**Using Plant Based Measurements to Support
Lygus Management Decisions
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Highlights

1. Lygus is a key pest causing fruit loss through their feeding.
2. Cotton plants cannot produce a boll at every fruiting position because the demand by developing cotton bolls outstrips the plant's capacity.
3. Knowing both the current fruit status and the Lygus population are critical to making the best treatment decision.
4. Important data to be collected and recorded include, number of fruiting branches, percent retention of first position fruit on BOTTOM five fruiting branches, percent retention of first position fruit on TOP five fruiting branches, and number of Lygus per 50 sweeps.
5. Estimate fruit retention weekly and scout for Lygus twice weekly.
6. Details for Lygus management can be found at www.ipm.ucdavis.edu, click agriculture & floriculture (Pest Management Guidelines) and then Cotton.
7. These data help frame our understanding of the overall fruit status of the field and whether the population of Lygus present is actually a threat

Lygus bugs are key pests to cotton's yield. They damage the plant by feeding on developing fruit structures and causing a loss of fruit. While the plant sheds a major portion of its fruit naturally, Lygus can impact yield and require additional time for compensation to occur.

There is a solid understanding of Acala upland cotton fruiting cycle. While the level of knowledge is not available for Pima cotton, enough similarities exist to allow for reasonable decisions to be made, based on the degree and location of fruit retention.

Understanding how a plant sets fruit and what normal retention levels are expected is a valuable tool in assessing Lygus population densities for management. In Acala upland cotton, tools have been developed to assess the fruit retention pattern and determine if it within expectations.

To do this, four pieces of information are required (refer to Figure 1)
1. the number of **fruiting branches**,
2. the retention of fruit on the first position (FP_1) on the **BOTTOM** five fruiting branches (FB),
3. the retention of fruit on the first position (FP_1) on the **TOP** five fruiting branches and
4. the number of **Lygus per 50 sweeps** from which the plant information was taken.

The number of fruiting branches provides an estimate of the plant's age. Fruit retention on the top five branches is variable depending on the age of the plant. It is important to know the percent of FP_1 fruit retained on the bottom five FBs because this indicates the value of upper fruit in compensating for early loss. Knowing the percent retention of FP_1 on the top of the plant provides us with an indication of current fruit set. These data help frame our understanding of the overall fruit status of the field and whether the population of Lygus present is actually a threat.

Table 1 and Figure 2 provide the levels of square retention a plant is expected to have based on its age (number of fruiting branches). These data are based on high yielding Acala upland cotton. Additional details and instructions and an on-line calculator is also available at UC IPM Cotton Pest Management Guideline web site, www.ipm.ucdavis.edu/PMG/C114/m114sccalcretn.html.

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The process works like this: cotton fields are scouted weekly for Lygus and square retention and scouted again for Lygus within the same week. The data collected are averaged for sub sections of the fields where Lygus populations were estimated. Using Table 1, locate the row in which the <u>number of fruiting branches</u> you determined for your field. Find the column that represents the <u>bottom</u> retention from your field site and read the number where the row and column intersect. This figure represents the **expected** retention for those conditions. If your estimated top retention is <u>below</u> this number, your crop is not holding the expected level of fruit. If your estimated fruit retention on top <u>is greater</u> than this figure, the plant is exceeding expectations and Lygus should not need to be managed.

For example, use the schematic cotton plant in Figure 1. Count the number of fruiting branches (10), count the bottom retention (4/5 or 80%) and count the number of positions at FP_1 in the top five fruiting branches (3/5 or 60%), and there were 5 Lygus adults per 50 sweeps. The expected retention on top would be 56%. Since we have 60%, the plant is retaining more fruit than it can be expected to mature and therefore the Lygus population is not yet a threat. However, in this scenario, the field should be watched closely.
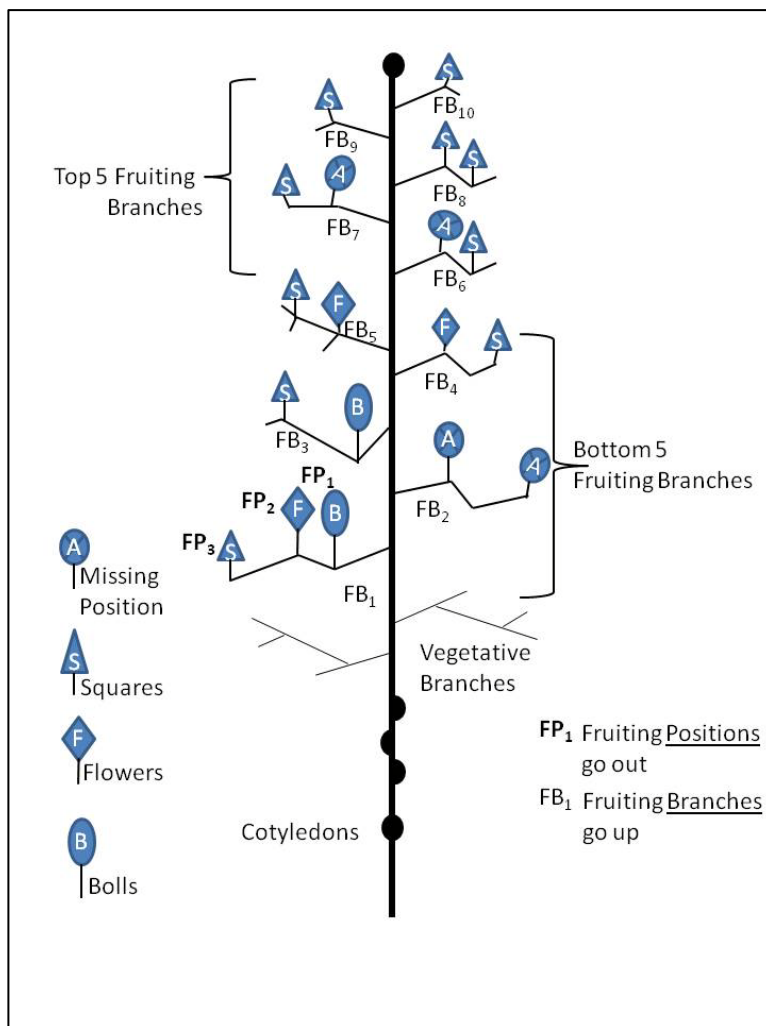
Figure 1. Schematic diagram of cotton plant fruiting structure.

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

Table 1. Expected retention (%) of the first position fruit on the TOP five fruiting branches for Acala upland cotton. Source: UC IPM Cotton Pest Management Guidelines
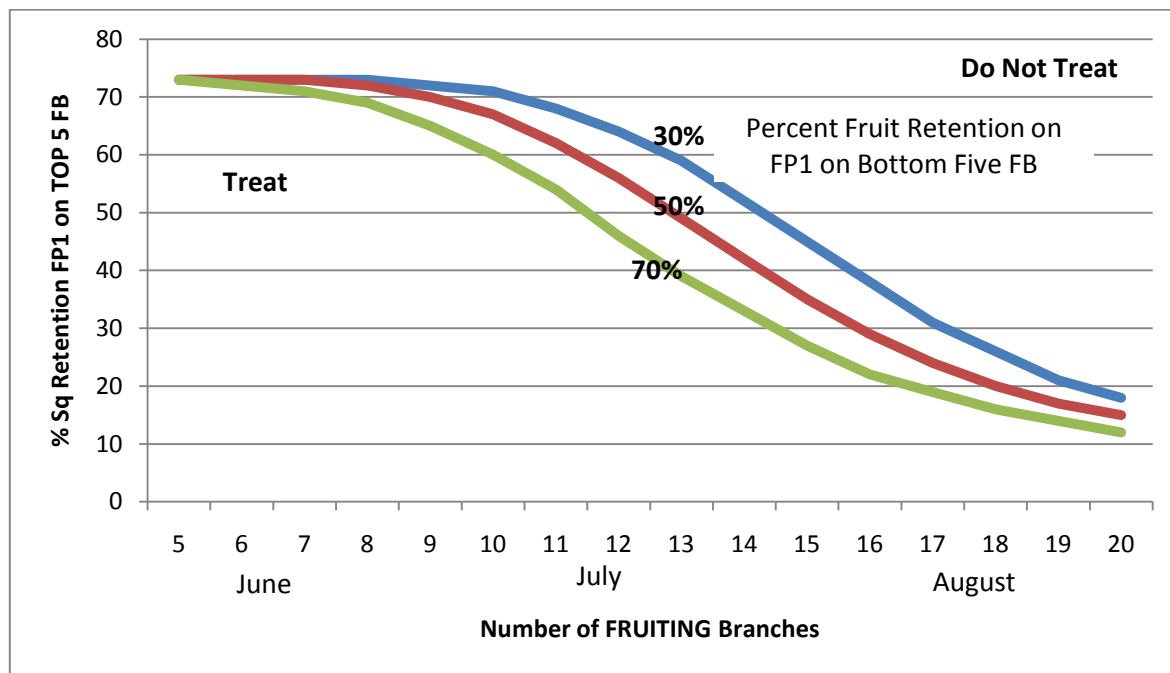
Figure 2 illustrates the same information as Table 1 but displays only three columns of bottom retention, 30%, 50% and & 70%.