications. New insecticides (insecticides without a federal label for use on cotton) were Oberon (spiromesifen) under development of Bayer Crop Science to control various insects and mites on corn, cotton, vegetables, fruit crops, and ornamentals; Calypso (thiacloprid) a chloronicotinyl (CNI) chemistry, pioneered by Bayer CropScience; Diamond (novaluron) a Benzoylphenyl urea compound under development by Crompton Corporation; XR-225 (gamma-cyhalothrin) a pyrethroid insecticide under development by Dow AgroSciences; and F0570 (zeta cypermethrin) a pyrethroid insecticide under development of FMC Corporation. Helena Buffer PS at 1 pt/100 gal and Silwet L77 at 4 fl oz/100 gal were used with all insecticide spray treatments with the exception of an Assail treatment that was tank mixed with methylated seed oil as a substitute for Silwet L77.

Silverleaf whitefly adults were sampled using the leaf turn method from 10 plants at random in each plot. Silverleaf whitefly nymphs were counted on single leaf disks of 1.65 cm^2 from the lower left hand quadrant on the undersides of 5^{th} node leaves extracted from 10 plants at random in each plot. Leaf samples were taken weekly from 3 June through 4 August 2003. On 8 September 2003, seed cotton was hand picked from 0.002 acre per plot, data were recorded, and yield as seed cotton per acre was calculated. Seed cotton samples were ginned and percentages of lint turnout and pounds of lint per acre were calculated.

Post-treatment means for silverleaf whitefly adults was greater ($P \leq 0.05$) for the untreated control than for the means of the insecticide treatments Diamond 0.83 EC at 0.013, Danitol 2.4 EC + Orthene 97, Oberon 2 SC at 0.133 lb (AI)/acre, Assail 70 WP + Silwet L77, Assail 70 WP + MSO, and Calypso 4 SC, Table 1. Post-treatment means for silverleaf whitefly nymphs was greater ($P \leq 0.05$) for the untreated control than for all insecticide treatment except Diamond 0.83EC at 0.026 lb (AI)/acre, gamma-cyhalothrin + Orthene 97 and zeta-cypermethrin + Orthene 97, Table 2. Whitefly nymph post-treatment means for Assail 70 WP + MSO was lower than all insecticide treatments except Oberon 2 SC at 0.109 lb and 0.133 lb (AI)/acre, Assail 70 WP + Silwet L77, and Calypso 4 SC. The gamma-cyhalothrin + Orthene 97 treatment had more whitefly nymphs that all other treatments except zeta-cypermethrin + Orthene 97, Diamond 0.83 EC at 0.026 lb (AI)/acre, and Warrior + Orthene 97.

Only Assail 75 WP + MSO, Oberon 2 SC at 0.125 lb and 0.133 lb (AI)/acre, and Calypso 4 SC had means for pounds of seed cotton per acre and pounds of lint per acre that were greater ($P \leq 0.05$) than the untreated control, Table 3. Seed cotton yield and lint yield were negatively correlated to whitefly nymphal population levels, $y = -101.89x + 1488.6$, $R^2 = 0.72$, and $P = 0.00045$ and $y = -41.666x + 561.01$, $R^2 = 0.71$ and $P = 0.00055$, respectively. Therefore, the highest means for pounds of seed cotton per acre and were from treatments that had the lowest numbers of silverleaf whitefly nymphs. The untreated control had a lower mean for lint turnout percentage than all insecticide treatments except gamma-cyhalothrin + Orthene 97, zeta-cypermethrin + Orthene 97, Diamond 0.83 EC at 0.026 lb (AI)/acre, Danitol 2.4 EC + Orthene 97, and Warrior + Orthene 97.Percentages of lint turnout were negatively correlated to whitefly nymphal population levels, $y = -0.3782x + 37.801$, $R^2 = 0.61$and $P = 0.0026$. Therefore, the highest means for percentage lint turnout and were from treatments that had the lowest numbers of silverleaf whitefly nymphs.

Whitefly adult and nymph means for gamma-cyhalothrin + Orthene 97 and zeta-cypermethrin + Orthene 97 were not different from the untreated control. The Assail treatments, Calypso, and the Oberon treatments provided the highest levels of control for silverleaf whitefly nymph, the most damaging stage of the insect. Diamond 0.83 EW may be useful for silverleaf whitefly control in cotton, not because it performed well in this study, but like other insect growth regulators, it shows better efficacy in larger plots than were possible in this study.

Table 1. Whitefly Adults per Cotton Leaf Following Insecticide Treatments to Cotton, Holtville, CA, 2003.

Treatment	Lb (AI)/acre	PTMyz
Check	--------	16.18 abc
*Oberon 2 SC	0.109	11.66 cde
*Oberon 2 SC	0.125	11.19 cde
*Oberon 2 SC	0.133	7.59 ef
Assail 70 WP + Silwet L77	0.101 + 0.03%v/v	5.51 f
Assail 70 WP + MSO	0.101 + 0.13%v/v	4.73 f
*Calypso 4 SC	0.0939	4.28 f
*Diamond 0.83EC	0.013	8.62 def
*Diamond 0.83EC	0.026	14.14 bc
*XDE-225 + Orthene 97	0.0125 + 0.5	21.19 a
Warrior + Orthene 97	0.025 + 0.5	13.77 bcd
*F0570 0.8 EW + Orthene 97	0.025 + 0.5	17.38 ab
Danitol 2.4 EC + Orthene 97	0.20 + 0.5	7.61 ef

* Not registered for use on cotton in California at time of publication.

Mean separations within columns followed by the same letter are not significantly different (LSD; $P < 0.05$). [y] Post-treatment means. [z] Log transformed data used for analysis; reverse transformed means are included in the table.

Table 2. Silverleaf Whitefly Nymphs per cm^2 of Cotton Leaf, Holtville, CA 2003.

Treatment	Lb(AI)/acre	PTM [yz]
Check	--------	7.20 a
*Oberon 2 SC	0.109	0.76 efg
*Oberon 2 SC	0.125	0.88 def
*Oberon 2 SC	0.133	0.53 fg
Assail 70 WP + Silwet L77	0.101 + 0.03%v/v	0.48 fg
Assail 70 WP + MSO	0.101 + 0.13%v/v	0.33 g
*Calypso 4 SC	0.0939	0.36 fg
*Diamond 0.83EC	0.013	1.96 bcd
*Diamond 0.83EC	0.026	3.38 ab
*XDE-225 + Orthene 97	0.0125 + 0.5	6.54 a
Warrior + Orthene 97	0.025 + 0.5	2.56 bc
*F0570 0.8 EW + Orthene 97	0.025 + 0.5	3.51 ab
Danitol 2.4 EC + Orthene 97	0.20 + 0.5	1.38 cde

* Not registered for use on cotton in California at time of publication.

Mean separations within columns followed by the same letter are not significantly different (LSD; $P < 0.05$). [y] Post-treatment means. [z] Log transformed data used for analysis; reverse transformed means are included in the table.

Table 3. Pounds of Seed Cotton and Lint per Acre and Percentages of Lint Turnout per Acre, Holtville, CA, 2003.

Treatment	Lb(AI)/acre	Seed Cotton/Acre	Lint/Acre	% Turnout
Check	--------	1055.10 de	375.40 de	35.49 e
*Oberon 2 SC	0.109	1186.11 bcde	440.36 bcde	37.48 abc
*Oberon 2 SC	0.125	1452.66 abc	538.32 abc	37.08 abcd
*Oberon 2 SC	0.133	1493.75 ab	555.21 ab	37.25 abcd
Assail 70 WP + Silwet L77	0.101 + 0.03%v/v	1348.85 abcd	513.71 bcd	37.93 abc
Assail 70 WP + MSO	0.101 + 0.13%v/v	1697.04 a	652.46 a	38.46 a
*Calypso 4 SC	0.0939	1468.21 abc	560.24 ab	38.14 ab
*Diamond 0.83EC	0.013	1341.74 abcd	505.34 bcd	37.61 abc
*Diamond 0.83EC	0.026	1126.89 bcde	413.67 cde	36.64 cde
*XDE-225 + Orthene 97	0.0125 + 0.5	900.52 e	326.40 e	35.93 de
Warrior + Orthene 97	0.025 + 0.5	1114.33 cde	398.73 de	35.91 de
*F0570 0.8 EW + Orthene 97	0.025 + 0.5	1065.58 de	383.84 de	35.77 de
Danitol 2.4 EC + Orthene 97	0.20 + 0.5	1357.7 abcd	499.29 bcd	36.84 bcde

* Not registered for use on cotton in California at time of publication.

Mean separations within columns followed by the same letter are not significantly different (LSD; $P < 0.05$).

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 March 1 to May 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).

Please feel free to call us if you need additional weather information. Or check the latest weather data on the worldwide web. Imperial County Weather Stations:
http://www.ipm.ucdavis.edu/calludt.cgi/WXSTATIONLIST?COUNTY=IM
California weather databases: http://www.ipm.ucdavis.edu/WEATHER/weather1.html
CIMIS web page: http://www.cimis.water.ca.gov/

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

Station	March		April		May	
	1-15	16-31	1-15	15-30	1-15	16-31
Calipatria	0.18	0.22	0.26	0.29	0.32	0.36
El Centro (Seeley)	0.16	0.20	0.24	0.28	0.31	0.34
Holtville (Meloland)	0.17	0.21	0.25	0.28	0.32	0.35

To simplify our information it is sometimes necessary to use trade names of products or equipment. No endorsement of named products is intended nor is criticism implied of similar products, which are not named

Eric T. Natwick, County Director