Management of Bean Thrips

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Bean thrips are an economic problem for California citrus growers only because adults will overwinter in the navel of navel oranges and may be detected in Australia where they are considered a quarantine pest resulting in the entire load being fumigated with methyl bromide. In addition to the cost and fruit damage from such treatments, Australia has indicated that unless progress is made in reducing finds, more severe penalties may result. It is possible that other countries may eventually consider bean thrips a quarantine risk.

Growers presently deploying sticky cards are doing so with few data regarding what color is best to use, how to deploy cards, and when it is too cold for bean thrips to fly, making monitoring pointless. A nondestructive method of sampling would reduce fruit losses due to cutting and might be more effective and less time consuming. An inexpensive and effective post-harvest treatment would be an ideal solution to this problem. We are told that because of the hassle and uncertainty of complying with the new bean thrips protocol, many packinghouses have decided not to ship navels to Australia. One objective of this project is to suggest refinements to the protocol based on replicated research data, which might make it easier for growers and packinghouses to resume shipments of navel oranges to Australia.

We submitted a grant proposal to the USDA to help support our bean thrips research. We requested a total of $66,929 ($53,188 in direct costs) to supplement funding obtained from the CRB. We were notified of full funding in late May. Thus, CRB will be paying for 27.4% of the research done in 2005-06.

It is difficult to summarize all of our bean thrips research conducted this last year. Mr. Alex Harman recently completed his M.S. thesis research on bean thrips and has prepared a draft paper on the evaluation of different colored sticky traps for monitoring adult bean thrips in the fall (sticky card monitoring is required as part of the Australia export mitigation plan). In trials on asparagus, Alex found that green sticky cards might be better than yellow, white, or blue traps. We need to confirm this finding in citrus trials which have been run late summer / fall 2005 (data analysis from these trials is in progress).

A second chapter of Alex' thesis deals with various alternatives to cutting fruit to sample for bean thrips in the navel of navel oranges. Cutting is obviously destructive to the fruit and as a result, we believe insufficient numbers of fruit are cut to give a good estimate of whether or not a load of citrus is contaminated with bean thrips (in field monitoring we found that typical infestation rates might be very low, usually below 1% and often 0.1% or lower). When cutting only 50 or 100 fruit, a load of citrus might be thought to be free of bean thrips when it is not. We believe the small number of fruit that are cut is one reason why AQIS officials in Australia may find bean thrips when the load is certified to be clean. The solution might be to develop a sampling method that is more precise but it is necessary that this method not take a large amount of time or labor, or be destructive to the fruit.

One of the more significant findings this last year is that bean thrips can be caught on traps not only on the edge of groves but also within the interior of large plantings of citrus. These data come from work done by Rick Dunn (Badger Farming Co., Exeter) and contradict our earlier preliminary findings from a citrus grove in Porterville that had extremely high levels of bean thrips in fruit on the border of a grove because of high nearby populations on tree tobacco. Obviously, there are situations where bean thrips are going to be higher on border rows near a high population source but there must be other

situations where high levels of bean thrips alight on citrus in the interior of groves. More research is needed on this subject.

This last year we ran several studies trying to determine when it becomes too cold for adult bean thrips to fly and be caught on sticky traps. This is important as we believe some growers are waiting until too late in winter to put up traps and are assuming that low or zero trap catch indicates bean thrips are not present. In contrast, we believe zero trap catch at this time of year just means the bean thrips are not flying around and are likely already in the fruit.

We ran three sets of experiments on this subject this year (Riverside Field 7H, Bakersfield with David Haviland's assistance, and research by Rick Dunn near Delano). The Riverside work was not productive in answering the question of temperature impact but did yield very interesting data regarding the number of bean thrips needed to cause various levels of fruit infestation (see Figure 1). We got a very nice start on the project with David Haviland but despite a lot of work, just as the weather turned cold where results might be interesting, a severe storm ruined the cages confining the bean thrips. The data from Delano (Table 1), however, were very interesting. Trap catch dropped off dramatically during the week ending Nov. 22 when the average maximum temperature dropped to 68°F (20.6°C).

Figure 1. Screened cloth tent over a citrus tree used to monitor bean thrips movement into the navel of navel oranges as the weather turned cold. Thrips were released inside the tent (not shown) and levels on a sticky card and in navels monitored.

Table 1. Bean thrips caught on sticky cards late during 2004 near Delano (Rick Dunn, Badger Farming Co., Exeter).

Week ending	Total bean thrips caught	average min (°F)	min range	average max (°F)	max range
Nov. 1	22	46.9	43.8-48.8	86.2	77.8-95.8
Nov. 8	37	50.5	48.2-52.8	86.8	84.8-88.2
Nov. 15	17	47.0	43.8-51.2	86.4	77.8-95.2
Nov. 22	5	47.6	43.2-55.2	69.1	59.8-81.8
Nov. 29	1	41.4	36.2-47.2	64.8	52.8-72.8
Dec. 5	0	36.5	34.2-39.2	67.8	64.2-71.8
Dec. 12	2	41.5	34.8-44.2	64.5	55.2-69.8
Dec. 19	1	42.5	37.2-46.8	61.0	48.8-68.8