



Cotton Field Check

Management Updates from UC Cooperative Extension
July 4, 2009



Highlights

1. The amount of damage Lygus can do upon arrival in a cotton field depends on their need to feed.
2. Lygus moving from drying safflower or wheat are likely to begin feeding at a higher rate than Lygus moving from alfalfa
3. Fruit retention provides an important indicator of feeding intensity.
4. Lygus in alfalfa hay can be managed by leaving habitat strips for the bugs to remain and can be one of the best defenses in limiting Lygus movement.
5. Measuring fruit retention can be useful in evaluating the need for if treatment or for evaluating how effective in stopping the loss of fruit.
6. Measuring fruit retention will provide an indication of the expected current retention on top of the plant based on age and previous retention.
7. Details for Lygus management can be found at www.ipm.ucdavis.edu, click agriculture & floriculture (Pest Management Guidelines) and then Cotton.
8. This information was developed for Acala cotton and is suggested only as a guide for Pima cotton.
9. It is critical to measure Lygus population density at least weekly and perform a complete fruit retention several times during the critical fruiting period or more frequently if the situation dictates.

The Importance of Evaluating Fruit Retention

PB Goodell, IPM Advisor

I was called to an Acala field this week because of a sustained Lygus movement out of alfalfa and possibly wheat. The field had 7+/50 sweep counts over a two week period and resulted in two insecticide applications. There was no evaluation by the PCA or consultant regarding fruit retention. After I collected the information, it was obvious the field had not sustained much damage for the population density present and the crop developed was not delayed. While insecticide intervention was justified by the population density, knowing fruiting pattern could have provided additional information.

I want to remind everyone that combining the fruiting pattern with Lygus numbers is a powerful tool which has been available since the early 1990's. The results from a fruit retention analysis provide important information about growth and development of the cotton crop. While the initial measurement is somewhat labor intensive, after the bottom fruit set is established for the field, data gathering is not very intrusive during the standard field scout check. Fruit evaluation does not need to be conducted weekly but only during critical periods when Lygus have moved into a field or to evaluate the result of an application for Lygus

As a reminder, three plant variables are required:

- Number of FRUITING branches (not number of Mainstem Nodes). This provides an estimate of the "age" of the plant in its development
- Percent retention of First Position Fruit on BOTTOM five fruiting branches. This tells you how well you have done in holding the earliest fruit, the vegetative brake of a cotton plant.
- Percent retention of First Position Fruit on TOP five fruiting branches. This variable provides information about feeding current pressure.
- A table is available to interpret what the critical retention should be based on age and initial fruit set (see Year Round IPM in Cotton at the UC IPM web site)
- To use the table, find the row with the number of fruiting branches for your field and look down the column that represents the percent retention of the Bottom five first fruiting positions. Where the row and column intersect is the critical retention for the TOP five first fruiting positions. Compare this number to your percent top retention from your field; if your number is larger, you are holding adequate fruit. If it is lower, that Lygus population could impact yield.

These data are developed from high yielding Acala fields. The use with Pima cotton is less clear. However, using the same technique in Pima will provide important information about fruit set and Lygus impact. The following pages from the *Year Round IPM Program for Cotton* provide detailed instructions, including the table containing critical top five, first position retention values.

Good pest management requires all the information available. Knowledge of the plant development is an essential part of evaluating Lygus management decisions.



www.ipm.ucdavis.edu

Cotton—Fruit Retention and Lygus Monitoring

Supplement to UC IPM Pest Management Guidelines: Cotton

To determine if treatment is needed for lygus, sample both fruit/square retention and lygus populations in the field. If fruit/square retention is lower than expected and lygus are above treatment thresholds, treatment is needed.

Directions:

Lygus Monitoring

Always use a standard sweep net with a diameter of 15 inches (37.5 cm). One sample consists of 50 sweeps across a single row of cotton. Take one sample in each quadrant of the field in fields that are up to 8 acres (32 ha). Take more samples in larger fields.

1. Walk briskly down the row and swing the net in front of you so that the lower edge of the rim strikes the plants about 10 inches (25 cm) from the top.
 - Keep the lower tilted edge slightly ahead of the upper edge.
 - Keep the sweeps far enough apart that you do not sweep plants that have already been jostled by the net.
 - Sweeps that are too closely spaced may cause lygus to fly or drop from the plants and thus be missed.
 - Keep the net moving to prevent adults from flying out.
2. After each set of 50 sweeps, count all the lygus bugs in the net, including nymphs, and record the total number below. Average the samples to follow the lygus population over the course of the season.
 - Be sure not to confuse aphids or bigeyed bug nymphs with small lygus bugs.
3. Stop monitoring lygus when:
 - Acala has 5 nodes above white flower (NAWF)
 - Pima has 3.5 NAWF

Fruit Retention Monitoring

1. Randomly select 5 plants from each quadrant of your field.
2. Count the number of first position squares on the **top 5** mainstem nodes and record.
3. Count the number of retained fruit in the first position on the **bottom 5** fruiting branches and record. (Until 10 fruiting branches are available, there will be an overlap between the top 5 and the bottom 5 nodes).
4. Count the number of fruiting branches and record. Total all columns.
5. After the plant has developed more than 10 fruiting branches, you can stop counting fruit on the bottom fruiting branches if the average boll retention remains constant for two weeks in a row. You can use this retention level for the rest of the season.
6. Calculate average percent retention and compare to the expected value derived from the table (p. 2).

Field _____ Date _____

Quadrant	Number of lygus per 50 sweeps		Plant	Number of first position fruit (Top 5 nodes)	Number of first position fruit (Bottom 5 nodes)	Number of fruiting branches
	Adults	Nymphs				
1			1			
			2			
			3			
			4			
			5			
2			6			
			7			
			8			
			9			
			10			
3			11			
			12			
			13			
			14			
			15			
4			16			
			17			
			18			
			19			
			20			
Total						
Average						

Cotton—Fruit Retention and Lygus Monitoring Calculations and Thresholds

Field _____ Date _____

1. Calculations:

Fruit retention monitoring:

a. Determine the average percent of fruit retained in the top 5 nodes:

Total 1st position fruit retained
 _____ on the **top 5** nodes X 100% = _____
 20 plants X 5 nodes

Example:
 Average percent of fruit retained in the **top 5** nodes, if the total first position fruit obtained for the **top 5** nodes is 60:
 _____ 60 total fruit = 0.6 X 100% = 60% average fruit retention
 20 plants X 5 nodes

b. Determine the average percent of fruit retained in the bottom 5 nodes:

Total 1st position fruit retained
 _____ on the **bottom 5** nodes X 100% = _____
 20 plants X 5 nodes

2. Determine if the percent fruit retention in the **top 5** fruiting branches is at, above, or below the expected value. In the table (or using the Web calculator), find the intersection of your sampled number of fruiting branches (from p. 1) and percent fruit retention on the first position of **bottom 5** fruiting branches (b above). This is the expected fruit retention of the **top 5** fruiting branches.

Expected retention (%) of the first position on the top 5 fruiting branches, from data for Acala cotton.

Total Fruiting Branches	Percent retention of the first position fruit on the BOTTOM 5 fruiting branches									
	10	20	30	40	50	60	70	80	90	100
Less than 5	The expected retention of the top 5 first fruiting positions is 73%. The retention on the first fruiting branch is erratic and at least 3 branches should be present before lygus decisions are made.									
5	73	73	73	73	73	73	73	73	72	71
6	73	73	73	73	73	73	72	72	70	69
7	73	73	73	73	73	72	71	70	68	65
8	73	73	73	73	72	71	69	66	63	60
9	73	73	72	71	70	68	65	62	58	53
10	73	72	71	69	67	65	60	56	51	46
11	71	70	68	66	62	58	54	49	44	39
12	69	67	64	61	56	51	46	41	37	32
13	66	63	59	54	49	44	39	35	30	27
14	61	57	52	47	42	37	33	29	25	22
15	55	50	45	40	35	31	27	24	21	18
16	48	43	38	33	29	25	22	20	18	16
17	40	36	31	28	24	21	19	17	15	14
18	34	29	26	23	20	18	16	14	13	12
19	28	24	21	19	17	15	14	13	12	11
20	23	20	18	16	15	13	12	11	11	10

Treatment thresholds and how to interpret monitoring results:

Treatment may be warranted if:

- square/fruit retention is **lower** than expected AND
- the average number of lygus per sample is:
 - Early squaring: 2 to 4 lygus per 50 sweeps
 - Midsquaring (bloom): 7 to 10 lygus (with at least 1 nymph) per 50 sweeps
 - Late squaring (boll filling): more than 10 lygus (including at least one nymph) per 50 sweeps

