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Editor: Robert B. Hutmacher **Assoc. Editor:** Brian Marsh

2004 SJV GROWING SEASON REVIEW: WEATHER CONDITIONS, PESTS AND THE CROP

Bob Hutmacher and Peter B. Goodell

There were about 780,000 acres of cotton planted in California in 2004. In the San Joaquin Valley, growers planted 95 percent of the total acres (740,000), with the remainder produced in the Southern Desert Valleys of Riverside and Imperial Counties (32,200 acres) and in various counties in Sacramento Valley (8,200 acres). Within the San Joaquin Valley, about 523,000 acres were planted to Upland varieties (*Gossypium hirsutum)* and about 215,600 acres were planted to Pima varieties (*Gossypium barbadense).* There were about 29,000 acres of Bt cotton plants, primarily in the southern California desert valleys.

Yield averages for the state averaged about 1520 lbs/ acre for Upland / Acala types of cotton and about 1450 lbs/acre for Pima cotton fields. Planting conditions (soil temperatures, soil moisture conditions, five-day heat unit forecasts) throughout most of March and April were generally considered very good to excellent, and prevailing weather conditions for the first 4 to 6 weeks after planting were also generally very good. Between March 10 and May 1, 2004, 87 percent of five-day heat unit forecasts were in the "Ideal" planting zone as described in the UC-Integrated Pest Management five-day heat unit forecast and planting recommendations program. During the same period, five percent were in the "Adequate" zone, four percent in the "Marginal" and four percent in the "Poor" planting zone range. The average five-days after planting

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ASSESSING THE ACCURACY OF COTTON PLANTING FORECASTS IN THE SAN JOAQUIN VALLEY

Douglas J. Munier, Peter B. Goodell and Joyce F. Strand

Spring weather is highly variable in any given year, with favorable planting periods scattered throughout the planting months of March and April. Delaying planting in hopes of better weather reduces the time for plant growth. An earlier planting adds no additional cost and may mean earlier fruiting and increased yields, but could increase the risk of cold weather damage. Tools which help manage the risk of delayed planting or replanting are a great benefit to cotton growers.

Degree-days and Cotton Planting

Until the late 1980's, cotton planting decisions were based on soil moisture and soil temperatures in the seed bed. Cotton was then planted during warmer and drier periods of weather with good soil temperatures and avoided periods when cold weather was predicted to occur soon after planting. In 1987, a new decision tool for cotton planting was introduced that utilized a five-day degree-day summation (Table 1A) based on forecasted temperatures.

Kater Hake, Farm Advisor, and Tom Kerby, Specialist, developed this forecasting tool during the mid-1980's. It combined a relationship between air temperature and quality of seed on stand establishment and utilized knowledge of cotton's decreased yields due to chilling injury. These researchers established four categories for predicting planting conditions (and hence cotton establishment) based on the forecasted degree-day's (Table 1B). Sometimes called heat units, degree-days are the integration of

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Season Overview

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accumulation in heat units during the March 10 to May 1 period was 31 heat units (base 60 F).

Conditions for plant growth and development were excellent through most of the remainder of the growing season. With generally warm, rain-free planting periods, seedling disease losses were quite limited and root systems developed fairly rapidly and some field evaluations indicated deeper, better established root systems during rapid vegetative growth stages. Warm early conditions allowed the crop to vigorously develop both a good framework of vegetative structures (stems, leaves) and fruiting branches. Cooler than average night-time temperatures during flowering and early boll formation were certainly part of the reason for very good to excellent boll retention. During the mid-season period of early to late June, the crop was reported to be 7 to 14 days ahead of normal. Heat unit accumulation during the season was moderate most days, with few days exceeding 25 HU accumulation (Figure 1).

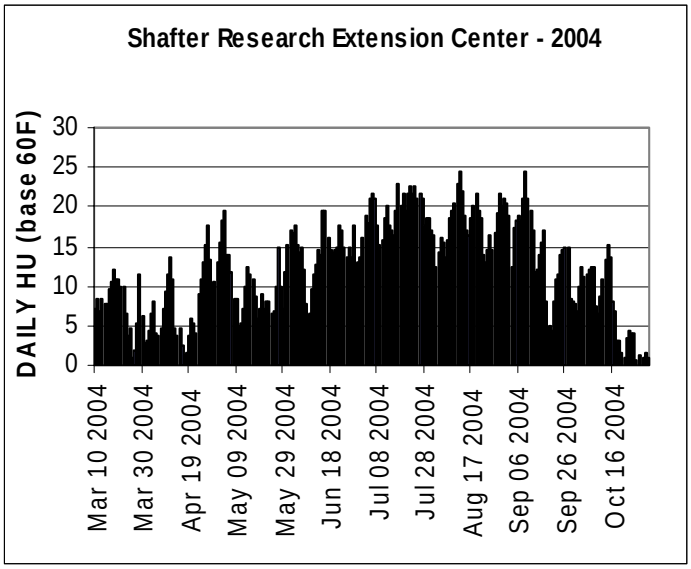

Figure 1. Daily heat units (base 60 F) at Shafter Research and Extension Center for the period March 10 to October 31, 2004 *(Shafter REC CIMIS weather station and single triangle calculations, no upper threshold).*

With very high early season fruit retention seen in many fields, there was potential for early vegetative cutout (cessation of new vegetative and fruiting site development) in many fields, necessitating careful management (limiting water and nutrient stress) to take full advantage of a fairly long growing season. Harvests generally started 1 to 2 weeks earlier than most years, and went well until mid-October rains started up, limited access to some fields, and delayed some harvests until after 1 to over 3 inches of rain.

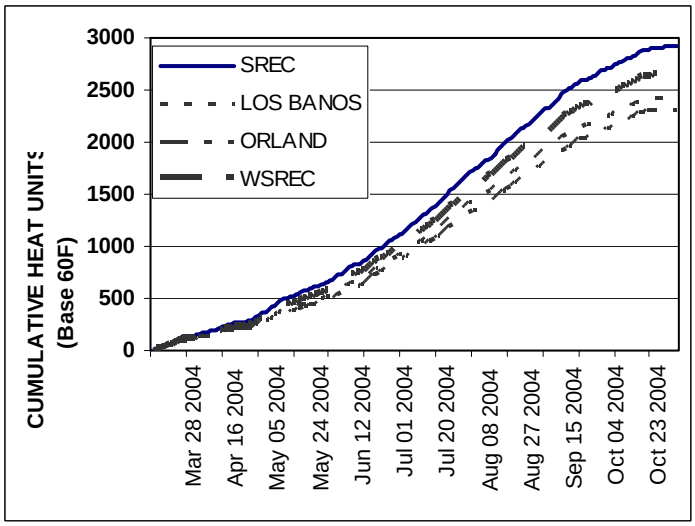

Figure 2. Accumulated heat units (base 60 F) at Shafter (Kern Co.), West Side REC (Fresno Co.), Los Banos (Merced Co.), and Orland (Glenn Co.) for March 10 to October 31 period in 2004.

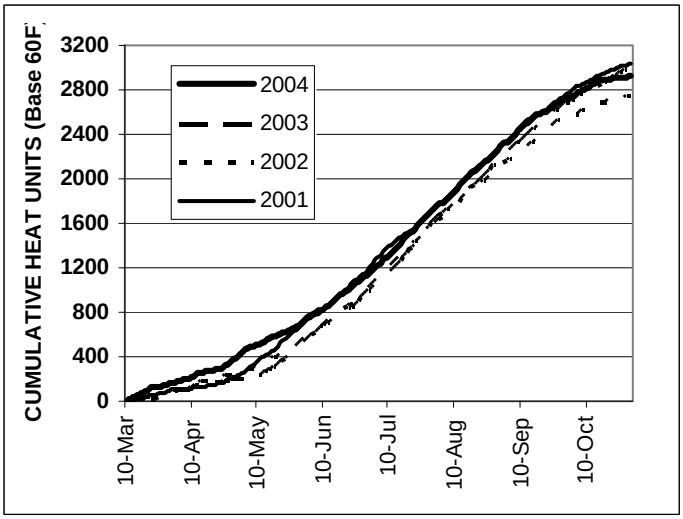

Figure 3. Accumulated heat units (base 60F) at Shafter REC (Kern Co.) between March 10 and October 31 in 2001, 2002, 2003 and 2004.

Similar patterns in heat unit accumulations were seen in other cotton-growing regions of the central valley of California (Figure 2), with warm spring conditions and relatively mild summer temperatures prevailing in most locations. Early season heat unit accumulations in 2004 were higher than in recent years (Fig. 3), but relatively mild temperatures the remainder of the season kept full season heat unit accumulations similar to recent years.

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Accuracy of Cotton Planting Forecasts

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time and temperature above the known developmental baseline temperature of an organism for each day.

Table 1A. Example of 5-day degree-days forecast (°D) and cotton-planting conditions (°F) for Fresno and Bakersfield.

	Bakersfield			Fresno	
Date	Degree-days	Temp. min./max.		Degree-days	Temp. min./max.
	°D	°F		°D	°F
April 6	2.9	50/71		3.4	51/72
April 7	1.7	49/68		1.9	48/69
April 8	0.5	49/64		0.7	52/64
April 9	0.4	44/64		0.9	45/66
April 10	2.7	45/72		2.9	47/72
Total	8			10	

Table 1B. Example of cotton-planting forecast provided on UCIPM Web site.

Forecast	Planting conditions
>20 °D*	Ideal
16-20 °D	Adequate
11-15 °D	Marginal
≤ 10 °D	Unfavorable

*Degree-days.

For many years, under the leadership of Dan Gudgel, Warning Coordination Meteorologist, the National Weather Service (NWS) in Hanford calculated the cotton five-day degree-day forecast for Bakersfield and Fresno. This information was broadcast daily over NOAA Weather Radio throughout the San Joaquin Valley during the cotton planting season. When NWS was no longer able to provide this forecast, cotton advisors and specialists asked the University of California Statewide IPM Program (UC IPM) to calculate the five-day degree-day summations (http://www.ipm.ucdavis.edu). The air temperature forecasts used in all the calculations were generated by the Hanford office of NWS as part of their standard forecasts for Fresno and Bakersfield.

In the year 2000, a survey of cotton growers' IPM practices, 87 percent of cotton growers indicated they used the degree-day forecast in their cotton planting decisions. This usage was reflected in the number of contacts recorded for the planting forecast Web site. During the 2000 planting season, the UC IPM cotton planting degree-day forecast Web site was accessed 6,343 times.

The purpose of this study was to evaluate the accuracy and reliability of the planting forecasts for Bakersfield and Fresno compared to observed air temperature data for 1998 through 2002. For each date's planting conditions forecast, the total degree-day's for that date and the next four days were calculated and the resulting planting condition's category was determined (Table 1B).

Observed data for comparison were five-day summations of degree-days using daily maximum and minimum air temperatures measured by NWS Automated Surface Observing Systems at the Fresno and Bakersfield airports. Although data from weather stations located on agricultural sites are available on the UC IPM Web site, the airport stations were selected for this study since National Weather Service verifies the accuracy of their Fresno and Bakersfield forecasts against these two locations.

Accuracy of the Forecasts

The five-day degree-day forecast only has to predict the correct planting condition category, a five or 10 degree-day range (Table 1B), rather than be strictly accurate to the actual degree-day total. This is particularly helpful when the five-day degree-day forecast is unfavorable (≤ 10 degree-days), or ideal (>20 degree-days).

Over the five years, accuracy for the Fresno and Bakersfield locations were very similar, differing only by one or two percent within each category, so the following analysis is based primarily on the averages of the two locations. The five-day degree-day forecasts predicted the correct category (based on comparison with observed temperatures) 75 percent of the time (Table 2). The forecasted planting conditions category was one higher or lower than the observed category 20 percent of the time, while it was two categories lower or higher in only 5 percent of the cases. During the five year period, it was never three categories higher or lower.

When the forecast underestimated the observed category, actual air temperatures and resulting planting conditions were more favorable than predicted. This occurred in nine percent of the forecasts. If the forecast indicated unfavorable or marginal planting conditions, this error would probably result in delayed cotton plantings. However, delaying planting by a few days is not a serious

error, especially if planting can be resumed during better than expected conditions.

When the forecast overestimated the planting category, conditions were less favorable to cotton planting than predicted. This error is potentially more serious than underestimation and occurred 16 percent of the time. The most serious error occurred when the predicted category was in the marginal or adequate categories, but the observed category was unfavorable. This error occurred in seven percent of the cases during this five-year period.

Degree-Day Distribution by Planting Conditions Category and Year

On average at both locations, most of the observed five-day degree-day totals during the planting period fell into the extreme categories of unfavorable or ideal. Averaged over both locations, for 72 percent of the days in March and 82 percent of the days in April, the observed degree-day totals were in these extreme categories. April had more than twice the ideal planting days compared to March.

As would be expected with variable spring weather, there were large year-to-year significant variations in the distribution of observed degree-day categories. The total number of days in the unfavorable category for one year varied from 4 days in Fresno to 32 days in both Bakersfield and Fresno over the five year period. The ideal category had a smaller range of 14 days for both Bakersfield and Fresno to 27 days for Bakersfield with an average of 22 days per year. The average degree-day distribution between the four categories for this five year period was very similar to the thirty year averages for Bakersfield and Fresno.

Unpredicted Unfavorable Conditions

The most serious error was when the forecast failed to predict the occurrence of unfavorable planting conditions. The top section of Table 3 shows there was no significant difference in the errors between Bakersfield and Fresno. These errors averaged 3.5 days per year.

The middle section of the table shows the significant year-to-year variability. The forecast failed to predict the occurrence of unfavorable planting conditions on only one day in Fresno during the 2002 planting period, compared to 7 days in Bakersfield during the 2000 cotton planting period.

Table 2. Five-year (1998-2002) comparison of forecast versus observed 5-day degree-day cotton-planting conditions for Bakersfield and Fresno, March 10 through April 30.

	Bakersfield			Fresno	
Planting-conditions category	Days	Frequency		Days	Frequency
	n	%		n	%
Equal	190	74		195	76
Forecast one category lower	20	8		22	9
Forecast two categories lower	2	1		4	2
Forecast one category better	29	11		34	13
Forecast two categories better	17	7		3	1

Table 3. Number of days when better-than-unfavorable planting conditions were forecast, but unfavorable conditions were observed.

Years	Months	Bakersfield	Fresno	Average
		----------no. days----------		
1998-2002	March-April	3.8	3.2	3.5
1998	March-April	3.0	3.0	3.0
1999	March-April	3.0	3.0	3.0
2000	March-April	7.0	4.0	5.5
2001	March-April	4.0	5.0	4.5
2002	March-April	2.0	1.0	1.5
1998-2002	March	2.6	2.4	2.5
1998-2002	April	1.2	0.8	1.0

The lower part of Table 3 shows on average over the five years, 2.5 and 1.0 of the days predicted for better than unfavorable planting conditions in March and April, respectively, were actually unfavorable planting days. Because there are only 22 potential planting days in March (March 10th to 31st), but 30 planting days in April, a potential March planting day is three times more likely than an April planting day to be forecasted for better than unfavorable, but have unfavorable planting conditions.

It is important to remember the planting conditions categories were established with the knowledge of the effects of seed quality on cotton stand establishment. Thus, with high-quality seed, planting during cooler conditions is less risky than when seed quality is marginal. Also, the cost of replanting when this error occurs early may be more than offset by the higher yields typically obtained with earlier planting dates when the earlier planting is successful.

By planting only on days in March with ideal category forecasts, the negative results from the forecasts' tendency to overestimate conditions can be avoided, since unfavorable conditions were never observed when the forecasts were in the ideal category. Over the five year period, on 25 percent of the March potential planting days, ideal planting conditions existed. In April, planting cotton when unpredicted unfavorable conditions occur, and having to replant is more expensive. The expenses are in increased production costs and in lower yields from later planting dates. There is the likely loss of 10 to 20 potential growing days while deciding whether replanting is necessary. Fortunately, on average, this situation occurred on only one day out of thirty days in April.

Based on 5 years results for Bakersfield and Fresno:

- The cotton planting conditions forecast predicted the correct planting conditions 75 percent of the time, giving a science based prediction of cotton planting conditions.
- Nine percent of the forecasts predicted conditions to be unfavorable when the observed planting conditions were better than unfavorable, possibly reducing the number of growing days available for the crop.
- Seven percent of the forecasts failed to predict unfavorable conditions and likely resulted in additional costs for replanting the crop. Since these situations most often occur in March, the guidelines for using the forecast in March could be revised to plant only on days predicted to be ideal for cotton planting.

The five day degree-day forecasting for cotton planting has proven to be a reliable and valuable tool for making planting decisions. The tool has been widely used since its introduction and continues to help guide one of the most important decisions of the season. Early, vigorous growth and development of cotton is key to all future agronomic and pest management decisions. Further work is required to refine this valuable tool for Pima cotton.

UC-IPM Resources for Cotton Planting Decisions

Growers and Consultants can get the 5-day heat unit forecast used for cotton planting decisions from the University of California IPM Web site at:

http://www.ipm.ucdavis.edu/WEATHER

* 5-day forecasts for 2005 available starting March 7

SEED FUNGICIDE TREATMENT TRIALS—UPDATE AND DATA SUMMARY

Bob Hutmacher, Mark Keeley *(UC Davis Plant Sci. Dept. and Shafter REC)*, Brian Marsh *(UCCE-Kern Co. and Shafter REC)*, Craig Rothrock *(Pathologist, Univ. of Ark.)*

Summaries of some data from cotton seed fungicide trials conducted 2001-2004 from the following trials are in Tables 2-6:

- Company Entry trials (treatments submitted to Bob Hutmacher from specific seed treatment companies)
- National Standards seed fungicide treatment trials (conducted by UC, but coordinated Beltwide by Dr. Craig Rothrock, University of Arkansas)

Included are a range of fungicide seed treatments from both of these sets of trials. Planting dates and emergence count dates are shown in table captions, and heat units during several periods after planting are summarized in Table 1. Data from treated seed can be compared with untreated controls to determine impacts of fungicide treatments on ability of seeds to emerge and produce surviving seedlings. Most data shown (Tables 2 through 6) represents stand counts made about 4 weeks after planting. Trials at Shafter were planted in a sandy loam soil with 2-3 years of cotton grown after cowpeas and corn or wheat. The Fresno County sites were clay loam soil, typically two years of cotton rotated out to tomatoes or small grain. Attempts were made to "aim" for planting during 5-day heat-unit forecasts classified "marginal" to put some pressure on the test, but test conditions after planting were highly variable.

Rhizoctonia has been a dominant seedling disease at both Shafter and Fresno Co. sites, and *Thielaviopsis* has also been confirmed as chronically present at the Shafter area sites represented in the trials shown in the following tables (Tables 1 through 6).

Table 1. Heat Units during specific periods after planting in UC seed fungicide treatment trials (refers to trial data shown in tables 2 — 6).

Table Number (tables in this article)	Year Or Location	Heat Units (base 60F) First 5 days After plant	First 2 weeks After plant	Entire period from planting to final count
2	2001 2002	2.5 43.9	34.6 100.3	223.4 178.1
3	2003 2004	33.2 49.8	60.3 82.6	151.0 320.3
4	2004: Shafter FresnoCo.	 33.2 23.9	 60.3 39.9	 110.8 76.9
5 and 6	2005: Shafter FresnoCo.	 49.8 12.4	 82.6 74.0	 320.3 304.0

In the seed treatment trials represented in Tables 1 through 6, we typically have seen significantly better emergence and seedling survival with the better performing seed treatments, as evidenced by comparing specific plant survival levels in seed fungicide treatments to survival levels for untreated seed.

As might be expected, sites/years where planting dates and conditions were more marginal (lower heat units in the first five days and first two weeks after planting, as shown in Table 1) had larger increases in plant survival with fungicide seed treatments than in sites/years with better conditions for early growth (higher heat units). In looking at Table 6, it might be tempting to suggest that Pima cotton survival is less impacted by seed fungicide treatments than the non-Acala Uplands or Acala varieties represented in the other tables. Table 6 shows some relatively small differences in seedling survival across treatments of Pima "Phytogen 76" seed. It should be noted, however, that we have only recently started seed fungicide treatment evaluations in Pima, and have only the limited data shown in Table 6. More Pima studies will be conducted in the future. We recognize that data from limited locations cannot fully represent the range of planting conditions growers encounter. Consider the intensity and "mix" of seedling diseases you have dealt with in the past and consider if effective chemicals are available to help.

Table 2. National Standard Seed treatment data from **Shafter REC tests.in 2001, 2002.** Varieties were Upland (Suregrow 747 (2001) and DP451 BG/RR (2002)). Emergence data taken about 4 weeks after planting. Planting dates were 4/6/01 and 3/28/02 while evaluation dates were 5/09/01 and 4/23/02.

Seed Treatment Chemicals	Chemical Rate Used (oz per 100 wt seed)	**Seedling Emergence** (surviving seedlings as % emerged & remaining alive out of # of planted seed)	
		2001 Trial	2002 Trial
Baytan 30 Ascend 30 Allegiance LS	0.5 1.5 1.2	68.9	69.6
Protégé 70 WP Ascend 30 Allegiance LS	0.07 1.5 1.2	46.9	73.0
Protégé 70 WP Ascend 30 Allegiance LS Baytan 30	0.07 1.5 1.2 0.25	61.0	71.6
RTU Baytan Thiram Allegiance FL	3.0 0.75	64.3	66.4
RTU Baytan Thiram Allegiance FL L1080, L1072	3.0 0.75 0.5, 9.1	63.3	65.0
Apron XL-LS Maxim 4FS CGA301940	0.32 0.08 3.1	52.1	Not tested
Apron XL-LS Maxim 4 FS NuFlow M-WP	0.32 0.08 0.84	61.4	Not tested
NuFlow ND Apron XL-TL NuFlow M-WP	7.5 1.0 0.84	64.6	Not tested
Apron XL-TL WECO 01B50 Nuflow M-WP	1.0 0.5 0.84	65.8	Not tested
Apron XL-TL NuCoat NuFlow M-WP	1.0 7.5 1.0	Not tested	69.9
Apron XL-TL NuCoat WECO 0257	1.0 7.5 0.5	Not tested	70.4
Vitavax-PCNB Allegiance FL	6.0 0.75	50.2	69.1
Untreated Control		**26.8**	**57.1**

Other treatments in addition to those shown were in trials, but aren't shown here if entered as numbered experimentals or only entered limited years.

Table 3. National Standard Seed treatment trial data from **Shafter REC tests**. The variety grown was an Upland (DP451 BG/RR (2003 & 2004)). Emergence data taken about 4 weeks after planting. Planting dates were 4/7/03 and 4/09/04 while evaluation dates were 5/13/03 and 5/12/04.

Seed Treatment Chemicals	Chemical Rate Used (oz or as shown per 100 wt seed)	**Seedling Emergence** (surviving seedlings as % emerged and remaining alive out of # of planted seed)	
		2003 Trial	2004 Trial
Baytan 30 Argent 30 Allegiance LS	0.5 1.5 1.2	66.8	80.4
RTU Baytan-Thiram Allegiance FL	\3.0 0.75	69.3	82.4
Allegiance LS L1194, L0030	1.2 6.1, 1.5	66.4	Not tested
Apron XL-TL NuFlow M HF Nusan 30EC	1.0 2.5 2.0	64.3	81.3
Apron XL-TL NuFlow M HF Nusan 30 EC WECO 0257	1.0 2.5 2.0 0.63	65.0	82.1
Apron XL-TL NuFlow M HF NuFlow ND	1.0 2.5 14.5	65.2	83.6
Apron XL-TL WECO 0257 NuFlow ND	1.0 0.63 7.5	68.8	80.1
Dynasty	3.1	63.3	78.7
Dynasty	3.9	66.1	81.8
Dynasty Systhane 40 WP	3.1 0.84	66.2	81.6
Vitavax PCNB Allegiance FL	6.0 0.75	59.7	75.5
RTU-PCNB	14.5	44.3	72.8
Allegiance FL	1.5	59.3	75.7
Helena HM0233 HM0301	1.5 12.0	Not tested	81.6
Untreated		**37.8**	**68.8**

Other treatment combinations in addition to those shown were in trials, but are not shown here if were entered as numbered experimentals or were only entered limited years.

Table 4. Company Entry Seed treatment trials in 2003 at **Shafter and Fresno County trial sites**. Variety planted at both sites was **Acala CPCSD "Maxxa".** Planting date was 4/7/03 at Shafter site and 4/09/03 at Fresno County site. Evaluation dates were 5/06/03 at Shafter REC site and 5/07/03 in Fresno County.

Seed Treatment Chemicals	Chemical Rate Used (oz or as shown per 100 wt seed)	**Seedling Emergence** (surviving seedlings as % emerged and remaining alive out of # of planted seed)	
		Shafter site	Fresno Co
RTU Baytan-Thiram Allegiance	3.0 0.75	67.8	54.0
RTU Baytan-Thiram Allegiance Protégé XT Kodiak FL	3.0 0.75 0.6 0.5	68.1	65.5
RTU Baytan-Thiram Allegiance CotGard	3.0 0.75 9.1	70.7	60.9
RTU Baytan-Thiram Allegiance RTU Vlt THI Kodiak FL	3.0 0.75 12 0.5	70.7	62.1
RTU Baytan-Thiram Allegiance Protégé FL Baytan 30 FL Kodiak FL	3.0 0.75 0.4 0.25 0.5	69.9	58.3
Apron XL-TL WECO 0257 *	1.0 150 ppm	66.8	64.6
Apron XL-TL WECO 0257 * NuFlow M HHF	1.0 150 ppm 2.5	65.9	56.7
Apron XL-TL WECO 0500 * WECO 0310 *	1.0 100 ppm 50 ppm	65.3	61.4
Apron XL-TL WECO 0500 * WECO 0310 * NuFlow M HF	1.0 100 ppm 50 ppm 2.5	66.9	60.4
Apron XL-TL Nuflow ND NuFlow M HF	1.0 14.5 2.5	66.8	62.9
Untreated Control		**53.3**	**40.4**

** experimental numbered materials from Wilbur Ellis Co.*

Table 5. Company Entry Seed treatment trials in 2004 at **Shafter and Fresno County trial sites**. Variety planted at both sites was **Acala CPCSD "Maxxa**". Planting date was 4/9/04 at Shafter site and 4/13/04 at Fresno County site. Evaluation dates were 5/10/04 at Shafter REC site and 5/19/04 at Fresno County.

Seed Treatment Chemicals	Chemical Rate Used (oz or as shown per 100 wt seed)	**Seedling Emergence** (surviving seedlings as % emerged and remaining alive out of # of planted seed)	
		Shafter Site	Fresno Co.
Apron XL-TL NuFlow ND NuFlow M WECO 0257 *	1.0 14.5 1.75 0.65	73.8	84.7
Apron XL-TL NuFlow ND NuFlow M WECO 0257 * BioStim C	1.0 14.5 1.75 0.65 0.25	74.0	81.3
NuFlow ND NuFlow M WECO 0257 * WECO 4004 *	14.5 1.75 0.65 0.60	76.7	81.6
RTU Baytan-Thiram 1.76FL Allegiance 2.65FL	195.5 ml 48.9 ml	69.9	76.2
Baytan 30-2.65FL Argent Allegiance LS	32.6 ml 97.79 ml 78.24 ml	74.3	84.1
L1226 + L0030 + L1008 **	41.73, 97.7, 78.24 ml	75.2	84.2
L1028 + L1226 + L0020 + L0037**	2.5 g ai, 41.7, 65.2, 20.86 ml	73.7	77.5
L0037-A1 + ** L0020-1+ L1226 +L0030 + L1080	32.6, 65.2, 41.73, 65.2, 32.6 ml	73.0	83.2
Vitavax 34 + L1226 + L0030+ L0020 + L1080 **	195.5, 41.73, 65.2, 65.2,32.6 ml	76.8	83.7
Untreated Control		**63.5**	**62.7**

** experimental numbered materials from Wilbur Ellis Co.*
*** experimental numbered materials from Gustafson Corp.*

Table 6. Company Entry Seed treatment trials in 2004 at Shafter and Fresno County trial sites. Variety planted at both sites was **Pima "Phytogen-76".** Planting date was 4/9/04 at Shafter site and 4/13/04 at Fresno County site. Evaluation dates were 5/10/04 at Shafter REC site and 5/19/04 at the Fresno County site.

Seed Treatment Chemicals	Chemical Rate Used (oz or as shown per 100 wt seed)	**Seedling Emergence** (surviving seedlings as % emerged and remaining alive out of # of planted seed)	
		Shafter Site	Fresno Co.
Apron XL-TL NuFlow ND NuFlow M WECO 0257 *	1.0 14.5 1.75 0.65	75.1	82.7
Apron XL-TL NuFlow ND NuFlow M WECO 0257 * BioStim C	1.0 14.5 1.75 0.65 0.25	74.0	83.6
NuFlow ND NuFlow M WECO 0257 * WECO 4004 *	14.5 1.75 0.65 0.60	76.6	87.9
RTU Baytan-Thiram 1.76FL Allegiance 2.65FL	195.5 ml 48.9 ml	70.1	79.8
Baytan 30-2.65FL Argent Allegiance LS	32.6 ml 97.79 ml 78.24 ml	75.4	81.5
L1226 + L0030 + L1008 **	41.73,97.7, 78.24 ml	74.2	85.7
L1028 + L1226 + L0020 + L0037**	2.5 g ai, 41.7, 65.2, 20.86 ml	76.3	84.1
L0037-A1 + ** L0020-A1+L1226 +L0030 + L1080	32.6, 65.2,41.73, 65.2, 32.6 ml	74.1	86.1
Vitavax 34 + L1226 + L0030+ L0020 + L1080 **	195.5, 41.73,65.2, 65.2,32.6 ml	75.0	85.0
Untreated Control		**65.1**	**70.1**

** experimental numbered materials from Wilbur Ellis Co.*
*** experimental numbered materials from Gustafson Corp.*

Season Review - San Joaquin Valley - 2004:
(continued from page 2)

Insect and Mite Pest Situation—2004.
Insect pressure in general was relatively light in most cotton fields in the San Joaquin Valley in 2004. Spider mite populations were reported to generally be low in most areas, but in limited areas there were some mid- and late-season population buildups that caused some damage that warranted treatments. Compared with most recent years, however, spider mite problems were relatively mild.

In most areas of the San Joaquin Valley, lygus populations during early through late squaring were quite low compared to "typical" conditions most years. Reflecting both relatively low lygus counts and favorable weather conditions, many San Joaquin Valley cotton fields had unusually high early and mid-season square and boll retention in 2004. Lygus bugs became problematic mostly in scattered areas in July and early August as populations moved into cotton as some other crops began to senesce.

Aphids were widely scattered in mid-season cotton fields, but in most areas did not develop into large, widespread problems. There were localized outbreaks of aphids, however, that reached treatment levels in some limited areas of the valley. Some unusual worm problems were seen in the early season in very limited areas, resulting in some damage to plant terminals and delays in early crop development in worst-affected fields. In general, though, few worm problems were evident in most fields. Expanding silverleaf whitefly populations were a primary pest management concern between July and September of 2004. Although populations were low to moderate in many areas until relatively late in plant development, whiteflies were observed across broad areas of the San Joaquin Valley. In recent years, silverleaf whitefly has continued to extend its distribution over a wider area that now includes areas in the central and western San Joaquin Valley production areas.

The 2004 growing season, in most areas, was a very favorable combination of a warm early start, moderate temperatures during much of the season, and relatively low pest pressures. For fields planted later (later in April or early May) or those grown under conditions that required more time to mature, rain during mid-October through November caused harvest delays, yield losses, and some impacts on fiber quality. Early through mid-season fruit retention was extremely high in most fields, however, and final yields were relatively high in fields not subject to serious water or nutrient stresses.

UC Statewide IPM Program Revises Pest Management Guidelines for Cotton

UC-IPM has revised its Pest Management Guidelines (PMG's) for cotton. The Guidelines can be found at the website: **www.ipm.ucdavis.edu** (*then click "PEST MGMT GUIDELINES" and then click "COTTON").* The Guidelines have been improved to support pest management and environmental issues. New features of the PMG's are year-round IPM programs that organize pest management activities and promote preventative practices, and toxicity information to help farmers select pesticides. Year-round IPM programs alert users to major activities to consider at each crop development stage to implement a comprehensive IPM program. Also recently added are "compare treatment" buttons on each PMG link to graphical displays that make it easy to compare leaching and runoff potential for each pesticide. Other enhancements in the PMG's include:

- photo galleries of pests
- monitoring forms
- mode of action for insecticides
- links to identification keys

For more information about PMG's / water quality issues, read "*Decision Making Tools for Pest Mgmt."* found at **www.uckac.edu/ppq** in the January issue of Plant Protection Quarterly

FUSARIUM RACE 4 UPDATES

Information Available on Scouting, Symptoms and Recommended Containment Practices at University of CA cotton web site: http://cottoninfo.ucdavis.edu

Updates on varietal screening for resistance to race 4 Fusarium are available by contacting your UCCE Farm Advisor *(addresses on back page)*

VERTICILLIUM WILT UPDATES

Article on factors influencing Verticillium wilt development, varietal differences in wilt symptoms seen in Acala variety trials is available at:

http://cottoninfo.ucdavis.edu

MEETINGS

Cotton Production Mtg.—Madera/Merced/Fresno Co.'s

WHEN: **Friday, March 4, 2005**
WHERE: **Firebaugh Service Club**
1360 O Street, Firebaugh
TIME: **9:00 to 12:00 (Lunch provided)**

For more information, please contact the Ron Vargas (559-675-7879, Ext. 201) or Dan Munk (559) 456-7285