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In This Island Issue

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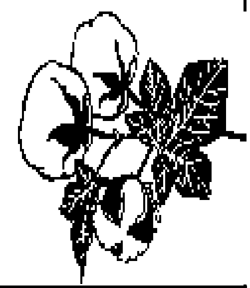

EARLY SEASON 2000— SOME PROBLEMS, BUT A MUCH BETTER START

Bob Hutmacher, Pete Goodell, Dan Munk, Ron Vargas, Bill Weir, Steve Wright, Bruce Roberts, Brian Marsh, Mark Keeley

The progress of the San Joaquin Valley (SJV) cotton crop in 2000 has generally been a much better story than in the previous two years. Since fall and early winter were warm and dry, fields were well-prepared far in advance of planting, and most seed beds were in relatively good condition as we began 2000. Rainfall patterns and warm weather were quite unusual this past winter, however, it worked out much better than expected for most cotton growers.

The heavy rains and greatly improved snowpack that came with late January and February eased many (but not all) of the concerns of a severe drought year. When the rains finally started, they raised concerns of delayed plantings and changes in timing of weed development. However, March came in, the rains became lighter and less frequent, and soil and air temperatures rapidly warmed to levels that made cotton plantings possible in many areas during some parts of late March (see Figures 1 and 2 for heat unit totals five days after planting at south SJV (Shafter) and north SJV (Los Banos) locations. During the month of April, we generally had very good conditions for planting during the first 10-12 days of the month, followed by a cool "spell" for about 7-10 days, after which there were good planting conditions again through the remainder of April and into May (Figures 1 and 2).

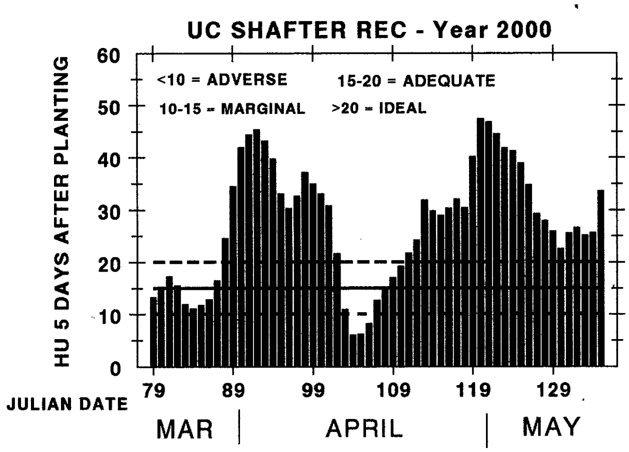

Figure 1. Heat unit totals 5 days after planting at Shafter REC site from mid-March through mid-May, 2000

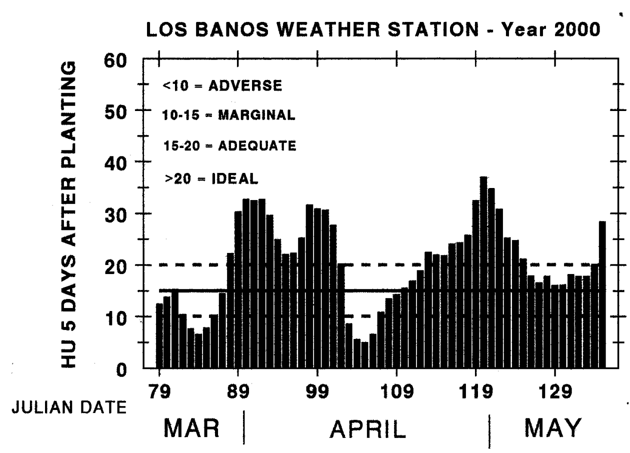

Figure 2. Heat unit totals 5 days after planting at Los Banos CIMIS Weather Station from mid-March through mid-May, 2000.

In general, the situation as we approach mid-June looks fairly good in many parts of the valley. Although heat units for planting looked quite good for some extended periods, as just discussed, daily heat units still have been quite "volatile", with some wide temperature

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"swings" (data for Shafter shown in Figure 3). Shafter (HU-base 60F) accumulations for the period March 20 through June 7 totaled 617 HU (2000) versus the 450 HU total for 1999 and the 26-year average of 553 HU, with much of the difference from the long-term average and higher total for 2000 associated with high HU accumulations the last 10-12 days of May. Similar heat unit accumulation patterns were seen across the SJV, but HU totals in the Los Banos area, for example, ranged from about 18 to 23 percent lower than in south San /Joaquin Valley areas such as at the University of CA Shafter Research and Extension Center.

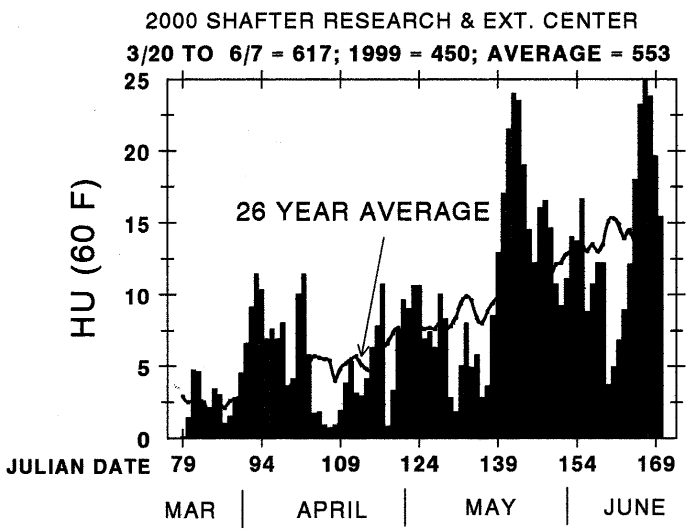

Figure 3. Daily heat units (HU 60F) for the year 2000 (bar graph) and 26-year average (solid line) at Shafter.

This isn't to say that there haven't been a few "bumps" along the road. For instance, Fresno County cotton acreage in the Five Points area received the brunt of a severe late-April (April 17-18) storm, when more than 20,000 acres were pummeled by intensive rain and hail. Rain gauges in the area ranged from 1.5 to over 2.2 inches in that short duration storm with severe damage occurring on 12,000 to 15,000 acres, forcing a replant decision. In most cases, replants were required on a whole field basis, with most replanting done between May 2nd and 10th. Most abandoned Pima plantings were replanted as Acala or Upland varieties, but due to the fast pace of fieldwork following the soil dry-down period, most growers did not feel particularly pressed to replant short season varieties. The rainfall associated with this storm also created early stand problems.

Numerous cotton fields in the cotyledon through 2nd true leaf stage proved especially vulnerable to seedling diseases this year, with some significant losses due to seedling diseases seen across the SJV (for example, some heavy stand losses seen in southern and western Kern County, western Tulare County, and central and western Fresno County). UCCE Farm Advisors reported that farms calls and requests for field visits were more numerous than normal as a consequence of cotton affected by *Rhizoctonia* and *Pythium* seedling diseases. *Thielaviopsis* problems were not generally reported to be as severe as in the past two years.

Several thousand acres in areas unaffected by hail in western Fresno County were also replanted due to poor emergence associated with a range of causes. It seems ironic and not at all "fair" that some replant fields still ended up with sub-optimal plant stands when significant areas of replanted fields succumbed to the same diseases that initiated the replant decision. This illustrates the difficulty in predicting seedling disease impacts and resulting management decisions, since it is a fact that the replant option does not always yield an ideal plant stand.

Early Insect and Mite Situation

UC Regional IPM Advisor Pete Goodell and UC Entomology Specialist Larry Godfrey, their crews and a group of volunteer "spotters" were out looking at fields across the valley starting in late winter. In general, limited winter rains through mid-January resulted in limited vegetation in foothill and weedy areas. This resulted in resulting in reduced over-wintering, egg-laying sites for those generations of lygus. There were concerns that heavy late-January and February rains would cause more problems, but "spotters" found that dry, windy conditions in March appeared to dry out most plants, again limiting available host sites. As a result, recent estimates are that lygus pressure should be low through squaring and into early bloom during most of June. Later lygus populations, however, can be expected to develop in a range of other crops (including safflower, sugar beets, seed and forage alfalfa and so on) migrating to cotton when crops are prepared for harvest.

Thrips were again widespread in their impacts on developing leaves in 2000, with some areas of the SJV seeing damage to the first 3 to 6 leaves as severe as in 1998 and 1999. As in the past two years, the impacts of thrips were much more severe in some specific varieties (such as Nucotton-33B among the CA Uplands) when compared with many other Acala and Pima varieties. Early spider mite populations were highly variable but reports of "treatable populations" were widespread across the SJV during much of May. Mite populations in many fields were kept in check by heavy thrips pressure, but miticide applications were also quite widespread during mid-May.

MANAGING LYGUS BUG IN A REGIONAL CONTEXT

Pete Goodell, Steve Wright, and Mark Carter, UC Kearney Agricultural Center, UCCE Tulare County, Agri-Consultants.

Background

Lygus bug, *Lygus hesperus,* is the key pest in San Joaquin Valley (SJV) insect cotton pest management. Between 1990 and 1998, it caused average losses estimated at 60,279 bales of cotton annually (Williams, 1990-99). The degree of Lygus control that is required will set the stage for insect pest management for the entire year. The use of broad-spectrum insecticides for Lygus control upsets the balance of other pests such as aphids, spider mites, and foliage-feeding worms.

Lygus is not an annual problem and its severity is linked to rainfall patterns and host availability (Goodell, 1998). Lygus moves from other hosts, including cultivated and uncultivated plants, in a manner described as aseasonal migration (Nechols et al, 1999). Aseasonal migration is movement from a host when it becomes unsuitable rather than a seasonal migratory event such as what is typical, for example, in monarch butterflies.

In the SJV of California, crop diversity provides many suitable sources for Lygus development including tomatoes, garlic, sugar beets, safflower, alfalfa, seed alfalfa and cotton. While not all of these crops are good hosts, associated weeds in the crop provide protective habitat or support reproduction. For example, in one typical 34 square mile area of the westside of Fresno County, 10 different crops could be found (Figure 1) with cotton and processing tomato dominating the landscape.

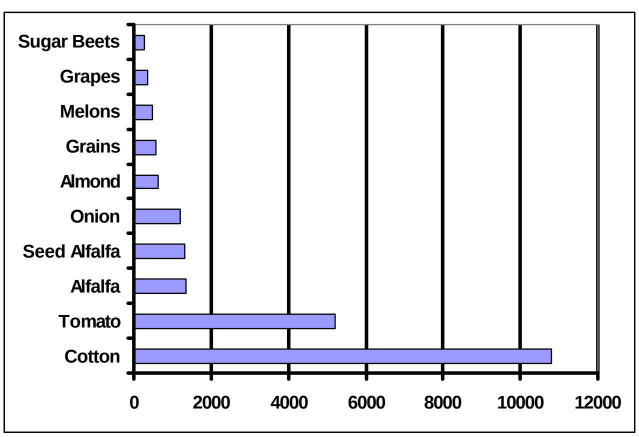

Figure 1. Crop diversity and number of acres of each crop in a select area on the west side of Fresno County (a 34.68 square mile area).

The migratory nature of Lygus offers challenges to the cotton industry that seeks to increase its biological reliance on IPM. During the growing season, it is not difficult to find cotton fields where pests are initially under biological control but within days of a migration of Lygus, require insecticide intervention to protect the yield. This rapid shift from a non-economically to economically-damaging level is unrelated to activities practiced internally within the field, but due to a migration external from the field. Dr. Vern Stern noted this problem over 30 years ago when he proposed managing the sources from which the Lygus originate in order to prevent cotton from becoming a sink for Lygus (Stern et al, 1967).

The application of broad-spectrum insecticides is the only control option once a population density exceeds the action threshold. This has resulted in secondary pest outbreaks and increased the proportion of production costs required for insect control. Over three decades ago, UC pest management guidelines recommended managing Lygus through habitat manipulation. These suggestions included management of Lygus in safflower based on heat accumulation (Sevacherian et al, 1977), developing alfalfa strips within cotton fields (Stern et al, 1969) and managing alfalfa hay through retention of uncut strips (Stern et al, 1967).

In 1998 and 1999, we conducted demonstration trials with alfalfa to manage Lygus movement into cotton.

Procedures

Strip Cutting Alfalfa, Tulare County, 1999. Steve Wright, UCCE Cotton Farm Advisor in Tulare County, was called to a farm at which Lygus bugs were consistently a problem. The farm was located near the St. John's River and contained both alfalfa hay and cotton (cv. NuCot 33B). Fields were ½ mile by ¼ mile and were 80 acres in size. The grower's practice was to harvest the alfalfa fields within days of each other without leaving any habitat in which Lygus could remain.

The demonstration trial consisted of three different cutting patterns in the alfalfa that was interspersed between cotton fields. During the June harvest, a variety of uncut strips about 15 ft wide were left in three alfalfa fields. One field retained only two outside strips, another retained two outside strips and one inside strip, and the third retained two outside strips and every irrigation "check". This corresponded to 1.8, 2.8 and 8 acres of alfalfa. Lygus densities were estimated weekly using a standard 38" sweep net in the alfalfa and the adjacent cotton during July 1999. A sample consisted of 50 sweeps across the cotton row or in a pendulum motion in the alfalfa.

Staggered Cutting of Alfalfa, Fresno County, 1998 and 1999. To improve management of Lygus on a large West Side farm, alfalfa harvest on 160-acre fields was staggered. This cutting schedule removed roughly one third of 900 acres of alfalfa on a weekly basis. Thus, two-thirds of the alfalfa was still available for Lygus, either ready to cut or receiving an irrigation after harvest. The alfalfa was sprinkler irrigated and 2-foot strips on either side of the hand-moved pipe were left uncut.

Lygus population densities were estimated with a standard sweep on a weekly basis in alfalfa and surrounding cotton by Agri-Consultants as part of regular pest management inspections. Each sample consisted of 50 sweeps as described previously.

Results

These demonstrations reinforced the validity of earlier guidelines that managing alfalfa has value for managing Lygus in cotton. In the Tulare County trial in July, Lygus densities averaged 3 bugs per 50 sweeps in cotton compared to 108 per 50 sweeps in alfalfa (Fig. 2). The number of uncut strips remaining (2, 3 or 9) did not appear to be important in retaining Lygus in alfalfa fields.

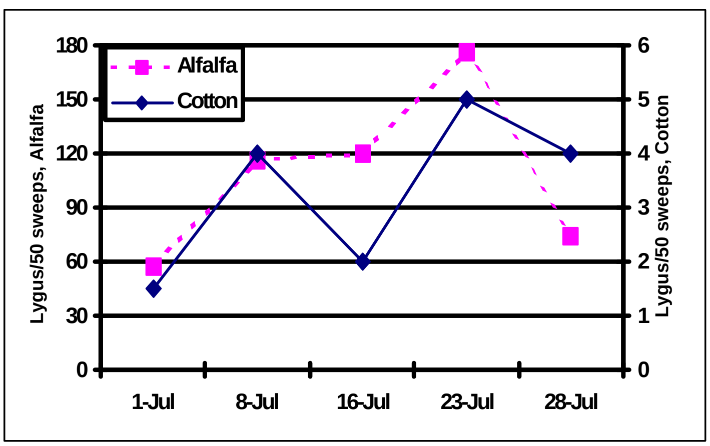

Figure 2. Lygus densities from adjacent alfalfa and cotton fields, Tulare Co. 1999

In the West Side Fresno County demonstration, the uncut strips within fields provided Lygus easy access to alfalfa habitat. More important, staggering the harvest of the 160-acre alfalfa fields created a mosaic of fields that provided ample habitat on the ranch to absorb Lygus movement from any field being harvested. This approach was successful in preventing Lygus migration into cotton during the two-year demonstration. In 1998, Lygus densities were higher in cotton fields located further away from alfalfa then in cotton located closer to alfalfa (Figure 3). Results were similar in 1999 (Figure 4), but Lygus densities overall were lower than 1998.

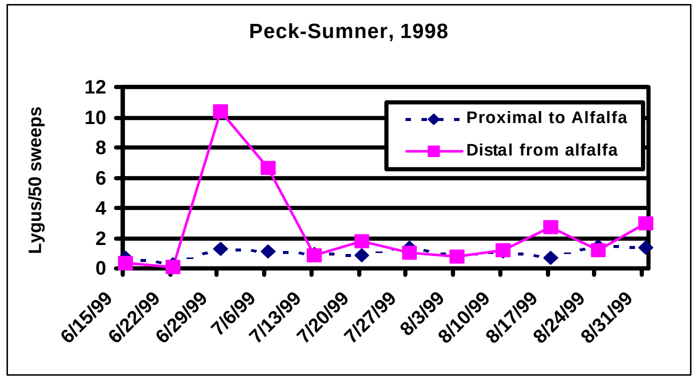

Figure 3. Lygus densities from cotton near alfalfa or distant from alfalfa, Fresno County 1998.

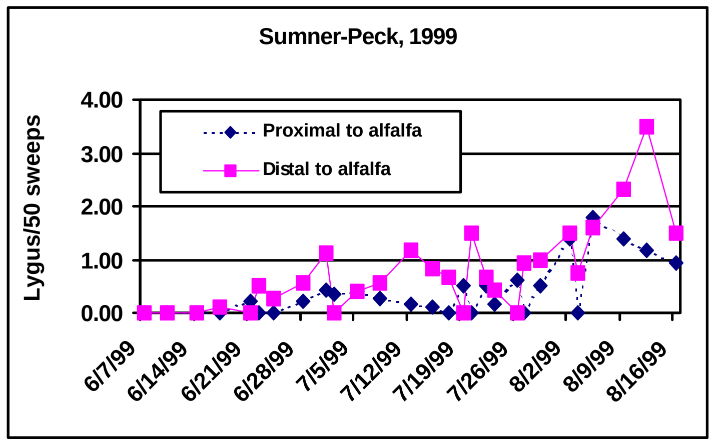

Figure 4. Lygus densities from cotton near alfalfa or distant from alfalfa, Fresno County 1999.

Discussion

As we move into the 21st Century, IPM is being pushed to higher levels of systems management. The goal should be to move farming systems toward increased biological reliance and away from reliance on chemical intervention, with the result being increased biological and economic stability. In cotton production, the options for accomplishing this are limited. Lygus is a key pest for which:

- there are no products that have a narrow spectrum against Lygus or reduced-risk to human health,
- there are no commercially available biological control strategies,
- no host plant resistance has been identified from either traditional breeding efforts or genetic engineering.

Increasing cotton's reliance on more biological approaches to pest management will require strategies that manage Lygus outside of the cotton fields. Pest management of Lygus in the SJV should re-focus on managing the sources that encourage Lygus to remain and preventing migration of this pest. Prevention of Lygus problems in cotton is the key to decreasing our current reliance on chemical intervention. In cotton, moving toward more biological reliance will require the farmer, Pest Control Advisor, crop consultant, and Land Grant University to look well beyond the individual field and consider the surrounding landscape.

Alfalfa grown for forage can play a critical role in providing a continuously available habitat for Lygus population in a region. These field demonstrations reinforce the value of alfalfa in the cropping landscape proposed 30 years ago. Where possible, staggering cutting schedules of alfalfa in an area will do much to keep Lygus from moving into cotton, is easier to accomplish then strip cutting, and does not compromise the quality of the hay.

In areas that have a high proportion of land dedicated to alfalfa hay, scheduling alfalfa harvest to maintain Lygus habitat should be possible without directed coordination. In these situations, nearby alfalfa fields should be available to receive bugs forced out by the harvest process. Cooperation will be essential to the cotton grower who does not farm the alfalfa and his neighbor who does. The critical ratio of cotton to alfalfa remains to be elucidated.

As alfalfa becomes less dominant in a local ecosystem, block cutting within a field or preservation of uncut strips becomes more important. In block cutting, the field is divided and harvested at different times. However, block cutting and creation of uncut strips is much more intrusive in the normal management of alfalfa. There are concerns about the loss of revenue from uncut strips due to reduced value of the older hay to the diary industry. These concerns conflict with results of earlier trials (Summers, 1976) that found uncut strips when blended with newly cut hay, did not suffer a reduction in quality. This problem requires further study.

Alfalfa hay in the SJV provides our best hope of managing Lygus in a biologically intensive manner. In regions where alfalfa is found as a dominant plant cover, Lygus outbreaks are seen less frequently and with less severity. In areas with little or no alfalfa, cotton acts as a major sink due to the lack of other suitable hosts.

SJV cotton is similar to other cotton growing regions in the US where criticism has been levied for its overdependence on insecticides. With a migratory pest like Lygus, the most direct way to increase biological reliance is to manage the ecosystem to eliminate its need for movement. Alfalfa can play a key role by providing alternative habitat to cotton, or in the future, acting as release site for biological control organisms against Lygus. Thus, the future strategy echoes the guidelines developed by an earlier generation of IPM entomologists, giving rise to the familiar refrain, *back to the future.*

Acknowledgments

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VERTICILLIUM WILT CONSIDERATIONS AND CALIFORNIA COTTON PRODUCTION

Bob Hutmacher

A vascular wilt disease caused by multiple strains of the soilborne fungus *Verticillium dahliae* has a long history of causing significant production losses in California cotton fields. In past decades, it has been estimated that significant populations of these organisms can be isolated in soils across wide regions of the San Joaquin Valley, including as much as 50% of the acreage in which cotton is part of the crop rotation. The result is that there is considerable potential for "reappearance" of *Verticillium* wilt under conditions favorable to the organism.

One measure of the relative success of breeding programs in Acala cottons which have over many years incorporated screening for tolerance to *Verticillium* is the reduction in incidence of foliar symptoms and yield losses associated with this fungal disease over the past 10 to 15 years. With the many recent changes in variety laws and introduction of many varieties "new" to California growers, often with origins outside of California, it is worth taking time to review symptoms associated with the *Verticillium* wilt disease. It is also important to consider potential cultural controls and the need to consider possible varietal "tolerance" in choosing the mix of cotton varieties and rotations you use.

Development of the disease / Symptoms.
The extensive research done since the 1930's by USDA and University of CA researchers, including that since the 1950's by Richard Garber and James DeVay, has provided a basis for understanding how to limit *Verticillium* impacts on cotton under CA conditions. Several "resting" forms of the *Verticillium* organism (mycelial threads, microsclerotia) can survive for long periods in the soil, even when susceptible cotton varieties have not been grown for many years.

Under favorable conditions (suitable temperature and moisture, proximity of the *Verticillium* fungus to the host cotton plant), the organism typically can enter the plant as small, hair-like filaments (hyphae) capable of penetrating the young tap root or small lateral roots. Within the plant, the hyphae can continue to penetrate the central stele of the root, into water-conducting vascular tissue. There it can also produce spores which can spread the fungal organisms through vascular tissue into stems and leaves. The organism largely proliferates within the water-conducting tissues, resulting in vascular discoloration and development of some of the more typical symptoms:

- Early signs (for very limited time period) can include unusually dark-green leaf color
- More easily-recognizable signs of *Verticillium* include blotchy, light-yellow areas between leaf veins, which as the disease progresses and becomes more severe, can get larger, and turn brown (necrotic) at the edges
- Leaf wilting and leaf abscission can occur with severe disease development, but these symptoms are not typically seen
- A brownish coloration can also develop in the vascular tissue at the same time as leaf symptoms, such that leaf veins in affected leaves or stem sections cut with a knife can show brownish coloration (vascular "staining")

Relationship between type and timing of *Verticillium* symptoms and effects on yield.
Past research efforts have looked at differences in symptom development across "susceptible" versus "tolerant" varieties, and the relationships between timing and extent of symptoms and impacts on yield. Generalizing from this detailed research can be difficult, but a few take-home messages can be summarized as follows:

- The best indicator of potential impact of the disease on yield is the timing of and extent of damaged leaves (ie. yellowed and necrotic areas)
- Earlier and more extensive leaf damage will reduce leaf area for photosynthesis and hurt future leaf and fruiting site development, and in severe cases can lead to leaf loss
- The brownish discoloration in vascular tissue of stems and leaf veins that occurs with *Verticillium* damage is useful as an indicator of the presence of the organism and distribution across an affected field. However, the percent of plants with vascular staining or the intensity / extent of the staining can vary with variety and often is not well-correlated (not a good indicator) of eventual damage to leaf area or yield
- The extent and timing of development of foliar symptoms / damage is strongly impacted by factors such as air and soil temperatures, moisture, soil type and nutrition and inoculum levels as affected by previous crops
- The percentage of plants with foliar symptoms is always less than the percentage of plants with vascular staining. These differences increase to a greater extent during periods of high temperature.

Impacts of varietal "tolerance", weather and cultural practices.
The initial entry of the *Verticillium* organism into the plant can occur as early as during seedling development or much

later during growth and development. The amount of damage done to the plant is not tightly related to the timing of the initial "attack". Instead, the extent of the damage to growth and yield is more impacted by the degree of "tolerance" (defense mechanisms) of the cotton variety as well as weather / cultural conditions that favor development of the organism. Specific plant characteristics that confer "tolerance" are complicated and not always well-understood, so will not be discussed here.

Weather and cultural conditions that generally favor more severe occurrences of *Verticillium* wilt include prolonged periods of cool, wet weather, cool weather with frequent irrigations, and cultural practices (excessive fertilization or irrigation) that encourage rank growth and delay maturity. A common question in 1999 was why we did not see even more wilt problems given our unusually cool 1999 season. The answer may not be entirely clear, but it may be that soil levels of the more virulent *Verticillium* inoculum in many cotton fields may be quite low after years of growing alternative crops and *Verticillium*-resistant cotton varieties.

Continuous cropping with non-resistant (susceptible) cotton varieties (without rotation) has been shown to sustain and even increase levels of these microsclerotia ("resting" forms of the fungus), increasing the chances of severe infestations with susceptible varieties. Numerous crop rotation studies have typically shown reduced levels of these forms of inoculum under rotations to certain crops (including alfalfa, clover, corn, small grains, sorghum, rice, pasture grasses) or fallow, with subsequent reductions in *Verticillium* incidence and damage for at least one and sometimes several seasons.

Even one-year rotations have provided significant benefits at sites with *Verticillium* problems. If you are interested in "checking out" the potential advantages of newly-introduced varieties in your operations, it may be prudent to consider a few precautions in your management decisions:

1. consider the availability of information (company, private or public research) on *Verticillium* tolerance of newly-introduced varieties (including where these evaluations were conducted; ie. were evaluations done in an area with known potential for *Verticillium* problems?);
2. make use of your own experience and field records regarding areas with past *Verticillium* problems;
3. plan to work with some "test areas" or limited plantings of varieties in which you have an interest:

- use these plantings to expand your knowledge of potential for *Verticillium* problems in your field
- consider planting a "mix" of variety choices representing *Verticillium* tolerance ranging from "unknown" or susceptible to ones known to be most resistant so you can assess your risk and keep risk more reasonable until more is known.

There may be some real advantages to be developed with a broader range of varieties for California cotton growers. Lack of disease development in 1999, however, doesn't guarantee similar responses in coming years, but we can at least be cautiously hopeful that the 1999 experience indicates that many of these newly-available varieties may be reasonably "resistant". Just exercise some caution in how rapidly you integrate new varieties into your plans when available information is limited.

Acknowledgements. *Sincere thanks to Dr. Richard Garber (Plant Pathologist, Shafter, CA) for his efforts in explaining prior research activities and review of research summaries presented in this article.*

UPDATE ON MEPIQUAT CHLORIDE RECOMMENDATIONS & MONITORING APPROACHES

Bob Hutmacher, Bill Weir, Dan Munk

Review of Impacts on "Earliness". Studies conducted in CA and AZ in the early to mid-1980's (Briggs, 1981; Kerby, Hake and Keeley, 1986) demonstrated that mepiquat chloride (primary trade name "PIX") applications made near first bloom increased harvestable bolls (relative to untreated control plants) during the first 6 to 8 fruiting branches (through about main stem node 12 or 13). This same research showed that these applications had either no effect or even could result in small decreases in harvestable bolls in later-developing fruiting branches. These and later studies in CA and other states indicated good ability of mepiquat chloride applications to improve "earliness" (expressed hereas higher early boll set). Impacts on final yield are somewhat less certain depending upon season length.

Kerby, Hake and Keeley (1986) studies demonstrated that if the growing season is a long one, untreated plants can produce yields similar to mepiquat-chloride treated plants in terms of total yield. Again, this is because the greatest impacts of this growth regulator on "earliness" have generally been found in improved boll set in the first 6 to 8 fruiting branches.

What Measurements to Use in Decision-Making

Pre-Bloom and First or Early Bloom:

The two primary approaches include: (1) length of internode between fourth and fifth node below the terminal (developed by Texas A&M researchers and widely used in the U.S. by Delta Pine); and (2) current UCCE-recommended approach for Acala (using plant height, number of main stem nodes, and measures of fruit retention). These two approaches differ in some key areas:

- Ease of measurement. UC approach for Acala takes more time since fruit retention measurements needed
- Growth stage for use in decision-making. UC approach for Acala is geared toward primary decisions on first mepiquat chloride applications (from about 14 to 16 main stem nodes), while the fourth-fifth internode approach provides help with application rate decisions all the way from pre-bloom (about 10 nodes) through peak bloom periods.

UCCE studies are underway (2nd year) at Shafter and West Side REC to evaluate consistency of both types of measurements and resulting differences in recommendations (timing of applications and rates).

"Features" of the fourth-fifth internode distance approach include: (1) ease of measurements; (2) it is compatible with taking a large number of measurements to characterize a field; (3) charts developed for use with this approach include specific recommendations regarding rates to consider for applications starting as early as 9 or 10 main stem nodes. Potential disadvantages of the fourth-fifth internode distance method are that there is no direct use of any measure of fruit retention. Impacts of fruit load on the need for growth control are not directly a c - counted for (even though this can be one of the primary reasons why plants can show differences in "vigor", whether measured here as internode length or as height:node ratios).

Mid-Bloom and later:

The best-available tools for evaluations of relative plant vigor to help assess plant growth management problems include height:node ratios (best used through early bloom) and the nodes-above-white-flower (NAWF) approach. Both of these approaches have been extensively discussed in prior issues of the CA Cotton Review and more information is also available from the *"Cotton Production Manual"* (UC Publication # 3352), UC cotton plant mapping programs for palmtop or PC, or from your UCCE Farm Advisor.

Growth Regulator Use in Pima—Recommendations

A very wide range of approaches in mepiquat chloride (PIX and related materials) use are currently used by Pima growers in California. In large part, the range of approaches used likely reflects some dissatisfaction and difficulties with growth management and yield results obtained with standard recommendations. Although most UCCE evaluations of Pima growth regulator responses have focused on impacts lint yields and on some measure of earliness, it has become more obvious in some years that mepiquat chloride applications are needed as much for vegetation and growth control as for ability to impact yields.

After about 10 years of UC Pima growth regulator studies and farm calls to Pima fields with growth management problems, some generalizations might be useful:

- The most consistent improvements in yield in UC studies have been with sequential applications beginning at full bloom (about 10-14 days after 1st bloom), with a 2nd application 10-14 days later
- The most effective application rates have been 0.5 to 1.0 pts/acre, with rates adjusted based upon relative vigor and square/early boll retention
- Pre-bloom or first bloom applications have been most useful in growth control and to help avoid delays in defoliation, provided plant vigor has been high enough to warrant these applications 1
- High vigor fields with poor early square retention may be the most likely to benefit from first bloom or even pre-bloom applications for growth control—but research data to support this is limited

Under long growing seasons and high yield potential conditions, research in AZ and CA has shown that mepiquat chloride applications made too early or at too high a rate can actually reduce the total number of fruiting sites and therefore, lint yields. Vigor and retention measurements can pay off in helping make some of these difficult "calls".

Review of Acala Sequential PIX Application Trials

Responses of Acala cotton varieties to mepiquat chloride application rates ranging from 0.13 to 0.5 pts/acre and application timing ranging from early square through 10 days after bloom were evaluated in four years of trials conducted by UCCE Farm Advisors and Tom Kerby and staff in 1987 through 1990. The tests involved SJ-2 (a relatively indeterminate variety), and GC-510 (a relatively determinate variety), with cotton planted in 30", 38" and 40" rows. Even though the varieties no longer are grown on much acreage, these test can still provide useful information Thirty-four separate tests were conducted during this four-year period, from Imperial Valley to Merced County, and the results are summarized in Table 1.

Table 1. Summary of yield results from sequential mepiquat chloride (PIX) trials on Acala cotton conducted by UCCE from 1987 through 1990. Average yields and average response (in lbs/acre lint yield increase over untreated control) are shown.

Treatments (application timing shown in left column, #'s indicate PIX application rates in pts per acre at each time of application): *treatment receiving 0 pts/acre at all times shown was untreated control Trt. 1)

	Trt 1	Trt 2	Trt 3	Trt 4	Trt 5
Early square (10 nodes) application	0	0.13	0.25	0.25	0
Early bloom (14-15 nodes) application	0	0.13	0.25	0.5	0.5
Application at early bloom plus 10 days	0	0.13	0.25	0	0
Average lint yield responses to PIX trts: Average yield for untreated control shown in lbs/acre; yields for other treatments as lbs /acre increase (+) in lint yields over yields of Untreated control					
30 inch row locations (18 trials)	1360	+81	+77	+65	+75
38 or 40 inch row locations (16 trials)	1296	+8	+16	+10	+36
SJ-2 variety at any site (8 trials)	1490	+49	+53	+61	+54
GC-510 variety at any site (15 trials)	1269	+56	+55	+48	+67
High yield sites (17 trials)	1537	+56	+43	+28	+55
Lower yield sites (17 trials)	1123	+37	+54	+50	+58

The primary messages from these trials with sequential low-dose mepiquat chloride (PIX, related materials) applications were: (1) low-dose sequential applications did not generally improve yields over those obtained with a 0.5 pts/acre application at first bloom (treatment 5); (2) across a wide range of situations, mepiquat chloride applications improved yields over untreated controls; (3) varietal differences in responses were not readily apparent; and (4) the most favorable responses to sequential lower dose applications (such as treatments # 2 or 3 above) were with 30 inch row spacing. The best performance of low-dose sequential applications in trials summarized above and more recent trials has been under 30 inch cotton production in the northern San Joaquin Valley.

ANNOUNCEMENTS:
Production Meetings, Field Days

PRODUCTION MEETINGS AND FIELD DAYS

(please mark these dates on your calendars - more details on production meeting agendas, locations and times can be obtained from your UC Cooperative Extension Farm Advisor - phone numbers listed on the back of this newsletter)

June UCCE Farm Advisor Cotton Production Meetings:

- Kern County - Tues., **June 20 -** (9:00 to noon, followed by lunch, Shafter Res. & Extension Center, 17053 N. Shafter Ave.)
- Tulare & Kings Counties - Wed., **June 21** - (9:30 to noon, followed by lunch, Tulare Agric.Pavilion, Laspina Ave., Tulare)
- Fresno County - Thursday, **June 22** - (9:00 to noon, followed by lunch, San Joaquin VFW Hall)
- Merced & Madera Counties - Thursday, **June 22 -** (starts with lunch at noon, followed by meetings about 12:30 to 2:30, Red Top, Road 4 at Hwy 152)

July UCCE Farm Advisor Cotton Production Meetings:

(locations and times still to be announced)

- Kern County - Tuesday, **July 18**
- Tulare & Kings Counties - Wednesday, **July 19**
- Fresno County - Thursday, **July 20**
- Merced & Madera Counties - Thursday, **July 20**

Cotton Field Days - University of CA and USDA-ARS participating

- UC Shafter Research and Extension Center - Tuesday**, September 19**
- UC West Side Research and Extension Center - Thursday**, September 21**

UCCE, USDA-ARS (Shafter) & Monsanto Alternative Tillage Field Days

- Madera County (Firebaugh area, Newhall Ranch) Tuesday**, August 8** (Contact person: Ron Vargas)
- Kern County (Buttonwillow area, WAY Farms) Thursday**, August 10** (Contact person: Bob Hutmacher)