Imperial AGRICULTURAL BRIEFS

Features *June 2004*

Our Website is http://ceimperial.ucdavis.edu

INSECTICIDE EFFICACY AGAINST BEET ARMYWORM IN ALFALFA IN 2003.

Eric T. Natwick

An insecticide efficacy study was conducted during the summer of 2003 at the UC Desert Research and Extension Center. A first year stand of alfalfa, VAR. CUF 101, was used for the experiment. Plots were arranged in a randomized complete block design with four replications. Eight insecticide treatments were compared to an untreated control for efficacy against beet armyworm and palestriped flea beetle and the insecticides were evaluated for their negative impact on predacious insects and spiders in alfalfa. Insecticide treatments and rates as fluid ounces or dry ounces of formulated product per acre are listed in Table 1. Plots measured 35 feet by 50 feet and insecticide treatments were broadcast applied August 5, 2003, using a tractor mounted spray boom with 19 X TJ-60 11003VS nozzles at 20 psi delivering 29 gpa.

Populations of beet armyworm, palestriped flea beetle, and beneficial arthropods were measured in each plot with a standard 15 inch diameter insect sweep net consisting of ten 180^{o} sweeps on August 4, 6, 8, 12 and 19, 2003, or 1 day pre-treatment (PT) and 1, 3, 7, and 14 days after treatment (DAT).

Steward 1.25 SC at 0.045 lb, 0.065 lb and 0.09 lb AI per acre and Lorsban 4E provided the best beet armyworm control with post treatment means that were significantly less than means for all other insecticide treatments and for the untreated control mean (LSD, P<0.05) (Table 1). The beet armyworm post treatment means for Gamma-cyhalothrin, Mustang Max and Assail WSP were not significantly different from the untreated control.

All insecticide treatments except the three Steward 1.25SC treatments had palestriped flea beetle post treatment means that were less than the mean for the untreated control (LSD, P<0.05) (Table 2). Gamma-cyhalothrin and Lorsban had the lowest post treatment means for palestriped flea beetle, but the means were not significantly different from Assail WSP, Mustang Max, or Warrior 1 CS.

The untreated control post treatment means for minute pirate bugs, colops beetles and spiders were not significantly different from the post treatment means for any of the insecticide treatments (LSD, P<0.05) (Table 3). Therefore, by this criteria, none of the insecticide treatments had a negative impact on the minute pirate bugs, colops beetles, nor spiders. All of the insecticide treatments negatively impacted bigeyed bugs. The post treatment means for bigeyed bugs for each insecticide treatment was significantly less than the mean for the untreated control. All insecticide treatments except the three Steward 1.25 SC treatments and the Assail WSP treatment had post treatment means for damsel bugs that were significantly less than the mean for the untreated control.

Table 2. Numbers [v] of Beet Armyworms per Ten Sweeps in Alfalfa, Holtville, CA, 2003.

Treatment	oz/acre	1 DPT[w]	1 DAT[xy]	3 DAT[y]	7 DAT	14 DAT[y]	PTM[yz]
Untreated Control	-----------	19.0 a	39.1 a	42.5 a	42.5 a	34.3 a	39.3 a
*Gamma-cyhalothrin	3.84	13.0 a	39.8 a	36.9 ab	40.5 a	24.6 ab	35.0 ab
Warrior 1CS	3.84	14.5a	24.8 a	15.8 ab	24.0 abc	16.7 abc	21.0 b
Steward 1.25SC	4.6	16.3 a	2.2 b	0.9 d	0.0 d	6.9 d	2.9 d
Steward 1.25SC	6.7	21.8 a	3.8 a	0.7 d	1.0 d	12.1 bcd	4.4 cd
Steward 1.25SC	9.22	23.5 a	6.3 b	5.0 c	8.0 cd	8.6 cd	6.3 c
*Mustang Max	2.5	16.3 a	42.8 a	14.8 b	21.3 d	14.0 bcd	23.9 ab
Lorsban 4 E	32.0	14.3 a	2.0 b	0.4 d	0.8 bc	11.3 bcd	3.9 cd
*Assail WSP	1.7	15.3 a	35.0 a	22.4 ab	31.0 ab	21.2 ab	26.9 ab

[v] Mean separations within columns by $LSD_{0.05}$. [w] Days pre-treatment. [x] Days after treatment. [y] Log transformed data used for analysis; reverse transformed means reported. [z] Post treatment mean.
* Not registered for this use at time of publication.

Table 2. Mean Numbers [w] of Palestriped Flea Beetle per Ten Sweeps in Alfalfa, Holtville, CA, 2003.

Treatment	oz/acre	1 DPT[x]	1 DAT[y]	3 DAT	7 DAT	14 DAT	PTM[z]
Untreated Control	-----------	118.8 a	75.0 a	56.5 a	38.8 ab	30.3 a	50.1 a
*Gamma-cyhalothrin	3.84	146.0 a	1.5 b	1.3 c	3.8 c	19.8 a	6.6 b
Warrior 1CS	3.84	134.5 a	15.5 b	12.8 bc	15.0 bc	17.0 a	15.1 b
Steward 1.25SC	4.6	155.5 a	70.0 a	65.8 a	57.0 a	18.0 a	52.7 a
Steward 1.25SC	6.7	168.8 a	73.3 a	67.3 a	55.8 a	17.8 a	53.5 a
Steward 1.25SC	9.22	151.8 a	58.0 a	40.0 ab	18.3 bc	25.3 a	35.4 a
*Mustang Max	2.5	123.0 a	2.8 b	10.8 c	22.0 bc	13.5 a	12.3 b
Lorsban 4 E	32.0	145.5 a	0.8 b	1.3 c	5.5 c	23.5 a	7.8 b
*Assail WSP	1.7	140.5 a	11.5 b	7.3 c	3.5 c	25.0 a	11.8 b

[w] Mean separations within columns by $LSD_{0.05}$. [x] Days pre-treatment. [y] Days after treatment. [z] Post treatment mean. * Not registered for this use at time of publication.

Table 3. Post Treatment Mean Numbers [z] of Predacious Insects and Spiders per Ten Sweeps in Alfalfa, Holtville, CA, 2003.

Treatment	oz/acre	MPB	BEB	DB	CB	Spiders
Untreated Control	---------	9.1 a	7.9 a	2.5 ab	1.6 a	2.3 a
*Gamma-cyhalothrin	3.84	6.4 a	4.6 b	2.0 bcd	1.0 a	2.1 a
Warrior 1CS	3.84	6.8 a	4.6 b	1.7 bcd	0.9 a	2.0 a
Steward 1.25SC	4.6	7.6 a	5.0 b	2.4 abc	1.3 a	2.1 a
Steward 1.25SC	6.7	7.3 a	4.9 b	2.1 abcd	1.4 a	1.9 a
Steward 1.25SC	9.22	6.3 a	5.1 b	2.1 abcd	1.1 a	2.2 a
*Mustang Max	2.5	6.4 a	4.3 b	1.2 d	0.8 a	2.1 a
Lorsban 4 E	32.0	6.1 a	4.0 b	1.4 cd	1.9 a	1.6 a
*Assail WSP	1.7	6.8 a	5.6 b	3.1 a	2.1 a	2.4 a

[z]Mean separations within columns by $LSD_{0.05}$. * Not registered for this use at time of publication.
MPB = Minute Pirate Bug
BEB = Bigeyed Bug
DB = Damsel Bug
CB = Colops Beetle

Colops Beetle

Minute Pirate Bug

Damsel Bug

Bigeyed Bug

Common Diseases of Alfalfa

Tom Turini

Alfalfa should be productive for many years. The life span of an alfalfa fields is rarely longer than 4 years due to decline in productivity. Pathogens, particularly those attacking roots and crowns can substantially contribute to stand decline.

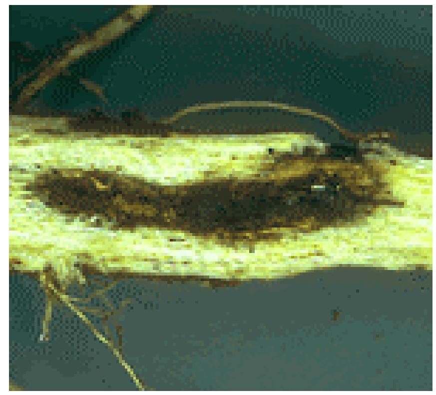
Many pathogens affect alfalfa and it is common for established alfalfa plants to host more than one pathogen. Therefore, diagnosis can be complicated. The following are a few diseases that could affect alfalfa in desert production areas.

Rhyzoctonia root and stem canker, caused by the fungus *Rhyzoctonia solani*, is one of the most common alfalfa diseases in the low desert. This disease is characterized by the cankers on the stems crowns and roots. During the summer, the root lesions appear as dry, tan, round or elliptical cankers on tap roots around the emerging lateral roots. As lesions expand, they may grow together girdling the root. If this occurs in the upper portion of the tap root, the plant will die. However, if the plant survives the summer, it recovers. During the fall and winter, the cankers heal and turn black. During the winter, while the fungus is inactive, some roots re-grow. Typically, this disease occurs severely in roughly circular localized patches within a field or in areas where drainage is a problem.

In addition, this fungus may be responsible for severe **seedling loss**. Seedlings attacked by *R. solani* have roots and lower stems that are shrunken and brown. *Pythium spp.* can also cause seedling loss before or shortly after emergence. *R. solani* can cause seedling death at any stage of seedling development. Warm wet soil conditions favor disease development. The optimum temperature range of this fungus is 77^{o} – 86^{o}F.

Phytophthora root rot is typically caused by *Phytophthora megasperma* in the low desert. Above ground symptoms appear as a general wilting. Lesions form on the taproot. Typically, lesions start where lateral roots emerge. Lesions have diffuse margins and a yellow discoloration extends through the root cortex into the xylem. If the lesions are limited to the tap root and conditions cease to favor disease development, the plants will recover. However, the plant will die if the infection spreads to the crown.

In fall, winter and spring, the *P. megasperma* that causes damage grows optimally at temperatures from 75^{o} – 81^{o}F. In addition, a high-temperature isolate (HTI) is present in Imperial County. This isolate grows optimally at temperatures from 84^{o} – 91^{o}F and is capable of growth at 102^{o}F.



Texas root rot, caused by *Phymatotrichopsis omnivore (Phymototrichum omnivorum* and *Oozonium omnivorum*), occurs in localized areas in the low desert. The characteristic dieback is obvious during the hotter months. Circular to oblong patches of alfalfa within the field will die out leaving only grassy weeds. The fungus causes a rot of the cortex, which results in leaf bronzing, wilting and plant death. Tan, coarse fungal strands (mycelium) present on the root surface are diagnostic for the disease. Texas root rot tends to occur year after year in the same area of the same fields.

The presence of this fungus may depress the value of land, so diagnosis of the disease should always be confirmed by a plant pathologist with experience with this disease.

Control

For some of these diseases, resistant varieties are available. In addition, severity of Phytophthora and Rhyzoctonia root rot can be reduced by avoiding the waterlogged conditions that favor these diseases.

Results of Imperial County Bermuda Rust Fungicide Efficacy Trial

Tom Turini and Herman Meister

The activity of Folicur 3.6F (tebuconizole) + Latron B1956 (non-ionic surfactant), Headline (pyraclostrobin) + Latron B1956 and dusting sulfur against bermudagrass rust (*Puccinia cynodontis*) were compared in a replicated field trail conducted in a commercial field near Calipatria, CA. The Folicur and Headline applications were made with a CO_2-pressurized backpack sprayer with four Visflo® 8002EVS flat fan spray tips (TeeJet®) positioned 19 in. apart on a spray boom. The tank mix was applied at 30 psi at 30 gal/A. Sulfur was applied with a hand operated dusting machine. These materials were applied on 31 March and 16 April. Disease was present when the first application was made.

The experimental design was a four replication randomized complete block. The plot size was 20 x 20 ft with 20 ft buffers.

Disease severity was evaluated on 15 April and 17 May. Fifteen stolens were randomly taken from each plot. The youngest 6 leaves on each stolen were rated on a scale of 0 to 10 based on the percentage of the leaves covered with rust pustules. A sample with a 0 rating would have no pustules and a 10 rating would be assigned to a sample completely covered with pustules.

Data was subjected to analysis of variance. Least Significant Difference (P 0.05) was use for mean separation.

On 15 April, bermudagrass treated with Headline + Latron B1956 and Folicur 3.6F + Latron B1956 performed similarly (Table 1). However, the Folicur 3.6F + Latron B1956 was not different than the untreated control (Table 1). By 7 May, bermudagrass treated with either Folicur 3.6F + Latron B1956 or Headline + Latron B1956 had lower bermudagrass rust severity than the untreated control or the dusting sulfur treatment (Table 1). The sulfur treatment was not different than the untreated control on 15 April or 7 May (Table 1).

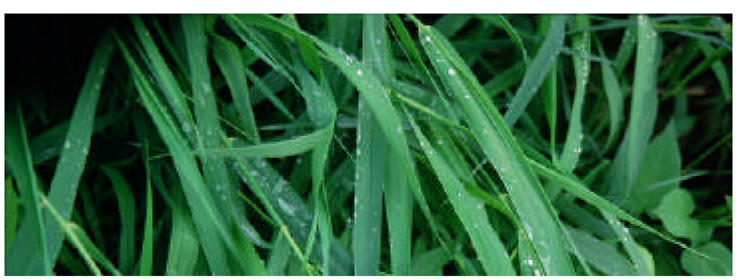
Table 1. Activity of fungicides on bermudagrass rust severity when applied after the disease is present.

Material [x]	Rate fp/acre	Leaf surface covered with pustules (%) [y]	
		15 April	7 May
Headline + Latron B1956	8.0 fl oz + 0.06 %	24.4 a [z]	18.0 a
Folicur 3.6F + Latron B1956	12.0 fl oz + 0.06 %	27.6 ab	16.2 a
Dusting Sulfur	30 lbs	37.0 c	23.8 b
Untreated		33.2 bc	23.2 b

[x] Materials were applied on 31 March and 16 April. A CO_2 – pressurized backpack sprayer at 30 psi was used to apply 30 gallons tank mix/acre.

[y] Fifteen stolen samples were taken from each plot. The upper six leaves on each sample were evaluated based on the percentage of the leaves covered with rust pustules. Samples rated 0 were symptomless, and 10 = 100% covered with pustules. Ratings were converted to percentages, which are presented

[z] Means within the same column followed by the same letter do not differ as determined by LSD P 0.05.



Timing of Pix Applications for Growth Suppression on Cotton in the Imperial Valley 2003

Herman Meister

Introduction and Objective

Cotton growers in the Valley are growing cotton more aggressively than in the past. New genetically modified varieties of cotton are being grown on better quality ground with more water and fertilizer.

Cotton growers were concerned that Pix applications were not providing the necessary growth regulatory effect when used according to label guidelines. They felt that the criteria or methods used to evaluate "when" to apply Pix were not appropriate for their area and growing technique.

As a result, a trial was established in the spring of 2003 to evaluate techniques for determining "when" to apply Pix. The "Height to Node" ratio (H:N) method was compared to the Maximum Internode Distance (MID) technique, both at lower activation levels than recommended by the label and the University of California. A multiple application treatment was included as a comparison along with a check.

Based on the information obtained in 2002, critical cotton development stages (first square, first bloom, and peak bloom) were chosen as target dates for Pix applications. These events are easily observed and can be tied to heat units for predictability.

Methods and Procedures

Cultural Practices:
The cotton variety DP 448B was irrigated to stand on April 7. Stand counts indicated a final plant population of 41,250 plants per acre. It was side-dressed with 150 lbs. urea (46% N) on May 28 with a second side-dress of 210 lbs. of urea on June 18. Seven more irrigations were applied to alternate furrows on the following dates: May 29, June 19, July 1, July 9, July 16, July 23, and July 30.

Petiole samples for nitrate N were collected five times during the season: May 28 (14,401ppm), June 18 (14,806ppm), July 1 (16,971ppm), July 16 (10,550ppm), July 30 (2757ppm).

Insect Control:
Plots were monitored weekly after emergence for mites, beet armyworms, lygus bugs, silverleaf whitefly (SLW). On June 10, SLW reached an economic threshold. The entire test area was sprayed with Knack (1 pt/A) by ground rig on June 12th. A subsequent application of Applaud was applied followed by two more applications of Assail. SLW migrating from declining melon trials nearby on the experiment station impacted the test area.

Pix treatments and application dates:

Multiple applications of Pix.
a) 4 oz at match head square (May 28)
b) 8 oz at first bloom (June 18)
c) 16 oz at peak bloom (June 30)

2) Pix at 16 oz applied at First Bloom (H:N of 1.2) on June 18

3) Pix at 16 oz applied at Peak Bloom (MID of 5.00 cm) on June 30

4) No Pix applications.

Treatments were randomized and replicated 4 times. Plots were 100 feet long and 4-40 inch beds wide. Pix treatments were applied with a CO_2 hand-held boom equipped with two 8002E FF nozzles, one located over the center of each row. Pix was applied in 25 gpa of water using 40 psi. Rates were calculated at 50 % field coverage.

Field Sampling
The plant mapping process was conducted in field by selecting 5 plants from the middle two rows of the plot designated for sampling. The remainder of the plot area was set aside for collecting yield data. The selected plants were cut off at the soil line and examined for plant height, nodes, fruit retention, nodes above white flower, and internode distance between the 4th and 5th nodes.

The crop was defoliated with Ginstar at 8 oz per acre on August 22. Samples for cotton yields were collected by handpicking 13.1 row feet (one-thousandth acre) from each of the two center rows of each plot on September 9th. Samples were weighed and hand ginned to determine % turnout.

Results

The following tables show the results of the Pix treatments on plant growth.

Table1. Cotton Growth Measurements Using the H:N Method.

Date	6-10	6-17	6-30*	7-15*	7-29*
Multiple Pix	1.01	1.09	1.38 b	1.39 b	1.35 b
Pix H:N 1.2	1.05	1.18	1.33 b	1.48 ab	1.49 ab
MID 5.0 cm	1.03	1.20	1.50 a	1.54 ab	1.48 ab
Check	1.06	1.20	1.48 a	1.64 a	1.65 a

*LSD, Pc ≤.05

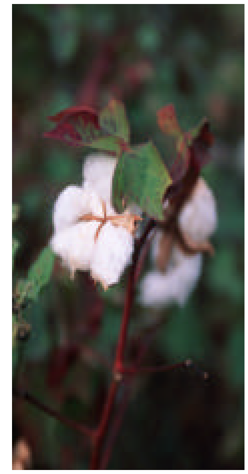


Table 2. Growth Measurements Using the Maximum Internode Distance Method in Centimeters.

Date	6-10	6-17	6-30*	7-15*	7-29*
Multiple Pix	3.05	3.75	3.98 b	4.00 b	3.75 b
Pix H:N 1.2	3.40	3.80	4.10 b	4.00 b	4.30 b
Pix MID 5.0 cm	3.25	4.15	5.00 a	4.30 b	3.85 b
Check	3.35	3.88	4.85 a	5.10 a	4.95 a

*LSD, Pc ≤.05

Table 3. Percent Fruit Retention.

Date	6-17	6-30	7-15	7-29
Multiple Pix	47	44.	49.	38
Pix H:N 1.3	50	42	47	39
MID 5.0 cm	46	40	49	38
Check	42	40	46	37

No significant differences between treatments on any sample date, ANOVA, P=0.05

Table 4. Nodes Above White Flower (NAWF) Evaluation.

Date	7-15	7-29*
Multiple Pix	4.2	1.2 b
Pix H:N 1.2	4.9	1.0 b
Mid 5.0 cm	5.0	1.8 b
Check	5.2	3.0 a

*LSD, Pc ≤.05

Table 5. Yields from handpicked samples converted to Bales/Acre.

Treatment	Lbs. seed cotton	% Turnout	Lbs. lint	Bales / Acre
Multiple Pix	3138	38	1185	2.72
Pix H:N 1.2	3098	38	1162	2.66
MID 5.0 cm	3111	37	1151	2.64
Check	3092	38	1175	2.69

No significant differences between treatments, ANOVA, P=0.05

Discussion

In 2002, there were no significant differences between treatments when using the H:N as method for measuring plant growth as opposed to the MID technique which did indicate that Pix was having a regulatory affect on cotton growth.

The 2003 data showed that both methods measured the growth regulatory effects of the Pix applications on June 30, July 15, and July 29. Neither method on June 10 or June 17^{t}sampling dates detected a difference between the check and the 4oz-rate application on May 28. On the June 30 sampling date (12 DAT on 6-18), both methods showed identical statistical separation of means for the multiple applications and H:N 1.2 treatments. On the next two sampling dates, (July 15 and 29) the MID method more precisely separated the means/treatments and provided a clear picture of differences.

Several differences between the two years are worth mentioning. In 2003, a different variety was used (DP 448B DP 5415 vs.), plant population was higher in 2003 (41,250 vs. 31,300), and the fruit retention was 15% lower in 2003, (45% vs. 60%).

There were no significant differences in the treatments in relation to percent fruit retention (Table 3).

There were no differences in NAWF on July 15 sample date, but as the crop advanced toward cutout, the Pix treatments arrived at cutout earlier as indicated by the counts on July 29th.

Yield samples from all the plots indicated that there were no significant differences in yields between treatments. Petiole samples collected at various stages of growth indicated more than adequate nitrogen was present to sustain the crop.

Conclusion

The Maximum Internode Distance method appears to more accurately measure the growth responses of the cotton plant to Pix applications for mid and late season evaluations. The H:N method measures the growth of the plant the entire season and may not be as suitable for mid and late season evaluations.

Fruit retention was not affected by Pix applications. Perhaps a slightly earlier advancement into cutout due to Pix applications was detected. No effect on yield was noted, so the issue of timing of the applications will need further investigation.

CIMIS REPORT

Khaled Bali and Steve Burch*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of June 1 to August 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474; http://ceimperial.ucdavis.edu) or the IID, Irrigation Management Unit (339-9082).

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

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

Station	June		July		August	
	1-15	16-30	1-15	15-31	1-15	16-31
Calipatria	0.39	0.40	0.39	0.38	0.35	0.32
El Centro (Seeley)	0.36	0.38	0.38	0.37	0.32	0.29
Holtville (Meloland)	0.38	0.39	0.39	0.38	0.34	0.31

* Irrigation Management Unit, Imperial Irrigation District.

Eric T. Natwick, County Director