University of California Cooperative Extension

California Cotton Review

The Newsletter of the UC Cooperative Extension Cotton Advisors

Volume 56 August 2000

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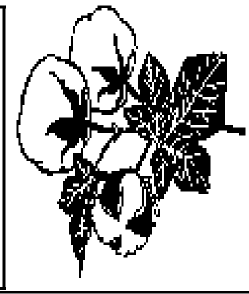


DEFOLIATING THE 2000 CROP

Steve Wright, Ron Vargas, Bruce Roberts, Bob Hutmacher

Introduction

Defoliation decisions will have to be made on a field by field basis due to the wide range of maturities. Most fields this season experienced good cutout and have a good uniform boll load, while some of the late-planted fields are more vegetative with a smaller boll load. Fields that evenly cut out and have a good boll load will be much easier to defoliate. Whatever the situation, the timing for harvest aid applications is based on crop maturity.

Timing Defoliation, Nodes Above Cracked Boll

The standard recommendation is to apply treatments when 95% of green bolls are mature or when 65% of expected harvestable bolls are open. A mature green boll cannot be easily cut with a sharp knife. The seed coat of seeds within mature bolls also has a tan color as opposed to the milky white color in immature bolls. Nodes above cracked boll (NACB) is the recommended technique to determine proper timing of defoliants. The recommended time that applications can be made on Uplands is 4 NACB and for Pima at 3 NACB. Timing defoliants at these stages will not affect fiber quality or yield. Determine the last-maturing first position boll on the main stem that is going to be harvested and begin counting down the stem to the first cracked boll. When there are 4 nodes separating these bolls in Acala and 3 nodes in Pima defoliants can be applied without affecting fiber quality or yield.

When you can advance the start of defoliation the risk of damage from late season whitefly or aphids is reduced. Other advantages of an earlier harvest include: Defoliants are much more effective when temperatures are warm - >80 F. Harvest in October with longer, warmer days is much more effective and time efficient with more picker power than during shorter, cooler, and possibly wet days of November. Fiber quality is preserved. Earlier finish also results in the completion of more groundwork before winter rain.

Factors to Consider In Selecting a Defoliation Strategy

Defoliation often is as much an art as a science with results varying considerably from field to field. There are at least a couple of scenarios where treatments would be most likely to be cost effective based on field tests and observations. The following are two general situations:

<u>**Condition 1**</u> *Fields with uniform and/or heavy boll load, abrupt cutout and warm temperatures >80 F. at time of defoliant application with warm weather expected after applications:*

- Under this condition lower labeled rates of most defoliants are effective.
- There is less potential for regrowth, less need for early glyphosate applications unless preharvest weed control is needed.
- Ginstar treatments should give effective single shot defoliation. Def and Folex should be effective.
- Ethephon treatments for boll opening may be less critical, however, Ethephon tank mixes will be useful in areas with aphids or whiteflys for faster leaf drop.
- If a second treatment is needed Chlorate /Starfire/ cacodylic acid applied alone or in combination will be more effective than under condition 2.

<u>**Condition 2.**</u> *Late plantings, and / or low boll retention, rank growth in Upland. and Pima cotton:*

- Under these conditions defoliants perform much less effectively. Regrowth and boll opening are a common

Support for this publication is provided by California Cotton Growers through their Cotton Incorporated State Support Program.

concern. Therefore, pretreatments for regrowth, and boll openers will enhance defoliation.

- Sequential applications will usually be required. Higher rates are usually required on the second application to defoliate or desiccate remaining leaves.

Acala Maxxa Studies

Table 1 summarizes 18 trials conducted at the West Side Research and Extension Center (WSR&ES) between 1993-1999, ranking the overall performance at 14-21 days after treatment for Acala regrowth control.. Table 2 summarizes some of the treatment results for 1996 through 1999. Some of the 1999 data was not included because of field variability. This table reemphasizes the difference that each season has on performance of preharvest aids. The field conditions that produced the results in 1997 are more representative of condition 1 as previously described whereas the conditions that produced the results in 1996 and 1998 are more representative of condition 2. In 1996 the pretreatments combination provided the most effective defoliation. Table 2 also gives some general costs for Upland defoliation options as of 1999 data. A grower must select a treatment that will perform the best under his or her field conditions. Material cost, efficacy, local conditions and plant back restrictions will determine which treatments to use.

Table 1. Acala Regrowth Control Studies 1993-1999

Treatment Combinations	Percent Regrowth Control
Treatments with glyphosate (1-2 qt)	80-92
Def or Folex (2 pt) + Dropp (.3lb) + Agridex (1 pt)	65-87
Ginstar >9 oz, Ginstar 9 oz + Accelerate (1.5 pt) or Cotton Aid (2pt)	55-80

Table 2. Acala Defoliation Summary 96-99

Table 2. Acala Defoliation Summary 96-99 **UCCE, WSR&EC Percent Defoliation (21 DAT) *****

Treatment	1996	1997	1998	1999	Ave. 96-99	Material Cost/A
Folex (2pt) + Prep (2 pt) B. $NaCLO_3$ (1 Gal. Defol 5) + Starfire (21oz)	86	88	92	75	**85**	$42
Folex (2pt) + Prep (2pt) + Agridex (1 pt)	82	55	79	77	**73**	$30
Ginstar (6 oz) B. Ginstar (8 oz)	74	95	60	--	**76**	$25
Prep (2 pt) B. Ginstar (8 oz)	60	--	31	--	**46**	$29
Def (2 pt) + Accelerate (1 pt)	55	60	--	--	**58**	$16
Ginstar (10 oz)	36	70	50	72	**57**	$18
$NaCLO_3$ (1 Gal) + Starfire (11 oz) B. $NaCLO_3$ (1 Gal) + Starfire (21 oz)	21	65	55	65	**52**	$23
Def (2pt) + Agridex (1pt)	55	52	33	55	**49**	$15
Accelerate (1.5pt) + Folex (2pt)	59	53	--	--	**56**	$18
Harvade (8oz) + DEF (2pt) B. $NaCLO_3$ (1 Gal) + Starfire (21 oz)	--	83	80	--	**82**	$32
Harvade (8oz) + Ginstar (6oz) B. $NaCLO_3$ (1 Gal) + Starfire (21 oz)	--	92	82	--	**87**	$30

B. Sequential - 2nd application 7 days after initial treatment. **** DAT = days after treatment*

Pima, because of its more indeterminate growth characteristics is more difficult and costly to defoliate than Upland varieties. Higher rates and sequential applications are usually needed to thoroughly desiccate remaining leaves. Several treatments were evaluated at the WSR&ES on Pima S-7 between 1995 and 1999. Table 3 lists the treatments that provided the most consistent defoliation performance at 14 to 21 days after treatment and material costs. Some European mills have again reported the presence of arsenic in Pima samples from the San Joaquin Valley due to excessive rates or multiple applications of cacodylic acid per season. A single application of cacodylic acid at label rates should avoid this problem. Select an alternative to cacodylic acid if additional treatments for desiccation are needed.

Table 3. Most Effective Pima Defoliation / Desiccation Treatments and Costs. UCCE, WSREC 95-99.

	Defoliation (%)						**Desiccation(%)**			**2000**
Treatment	**1995**	**1996**	**1997**	**1998**	**1999**	**Avg.**		**Avg**		**Material Cost/A**
Prep (2 pt) + Dropp (.3 lb) B. Ginstar (10 oz) or $NaCLO_3$ + Harvade (8 oz), or Starfire (21 oz), or $NaCLO_3$ + Folex, or $NaCLO_3$ + Cot.Aid (1.3 pt)	63	38	63	58	43	**53**		**67**		**$43-56**
Ginstar (13 oz) + Prep (2 pt) B. $NaCLO_3$ (1 gal Defol 5) + Starfire (21 oz)	70	34	75	50	35	**53**		**67**		**$51**
Ginstar (6 oz) B. Ginstar (10 oz)	61	39	73	41	57	**54**		**66**		**$28**
Dropp (.3 lb) + Agridex (1 pt) B. Ginstar (13 oz)	65	38	**--**	**--**	**--**	**52**		**50**		**$45**
Cotton Quik (3.5 qt) + Ginstar (13 oz)	**--**	85	72	50	**--**	**61**		**78**		**$51**
Ginstar (13 oz)	58	38	77	51	43	**53**		**63**		**$23**

Defoliation is the last operation in the production cycle where management practices can have a big impact on profit. These final decisions will affect the overall harvest efficiency, can still impact fiber quality and therefore lint value. As can be seen in both Table 2 and Table 3, there is a wide range of costs of materials used as harvest aids, so both the cost of materials and the number of applications required for the crop and weather conditions must be considered. Hopefully this information will be helpful in making your defoliation decisions. See last year's article on defoliation observations in some CA Upland varieties (September 1999 issue of the CA Cotton Review) for a report on some additional observations and findings. Many past issues of the CA Cotton Review, including prior issues on defoliation, can be accessed on the University of CA Cotton web site at:

cottoninfo.ucdavis.edu

STICKY COTTON: SOURCES AND SOLUTIONS

Insert included with this *"California Cotton Review "* issue

Peter B. Goodell

Preventing the development of sticky cotton is essential to the cotton industry both in California as well as other states. While late season whiteflies and aphids have not been as large a problem the past few years, the cotton industry must remain vigilant regarding the persistent threat of sticky cotton. This volume of the California Cotton Review contains an important insert developed by the University of California, University of Arizona, Texas A&M, USDA Agricultural Research Service and Cotton Incorporated, with support from the Sticky Cotton Task Force of Cotton Incorporated. *Sticky Cotton Sources and Solutions* is a four-page color leaflet that describes the problem of sticky cotton, its detection and measurement, and its potential economic importance. It discusses the origins of sticky cotton including insect and plant derived sources. Finally, it offers information useful to the mitigation of the problem. The cotton industry should review the leaflet and renew its committment to protecting high quality lint of California cotton.

Additional copies can be obtained by contacting Pete Goodell at 559/646-6515. Web versions are available from:
http://ag.arizona.edu/cotton/stickycss.pdf

TRENDS IN PESTICIDE USE AND PESTICIDE RESISTANCE IN SAN JOAQUIN VALLEY COTTON

Beth Grafton-Cardwell, Peter B. Goodell, Greg Montez

Background

Two key pests of San Joaquin Valley cotton, Lygus (*Lygus hesperus*) and cotton aphids (*Aphis gossypii*) have been controlled with organochlorine, organophosphate, and carbamate insecticides for more than 30 years. During the early 1990s, these insecticides began to lose their effectiveness and the pyrethroid Capture was introduced. At about the same time, the production habits of San Joaquin Valley growers shifted away from using nitrogen or water stress to manage plant growth, towards using plant growth regulators. Increasing amounts of nitrogen and irrigation were used to develop the most vigorous plant canopy and this caused aphids to grow and reproduce faster (Godfrey et al. 1999). Cotton aphids, which had previously been an early season problem kept under control by natural enemies, became a serious mid-season pest.

Cotton aphid developed resistance to Capture rapidly, and by 1995, it was no longer effective for controlling aphids (Grafton-Cardwell and Goodell 1996). Resistance to Capture in Lygus was also detected in 1996, however, it was not as severe (Grafton-Cardwell et al. 1997) or as stable (Knabke and Staetz 1997) as Capture resistance in cotton aphids. Because the pyrethroids gave longer residual control than other insecticides, growers continued to use pyrethroids for Lygus control in spite of resistance. When pyrethroids are used for early season Lygus control, insecticide use for secondary pests such as cotton aphids, spider mites, and various Lepidoptera escalates (Godfrey et al. 1998). This is because pyrethroids are toxic to the natural enemies that control these pests. Between 1985 and 1995, pesticide use increased from 1.5 applications to up to 6 applications per season for all pests and yields were low in 1995. In response to this escalation of broad-spectrum pesticide use, University of California Extension personnel held a cotton industry workshop to review the pest situation. One outcome of this review was a series of insecticide resistance management guidelines that emphasized the preservation of natural enemies by avoiding early season broad-spectrum insecticides and the careful rotation of insecticide/acaricide chemistries (Goodell et al. 1999). We currently report on the pest densities, pesticide use patterns, and pest resistance of spider mites, Lygus, and cotton aphids during 1996-2000, the period just prior to and following implementation of these resistance management guidelines.

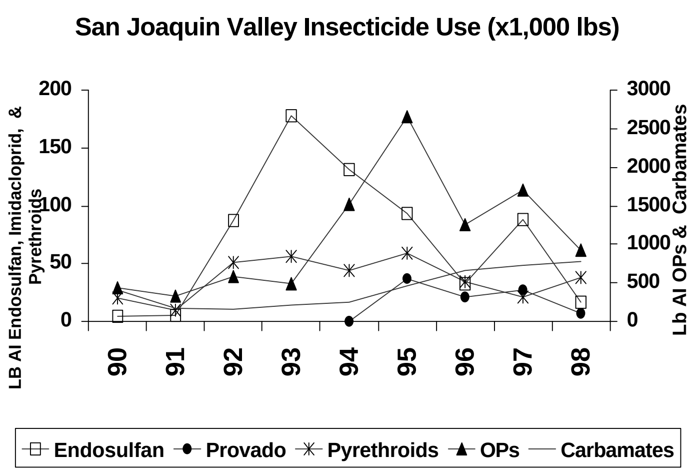
Procedures

Insecticide resistance bioassays for aphids and spider mites were prepared by treating plastic petri dishes with discriminating concentrations of pesticides mixed in ethanol. We expected to observe greater than 80% mean mortality of individuals placed in these dishes if the population was susceptible to the pesticide. We could not test all insecticides and acaricides registered, and so we screened insecticides from major chemical classes. For aphids, the insecticides included the organophosphate Lorsban, the organochlorine Thiodan or Phaser, the pyrethroid Capture, and the chloronicotinyl Provado and mortality was assessed after 3 hours. For spider mites, acaricides included Kelthane, Comite, and Zephyr and mortality was assessed after 24 hours. For Lygus, plastic ziploc bags were treated with 5 µl technical grade insecticide in acetone and mixed with the pyrethroid Capture, the organophosphate Metasystox-R, the carbamate Lannate, or the chloronicotinyl Provado. Lygus mortality was assessed after 8 hours. Pesticide use data was obtained from the California Department of Pesticide Regulation for 1990-1998 and summarized for Merced, Madera, Fresno, Kings, Tulare and Kern counties. Estimates of pest densities were obtained from the Cotton Insect Losses summary for the National Cotton Council (Williams 1991-1999).

Results

Pesticide use for Lygus and aphid control between 1990-1998 in the San Joaquin Valley is illustrated in Figure 1. Thiodan/Phaser use reached a peak in 1993, organophosphate and pyrethroid use peaked in 1995, carbamate use continues to steadily increase (primarily Temik), and Provado use was initiated in 1995. In 1995, when organophosphate and pyrethroid use was at it's highest, pesticides were not very effective in controlling cotton aphid or spider mites. The resistance monitoring program was initiated the following year (1996) in response to concerns that resistance was the cause of the aphid and mite problems.

Fig. 1



Cotton aphid numbers were high during 1994-97. The percentage of cotton aphid populations with resistance to Capture was highest in 1996 (85% of populations tested) when resistance monitoring was initiated (Fig. 2). Capture resistance declined slightly in subsequent years as pyrethroid use in cotton declined, however, reduction in pyrethroid use did not bring the San Joaquin Valley cotton aphid population back to a susceptible state. In contrast, resistance to chlorpyrifos was fairly high in 1996 (40% of populations tested), but as use declined after

Fig. 2

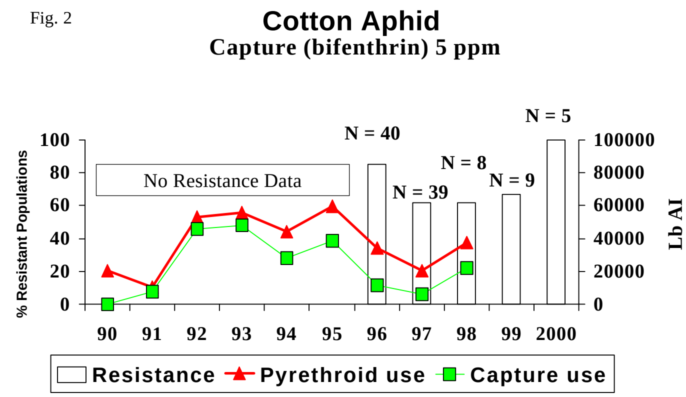


Fig. 3

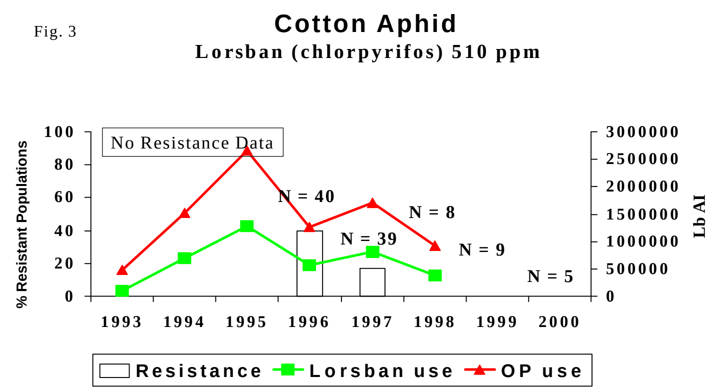
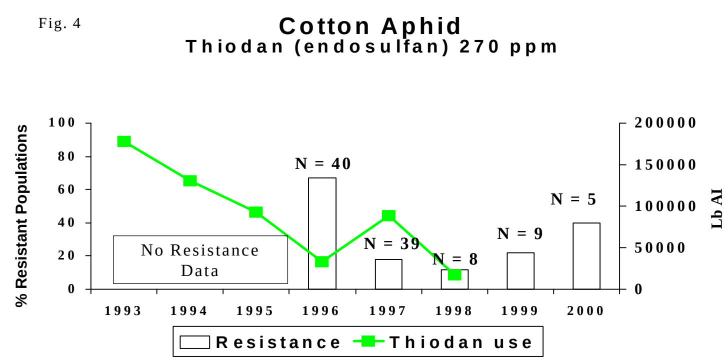


Fig. 4



1995, so has the percentage of resistant populations (Fig. 3). This suggests that organophosphate resistance in cotton aphids is unstable and manageable through careful rotation of insecticide classes. A similar pattern is seen for endosulfan (Fig. 4) with 67% resistant populations in 1996 dropping to as few as 12% of populations in 1998. Imidacloprid was registered for use in 1995, and to date, no resistance to this insecticide has been detected in cotton aphids. Part of the reduction in organophosphate and pyrethroid use in the late 1990s was due to the introduction of this new insecticide class (chloronicotinyl)., Continued rotation of these different insecticide classes with any insecticides that become registered in the future is recommended.

Lygus bugs become a key pest in cotton fields as foothill vegetation dries and as neighboring alfalfa fields are harvested (Goodell 1998). In 1996, Lygus bug susceptibility to Capture in the early season was observed, suggesting

Fig. 5

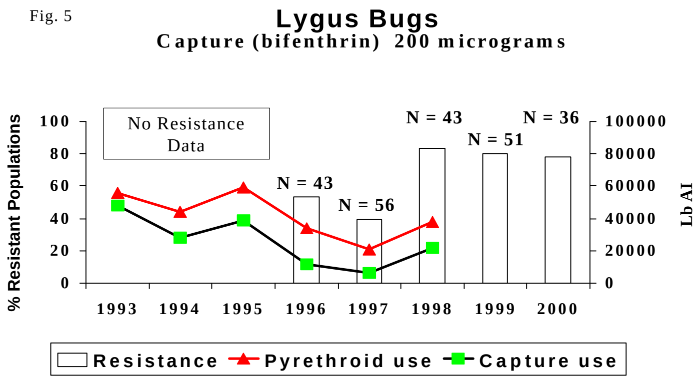


Fig. 6

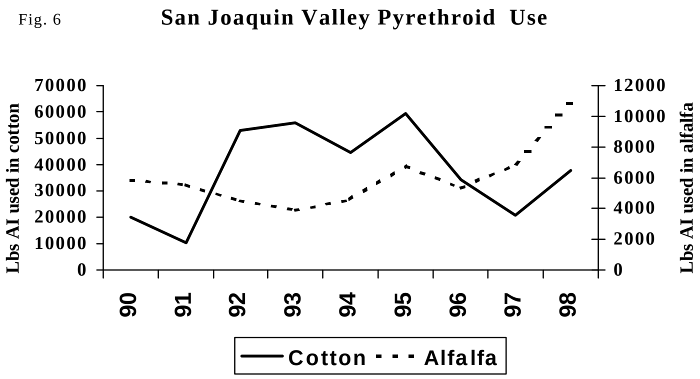
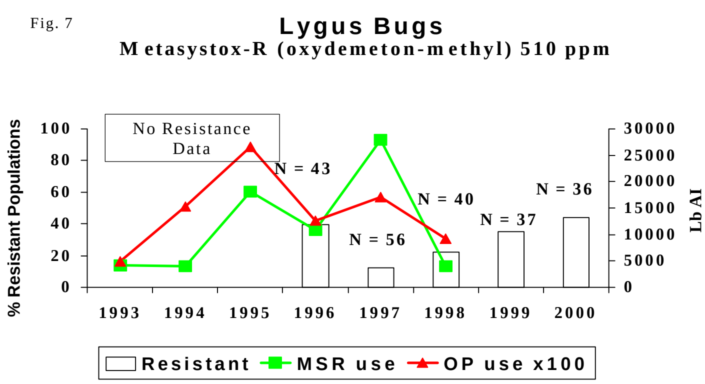


Fig. 7



that resistance to this insecticide could be managed (Knabke and Staetz 1997). However in 1997-00 resistance surveys, resistance to Capture in Lygus bugs increased to ≥80% of populations tested at all times of the season (Fig. 5). Although pyrethroid use declined in cotton after 1995, use in alfalfa has dramatically increased (Fig. 6). Recent registration of pyrethroids for alfalfa weevil control and other pests of alfalfa has greatly escalated pyrethroid use in this crop. If the heavy pyrethroid use in alfalfa continues, we are likely to see Capture resistance in Lygus continue to intensify. Use of pyrethroids in cotton increased in 1998 (Fig. 1), possibly in response to the increasing level of resistance in Lygus. Resistances to the organophosphate Metasystox-R and the carbamate Lannate fluctuated,

Fig. 8

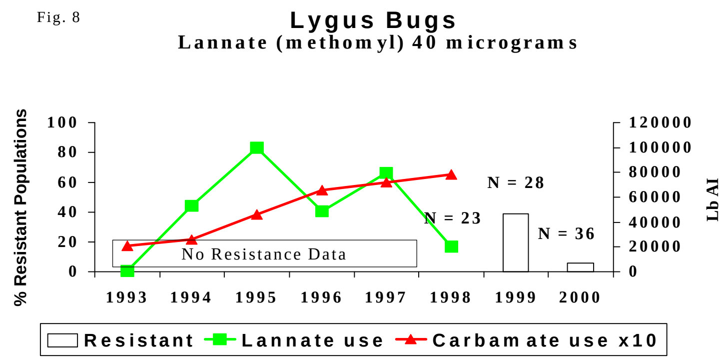


Fig. 9

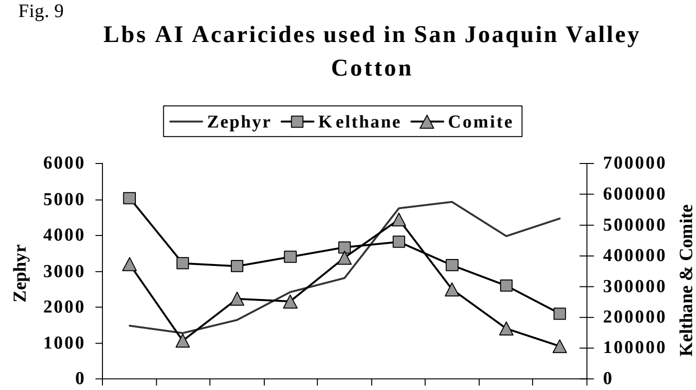
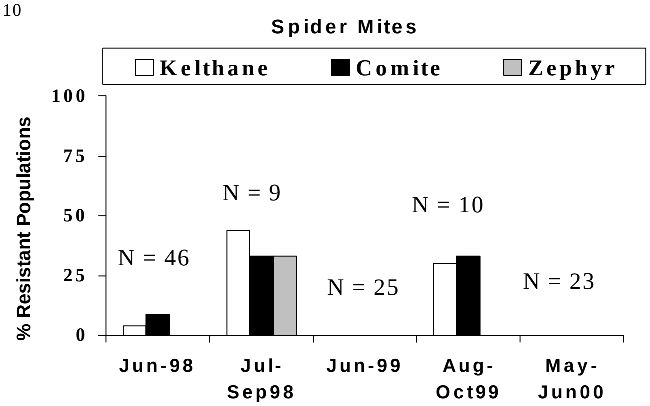


Fig. 10



as did use of these insecticides (Fig. 7 & 8). A low percentage of populations with resistance to Provado (6%) was first detected in 2000. There is a great need for development of selective insecticides for Lygus control in order to allow the natural enemies of the other pests to survive.

Spider mites. Figure 9 shows the pesticide use patterns for Zephyr, Kelthane, and Comite use for spider mites in the San Joaquin Valley from 1990-98. Peak use of all three acaricides occurred in 1995, the year when cotton aphid populations were out of control and broad-spectrum pesticide use was at it's highest (Fig. 1). Spider mites have many natural enemies that aid control and if left undisturbed control most populations. The observed pattern of pesticide resistance in spider mites is different than insects. Each year, spider mite populations are initially quite susceptible to all three acaricides (Fig. 10). This is because populations consist primarily of fully susceptible strawberry mite (*Tetranychus turkestani*) and because resistance declines in *T. urticae* and *T. pacificus* during the winter.

Acaricides are applied during June and July and these applications select for resistance. This pattern has been observed for Kelthane and Comite since the mid 1980s (Grafton-Cardwell et al. 1987). In 1998, resistance to Zephyr was observed for the first time in *T. urticae* and *T. pacificus* infesting cotton. However, resistance declined by the subsequent spring. Many factors result in yearly subsiding of acaricide resistance levels in cotton spider mites including, selectivity of acaricides favoring natural enemies, high movement of spider mites between crops, natural rotation of acaricide classes, and recessive inheritance of resistance. The result is that Kelthane and Comite remain efficacious as early or mid season sprays in most cotton fields in spite of >17 years of documented resistance. There has been a tendency in recent years for cotton growers to increasingly rely on Zephyr for spider mite control (Fig. 9). For resistance management purposes, rotation of Zephyr with other acaricides is continually advised (Goodell et al. 1999).

Summary

Pesticide bioassays were useful for detecting trends in resistance to major groups of insecticides and acaricides. The data indicate that pyrethroid resistance in Lygus and cotton aphids is quite high, suggesting that pyrethroid usefulness may be approaching an end. In contrast, resistances to organophosphates, organochlorines, and acaricides occur, yet the level or frequency of resistance fluctuates in response to pesticide use. There is greater potential for maintaining susceptibility to these pesticides if their use is limited.

The education program emphasized the concept that pesticide resistance cannot be managed in one pest without managing it in the other pests. Use of insecticides for either Lygus or cotton aphids selects for resistance in both insects. Heavy use of early season broad-spectrum pesticides for Lygus disrupts biological control resulting in increased use of acaricides for spider mites and insecticides for aphids. In addition, cotton pests are influenced by insecticide use in neighboring crops. Escalating pyrethroid use in alfalfa is a likely cause of increased resistance in Lygus infesting cotton. The best resistance management program is one that reduces all pesticide use and the University of California Resistance Guidelines help growers follow that strategy.

Acknowledgments

We would like to thank J. Christiansen and R. Striggow for field work & bioassays;Dr. B. Brindley for preparing Lygus bioassay bags. Coordination efforts of California Cotton Growers and Ginners Association are recognized and appreciated. The Cotton Incorporated Core Program and California State Support Committee provided partial funding to support this research.

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THE VALUE OF FINAL PLANT MAPPING

Dan Munk, Peter B. Goodell, Bob Hutmacher and Jon Wroble

Over the past decade, plant mapping techniques have been used by cotton growers and consultants to aid in crop management decisions. In-season plant mapping has been intensively used to identify the magnitude of early season canopy vigor, predict the timing of first flower, assess the need for plant growth regulators and assist in evaluating pest management decisions. It has been consistently demonstrated that these in-season crop assessments are invaluable in making timely and informed management decisions.

Late in the season management issues change with more focus placed on proper irrigation termination, determining proper defoliation timing or deliberating over a final pesticide application. The common late season crop monitoring methods use an evaluation of percent open bolls or node above cracked boll to help with the defoliation decision. However, to understand production limitations in fields and assist in final yield projections, a more comprehensive late season plant assessment known as Final Plant Mapping (FPM) can be useful.

Scope of the Measurements. FPM information quantifies end of season plant vigor, total number of harvestable bolls, and the distribution of those bolls on the plant. Late season assessments of plant vigor can be used as an indication of changing vegetative growth conditions since the last in-season plant map. It can assist with evaluations of the effectiveness of plant growth regulator programs, pest management effectiveness and provide information about the payback from late-season irrigation and nitrogen management practices. Vigorous late season cotton can also be indirectly associated with retention problems caused by insect pests or late season physiological stresses. Late season vigor indices should also be used in combination with boll retention data to help in the interpretation of plant responses.

FPM boll retention information can be used to characterize the timing of fruit retained on the plant or alternatively the timing of stress events that impact growth and yield during the season. When used with plant map data collected during the bloom period, good estimates of boll set dates can be derived for most positions on the plant, thereby pinpointing time periods that influenced crop development. For instance, early season bolls set three days apart for adjacent first position fruit while a six-day delay is expected on second position fruit located on the same fruiting branch.

It is desirable to conduct the final map of the season during a time when a good estimate of harvested bolls can be made. Because of the high physiologic boll shed on late season cotton, it is important to conduct these evaluations at a time when all harvestable bolls are at least 15 days old. Generally speaking, a decision on harvestability of bolls can be made by early September for most Upland cottons while mid-September boll development or later in Pima cotton will provide best results.

Uses and Interpretation of FPM Data: Three Examples.

Cotton variety can be an important component of the FPM, and caution should be exercised in comparing cottons with vastly different determinancies. Table 1 illustrates the variety effect in a high-yielding, replicated cotton test conducted in 1999. In the three varieties compared, Acala “Maxxa” demonstrated a strong tendency to have fewer bolls per plant and completed its effective fruit cycle using fewer total fruiting branches than Hazera (an Upland experimental) or Pima “S7”. In Hazera plots, we also found plant heights to be markedly higher indicating a highly vigorous variety and found its boll distribution to be more similar to Pima plant types than the Upland varieties. The proportion of bolls harvested in Hazera 195-208 also compared closely with that of a Pima plant type and indicates the tendency for this Upland hybrid to require a longer season to mature.

Table 1

Variety	Plant Height (in.)	# of Fruiting Branches	Percent retention of bolls by position on sympodial branch			Total Bolls per Plant	Yield (lbs Lint per acre)
			Pos. #1	Pos. #2	Pos. #3		
Pima S7	44	16.4	34.2	32.8	26.2	29	2014
Maxxa	44.6	15.7	66.6	24.1	3.5	11.2	2004
Hazera 195-208	52.6	18.8	37.8	34.3	22	28.1	2382

Irrigation termination decisions have been evaluated with the FPM. In contrasting irrigation treatments in Five Points (Table 2), two additional late season irrigations produced a crop that was considerably taller (8 inches), had four additional fruiting branches, and contained more than two additional fruiting branches contributing to yield extending the season by an additional 10 to 14 days. The yield enhanced by this later termination was found to be only 50 lbs. lint/acre and unlikely to replace the additional defoliation and water costs needed to finish the crop.

Insect pests can have a dramatic impact on plant architecture as a result of fruit and leaf feeding. Early Lygus feeding during the earliest part of the fruiting cycle can reduce bottom fruit retention and create a vigorous but unproductive cotton plant. Early fruit loss caused by Lygus feeding can be at least partially compensated through management and cooperative weather patterns. For example, a mildly warm June and July provides adequate time for recovering early losses. However, a year with June and July temperatures like those occurring in 1995 can limit the plant's ability to develop and set fruit.

In contrasting the same field between two years (Table 3), it was noted that in 1995 mid- and late-season pest complexes composed of two-spotted mite, cotton aphid and Lygus bugs reduced the yield potential of cotton. This same high-yield potential ground planted to cotton in 1997 produced a dramatically different cotton plant. The number of bolls produced per plant in 1995 was significantly lower although it required two additional fruiting branches to produce less than 50 percent of the yield attained in 1997.

The FPM data in this example clearly points to a mid- and late-season problem as described by the FP1 fruit retention differences in the 95% zone. The large number of fruiting branches in both years also suggests that pests, and not climate, were the dominant factor influencing yield, although it does not rule out carbohydrate limitations as a factor in late-season losses. With this type of late crop evaluation available, we can begin to determine the success or failure of the pest management strategies used during the season and gain insight as to value and appropriateness of in-season pest management decisions.

Electronic Tools To Use. Developing FPM information requires a time commitment during late August - through harvest. FPM monitoring may not be desired for every field. However, it could be useful, for example, in discerning impacts of agronomic management method changes or the impact of contrasting insecticide management programs used on farm. Monitoring fields with different planting dates, contrasting earliness approaches or contrasting water management methods will allow us to better evaluate decisions that impact the bottom line.

The program was originally developed to run under the DOS shell with output files (print files) generated with the .prt extension. These files can then be opened in Excel and Lotus as a tab delimited file and results viewed or printed. The program can be downloaded to your personal computer using the UCCE Cotton website at **cottoninfo.ucdavis.edu** or copies obtained at your local county Cooperative Extension office.

Table 2

Date of Final Irrig.	Plant Height (in.)	Total # of Fruiting Branches	Total Bolls per Plant	95% Zone (all FB bolls)	All Nodes 95% Zone (all FB bolls)	Yield (lbs Lint per acre)
July 18th	50.3	16.3	16.2	11.8	17.3	1868
Aug. 30th	58.1	20.5	18.2	14.2	19.7	1918

Table 3

Trial Year	Plant Height (in.)	Total # of Fruiting Branches	% FP1 Reten. In Bot. 5 FB	95% Zone (all FB bolls)	% FP1 Reten. In 95% Zone	# of Bolls Per Plant	Yield (lbs lint per acre)
1995	56.6	23.3	56	20.5	28.1	11.1	827
1997	47.6	19.3	65	18.6	69.2	17.3	1974

ANNOUNCEMENTS

COTTON FIELD DAYS - University of CA, USDA-ARS and CA Dept. of Food and Agric.ulture participating

- UC Shafter Research and Extension Center - Tuesday**, September 19**
  (contact Brian Marsh (661) 868-6210 or Bob Hutmacher (661) 746-8020 for more information)
- UC West Side Research and Extension Center - Thursday**, September 21**
  (contact Dan Munk (559) 456-7561 for more information)