

2009 Cotton Pest Management Field Tour — Whitefly, Lygus, & Mite Control Product Performance

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About 35 growers, PCAs, and allied industry representatives were treated to an “elevating” experience touring the 2009 Small Plot Efficacy Trials recently at the Maricopa Agricultural Center. Everyone was loaded onto a cotton trailer flatbed, outfitted with hay bale seating and pulled through a series of experiments encompassing 200 plots (see photos). This birds-eye view gave great insight into not only the efficacy of different control regimes, but also their consequences for IPM.

We reviewed two different trials, one dedicated to exploring experimental and registered product performance against whiteflies, *Bemisia tabaci* (Biotype B), and the other examining products for the control of *Lygus hesperus* and mites (*Tetranychus* spp.). The trial particulars are provided on the accompanying map including the number and timing of experimental treatments, maintenance sprays (those made over the entire test), and other production information.

In general, treatments were made only when pest levels exceeded thresholds. For whiteflies, that's 5 adults per leaf and 1 large nymph per quarter-sized disk on the 5th mainstem leaf below the terminal. For Lygus, we sprayed when there were at least 15 total Lygus and 4 nymphs per 100 sweeps. Mite-targeted products were treated on the Lygus threshold in order to examine any potential Lygus control benefits in addition to efficacy against mites.

Samples were taken weekly, 5 leaves per plot for whitefly densities and 25 sweeps per plot for Lygus densities. Preliminary data are provided in the accompanying datasheets. All products were compared directly to untreated check plots (UTC). Mites were evaluated in both trials, but results showing significant differences for the Lygus test only are shown.

The tour route (see the green line on the maps) highlighted important product comparisons. Whitefly damage was evident by excessive honeydew on leaves and high levels of a whitefly-vectored virus that causes cotton leaf crumple. Lygus damage was easily seen by the height of the plants and the reduced boll loads. Taller plants are indicative of plants that have lost fruiting sites and re-invested their carbohydrates into unproductive stem growth and elongation. Example plants of each type of response were put on display for growers to inspect up close before the tour started. Most impressive, however, was the opportunity to easily see the impact of these technologies on natural enemy populations (mainly predators of pest insects and mites). Normally this is not something that is readily seen while passing through or by plots. However, chemistry that was disruptive to the natural enemy complex consistently lead to secondary outbreaks of pest mites as well as resurgences of whiteflies. Mites cause an array of visible symptoms including reddening and bronzing of leaf surfaces and, when severe, premature defoliation (see photos).

These studies underscore the critical importance of carefully selecting control products that perform as intended, while conserving the natural enemies so important to keeping all pests in check.

Grateful appreciation is extended to the sponsors of these studies including: Arizona Cotton Growers Association, Cotton Incorporated, USDA-Pest Management Alternatives Program, USDA-Risk Avoidance and Mitigation Program, and cooperating agrochemical industries, and to the staff of the Maricopa Agricultural Center for assistance in development of this unique tour.

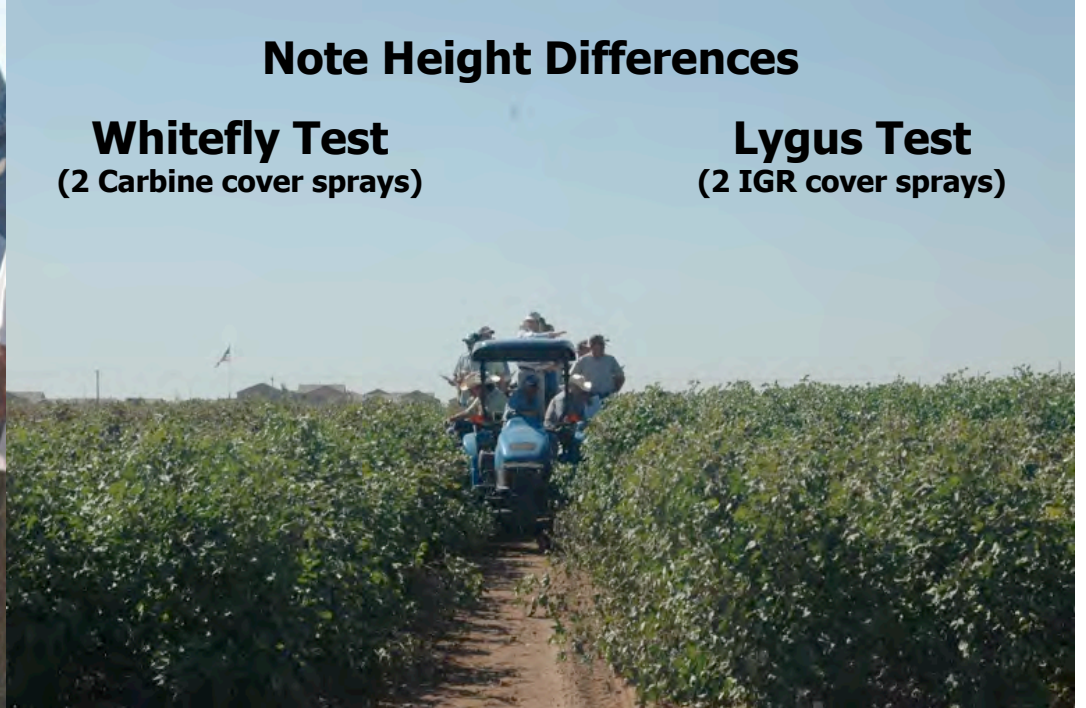
Cotton Pest Management Field Tour



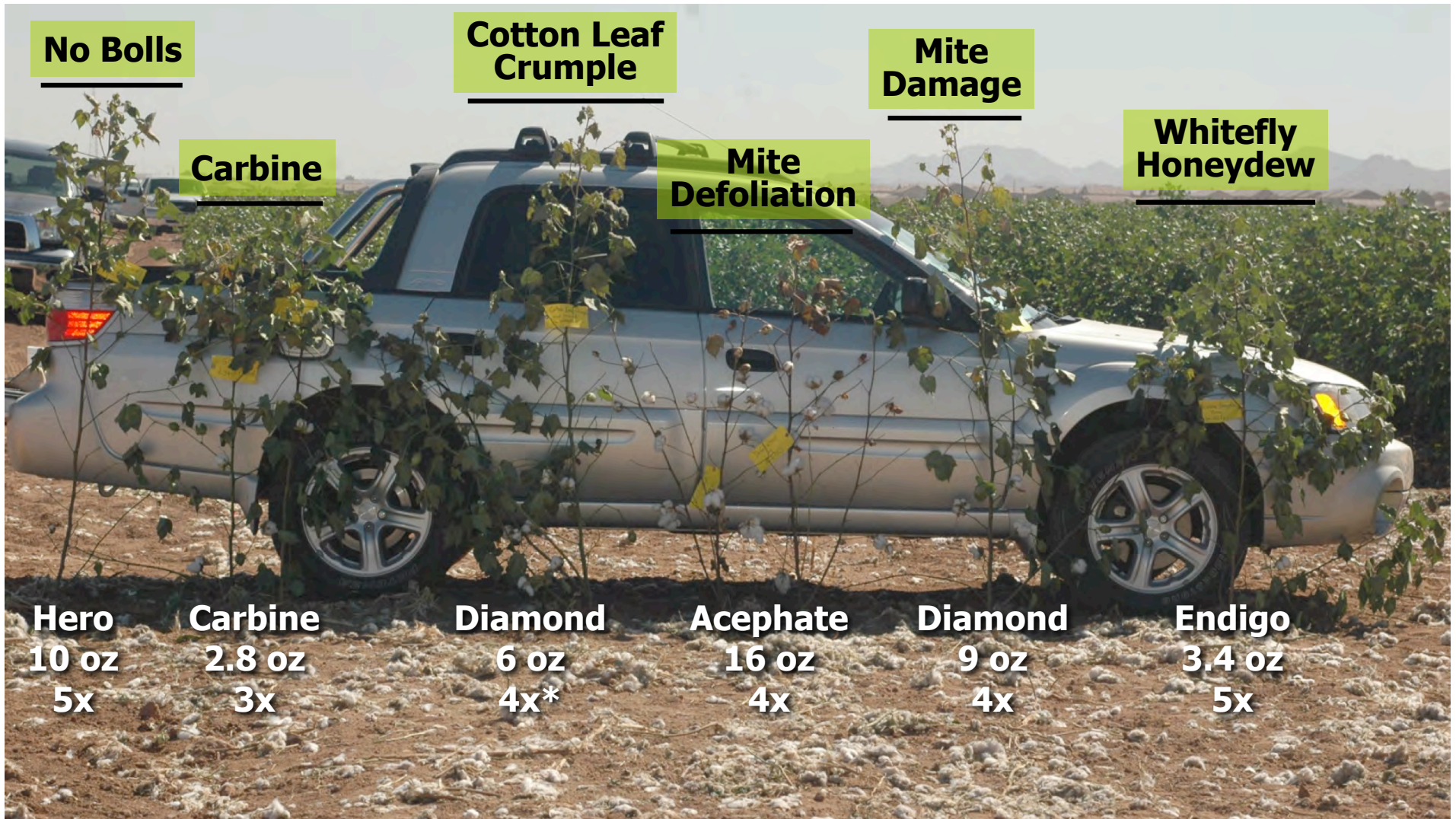
Note Height Differences

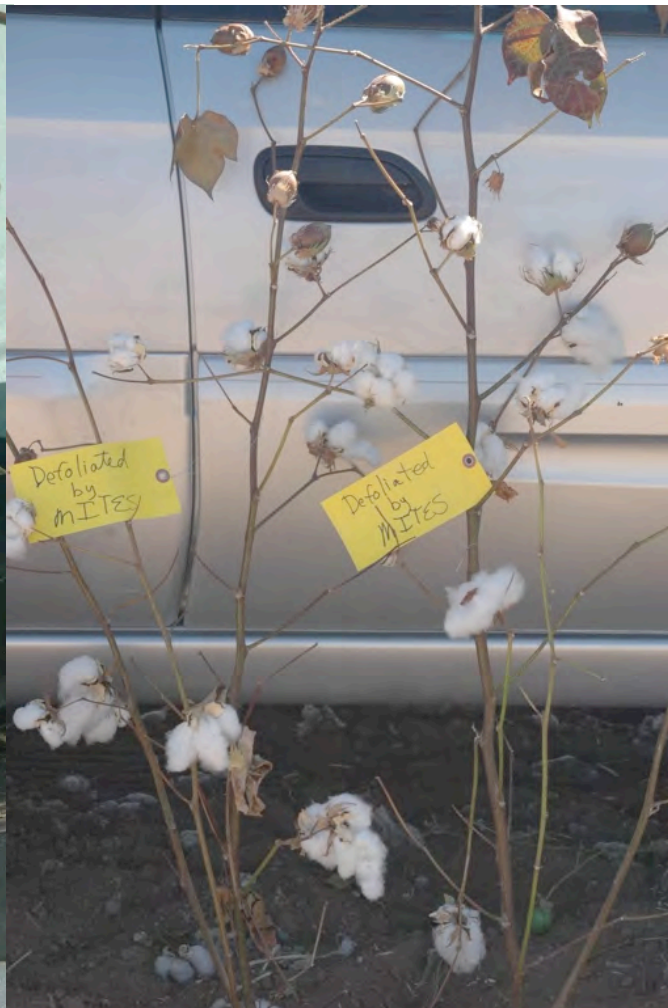
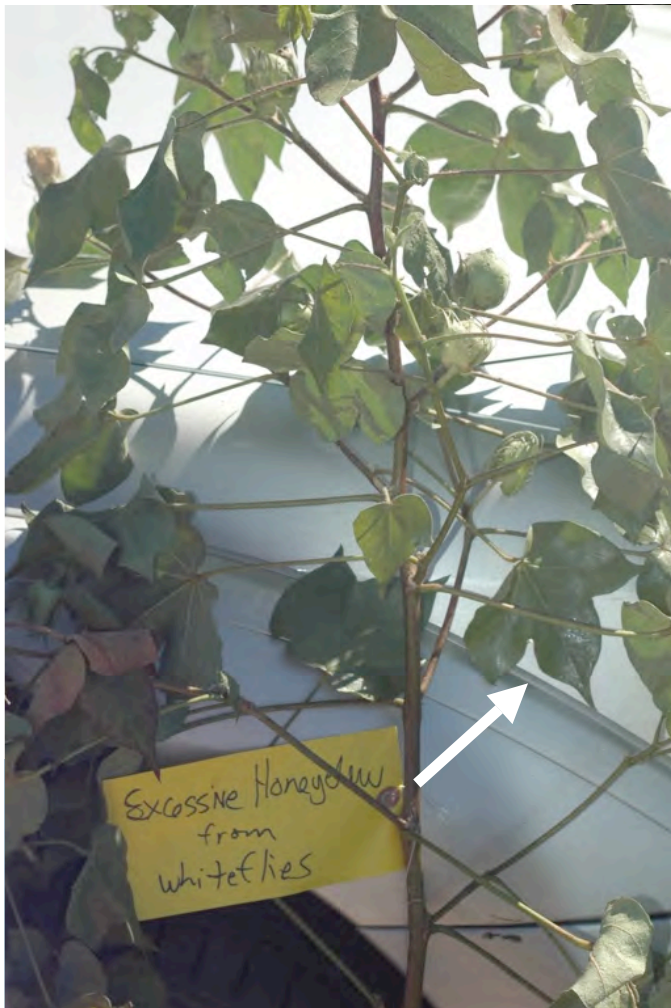
Whitefly Test
(2 Carbine cover sprays)

Lygus Test
(2 IGR cover sprays)



Consequences of Lygus Control Chemical Choices







**Mite
Damage**

2009 F3 Whitefly

Located in Field 3 border 87-95

		<u>Dates</u>		87	88	89	90	91	92	93	94	95	
		7/28	8/4										
<u>Treatments</u>	<u>Sprays</u>	8/12	8/26										
T26 = Intruder*	2	•	•	HGW86 R2 77	NNI0101 78	HGW86+ Intruder 81	CMT560 +UAN 82	HGW86 R3 87	Intruder 88	CMT560 Lo+UAN 93	HGW86 R2- 94	NNI0101 WDG 99	Rep 4
T27 = Oberon*	2	•	•	HGW86 R4 76	NNI0101 Hi 79	JAEXP R1 80	JAEXP R5 83	NAI2302 Med. 86	HGW86 R1 89	NNI0101 Med. 92	NAI2302 Lo 95	JAEXP R2 98	
T28 = Oberon + UAN*	2	•	•	NNI0101 53	NAI2302 Hi 54	NNI0101 Hi 59	UTC 84	JAEXP R3 85	Oberon 90	NAI2302 Hi 91	Oberon + UAN 96	JAEXP R4 97	
T29 = CMT560 Lo + UAN	2	•	•	HGW86 R1 52	CMT560 Lo+UAN 55	JAEXP R3 58	NNI0101 WDG 60	CMT560 +UAN 63	Oberon + UAN 64	Knack fb Courier 69	HGW86 R3 70	JAEXP R2 75	
T30 = CMT560 + UAN	2	•	•	UTC 51	HGW86 R4 56	Oberon 57	JAEXP R1 61	NAI2302 Med. 62	JAEXP R4 65	HGW86 R2- 68	NNI0101 Med. 71	NAI2302 Lo 74	3
T31 = UA-EXP32 R1*	2	•	•	CMT560 +UAN 28	JAEXP R2 29	HGW86 R3 34	NNI0101 Med. 35	HGW86 R2 40	JAEXP R5 66	Intruder 67	HGW86+ Intruder 72	HGW86 R2 73	
T32 = UA-EXP32 R2*	2	•	•	NAI2302 Hi 27	NAI2302 Med. 30	CMT560 Lo+UAN 33	JAEXP R4 36	HGW86 R4 39	HGW86+ Intruder 41	Oberon + UAN 44	JAEXP R1 45	NNI0101 50	2
T33 = UA-EXP32 R3*	2	•	•	Oberon 26	NNI0101 Hi 31	JAEXP R3 32	Knack fb Courier 37	HGW86 R2- 38	NAI2302 Lo 42	JAEXP R5 43	UTC 46	HGW86 R1 49	
T34 = UA-EXP32 R4*	2	•	•	Intruder 3	CMT560 Lo+UAN 4	JAEXP R4 9	HGW86 R2 10	UTC 15	NNI0101 Med. 16	NAI2302 Med. 21	Intruder 47	NNI0101 WDG 48	
T35 = UA-EXP32 R5*	2	•	•	Knack fb Courier 2	HGW86+ Intruder 5	JAEXP R1 8	JAEXP R5 11	NAI2302 Lo 14	HGW86 R1 17	NAI2302 Hi 20	HGW86 R4 22	NNI0101 Hi 25	
T36 = DPX-HGW86 R1**	2	•	•	HGW86 R2- 1	NNI0101 WDG 6	HGW86 R3 7	JAEXP R3 12	CMT560 +UAN 13	JAEXP R2 18	Oberon 19	Oberon + UAN 23	NNI0101 24	1
T37 = DPX-HGW86 R2**	2	•	•										
T38 = DPX-HGW86 R2	2	•	•										
T39 = DPX-HGW86 R3**	2	•	•										
T40 = DPX-HGW86 R4**	2	•	•										
T41 = DPX-HGW86 R2 + Intruder Lo**	2	•	•										
T42 = NNI0101 WDG*	2	•	•										
T43 = NNI0101*	2	•	•										
T44 = NNI0101 Med*	2	•	•										
T45 = NNI0101 Hi*	2	•	•										
T46 = NAI-2302 Lo*	4	•	•										
T47 = NAI-2302 Med*	4	•	•										
T48 = NAI-2302 Hi*	4	•	•										
T49 = Knack fb Courier	2	•	•										
T50 = UTC-WF													

* Induce (0.5%)
** MSO (0.5%)

Maintenance Sprays

7/30 Carbine @ 2.8 oz/A: Lygus
8/4 Pentia @ 10 oz/A: PGR
8/17 Carbine (2.8 oz) + Pentia (10 oz)

Production Information

12 rows by 37 ft plots with 7 ft alleys & 2 row skips between plots.
Planted on 5/26/09 & watered up on 5/27/09 with DP161B2RF.

Trt	Product	Date ==>		8/3		8/10		8/17		8/24		8/31		9/8		9/14	
		20-Jul	27-Jul	A/leaf	L/disk	A/leaf	L/disk	A/leaf	L/disk	A/leaf	L/disk	A/leaf	L/disk	A/leaf	L/disk	A/leaf	L/disk
26	Intruder*			1.8	0.1	6.9	0.1	5.2	0.5	2.5	1.7	3.0	1.7	0.6	0.1	1.3	0.3
27	Oberon*			3.8	0.1	7.7	0.7	20.1	0.6	12.9	3.6	5.6	1.4	5.9	0.3	5.0	0.3
28	Oberon* + UAN			5.5	0.0	5.7	1.7	10.4	0.0	12.6	3.7	6.2	2.0	4.0	0.3	5.6	0.2
29	CMT560 Lo + UAN 32%			2.3	0.0	3.7	0.3	6.1	0.1	4.9	1.7	4.0	1.0	2.4	0.4	2.6	0.3
30	CMT560 + UAN 32%			1.7	0.0	2.1	0.1	3.9	0.0	3.3	1.1	1.7	0.3	4.7	0.3	3.4	0.1
31	UA-EXP32 R1*			5.6	1.5	31.1	1.6	64.4	2.1	19.2	8.7	46.4	11.8	14.5	2.3	3.9	4.2
32	UA-EXP32 R2*			5.1	2.3	23.1	1.5	24.4	1.4	18.7	5.4	28.4	10.5	13.4	3.9	7.3	4.1
33	UA-EXP32 R3*			3.4	0.1	15.7	0.4	12.0	0.7	13.0	5.6	32.2	8.2	14.4	1.8	3.8	1.5
34	UA-EXP32 R4*			4.5	0.6	29.3	2.5	22.2	2.2	35.1	10.1	31.0	6.6	10.7	1.2	7.0	4.4
35	UA-EXP32 R5*			4.8	1.2	10.7	0.5	26.1	0.6	16.7	8.2	27.2	7.0	6.4	1.2	5.8	2.0
36	HGW86 R1**			2.6	0.1	14.5	0.7	11.6	0.4	7.3	4.2	4.4	2.6	1.9	0.1	2.9	0.5
37	HGW86 R2**			4.6	0.0	7.2	0.6	20.5	0.9	9.2	3.8	5.7	3.4	1.0	0.1	3.9	0.9
38	HGW86 R2		Precounts	4.2	0.3	29.0	1.6	18.4	2.8	13.0	9.1	18.1	11.0	3.0	0.3	3.8	1.6
39	HGW86 R3**	3 \ 0.7	7.7\2.0	3.2	0.5	7.0	0.2	12.8	0.7	10.5	4.9	10.1	2.9	2.9	0.5	2.9	1.0
40	HGW86 R4**			1.9	0.0	6.1	0.6	9.6	0.2	5.9	3.2	3.9	2.5	0.8	0.2	1.8	0.1
41	HGW86 R2 + Intruder**			1.4	0.0	6.9	0.1	9.8	0.4	5.5	1.8	3.9	2.7	1.2	0.1	2.0	0.2
42	NNI0101 WDG*			1.3	1.0	7.7	2.1	7.6	0.5	8.6	12.0	3.9	7.6	5.6	2.6	3.6	1.7
43	NNI0101*			2.4	1.2	10.5	0.4	9.6	0.3	7.1	6.3	8.0	4.7	5.0	1.7	4.0	1.3
44	NNI0101 Med.*			1.2	0.7	7.1	0.5	12.3	0.2	8.7	5.8	19.1	5.0	9.6	2.0	4.5	0.8
45	NNI0101 Hi*			0.8	0.4	4.1	0.5	5.5	0.0	7.4	4.4	2.9	4.4	3.5	0.1	3.5	0.4
46	NAI2302 Lo*			7.5	2.9	20.7	1.6	30.7	0.9	33.1	15.2	68.6	12.9	13.5	5.5	7.4	12.1
47	NAI2302 Med.*			7.2	1.8	17.3	1.2	37.4	0.7	31.0	15.6	117	15.1	15.8	1.8	10.1	11.3
48	NAI2302 Hi*			8	1.3	25.6	0.8	25.9	1.8	18.8	12.4	70.4	11.2	14.1	0.5	14.1	5.4
49†	Knack fb Courier†			9.4	1.9	9.5	1.1	11.8	0.5	9.5	5.5	14.1	4.9	3.5	2.6	6.0	2.8
50	UTC-WF			6.9	0.6	38.4	1.8	41.9	1.4	27.7	20.1	75.6	15.1	10.5	3.8	5.9	4.1

* + Induce at 0.5% (v/v)

** + MSO at 0.5% (v/v)

& acidified < 4 pH

† 3 replicates only,

excluded from analyses

= significantly lower than the UTC

= significantly higher than the UTC

All analyses based on raw data (no hairiness covariate)

Threshold: 3–5 adults per leaf +

1 large nymph per disk

2009 F3 Lygus

Located in Field 3 border 96-105

		96 97 98 99 100 101 102 103 104 105																				
		Dates																				
Treatments	Sprays	7/14	7/29	8/7	8/13	8/18	8/25															
T1 = Rotation: Carbine fb Vydate fb Orthene	3	•	•	•				Diamond Med. 177	UTC 178	UAEXP R3 182	AgriFlex 183	Carbine Lo 187	UAEXP R2 188	Diamond Lo 192	UAEXP R5 193	Leverage 360 Lo 197	C-V-O rotation 198					
T2 = Orthene 97	4							AgriMek 176	Oberon 179	BAS320 181	UAEXP R1 184	Diamond +Carbine 186	Leverage 360 Hi 189	Carbine 191	Belay Hi 194	Orthene 196	Diamond Hi 199					
T3 = BAS320**	3	•	•	•				Endigo 175	Diamond Lo 152	Hero 180	C-V-O rotation 157	Belay Med. 185	UAEXP R2 162	Belay+ Orthene 190	Diamond +Carbine 167	UAEXP R4 195	Hero 172					
T4 = Carbine	3	•	•	•				Orthene 151	UTC 153	Leverage 360 Hi 156	Diamond Hi 158	Oberon 161	Carbine Lo 163	AgriMek 166	Carbine 168	UAEXP R3 171	UAEXP R4 173					
T5 = Carbine Lo* (1.7 oz)	3	•	•	•				Leverage 360 Lo 150	UAEXP R5 154	BAS320 155	Belay Hi 159	Diamond Med. 160	Belay+ Orthene 164	Belay Med. 165	Endigo 169	AgriFlex 170	UAEXP R1 174					
T6 = Belay Med (4.5 oz)	3	•	•	•				Diamond +Carbine 127	Belay Med. 128	Orthene 132	Hero 133	UAEXP R4 137	AgriMek 138	UAEXP R2 142	Leverage 360 Hi 143	BAS320 147	UAEXP R5 148					
T7 = Belay Hi (6.0 oz)	3	•	•	•				Oberon 126	AgriFlex 129	UAEXP R1 131	Leverage 360 Lo 134	Diamond Hi 136	Endigo 139	Diamond Lo 141	Belay Hi 144	Carbine 146	UAEXP R3 149					
T8 = Belay Lo (3.0 oz) + Orthene Lo (8.2 oz)	3	•	•	•				Diamond Med. 125	UAEXP R1 102	Belay+ Orthene 130	Carbine 107	UTC 135	AgriFlex 112	C-V-O rotation 140	Leverage 360 Hi 117	Carbine Lo 145	Diamond Lo 122					
T9 = Leverage 360 Lo* (2.9 oz)	5	•	•	•	•	•		Carbine Lo 101	Hero 103	UTC 106	Orthene 108	Oberon 111	Leverage 360 Lo 113	UAEXP R4 116	BAS320 118	AgriMek 121	Belay Hi 123					
T10 = Leverage 360 Hi* (3.2 oz)	5	•	•	•	•	•		Belay Med. 100	UAEXP R3 104	C-V-O rotation 105	UAEXP R5 109	Diamond Med. 110	Diamond Hi 114	UAEXP R2 115	Belay+ Orthene 119	Endigo 120	Diamond +Carbine 124					
T11 = Endigo* (3.4 oz)	5	•	•	•	•	•																
T12 = Hero (10.3 oz)	5	•	•	•	•	•																
T13 = Diamond Lo* (6.0 oz)	4†	•	•	•	•	•																
T14 = Diamond Med* (9.0 oz)	4†	•	•	•	•	•																
T15 = Diamond Hi* (12.0 oz)	4†	•	•	•	•	•																
T16 = Diamond Lo (6.0 oz) + Carbine Lo* (1.7 oz)	4†	•	•	•	•	•																
T17 = UA-EXP32 R1*	3	•	•	•																		
T18 = UA-EXP32 R2*	3	•	•	•																		
T19 = UA-EXP32 R3*	3	•	•	•																		
T20 = UA-EXP32 R4*	3	•	•	•																		
T21 = UA-EXP32 R5*	3	•	•	•																		
T22 = Oberon* (16 oz)	4††	•	•	•	•	•																
T23 = Agrimek* (1.7 oz)	4††	•	•	•	•	•																
T24 = Agri-Flex* (4.7 oz)	4††	•	•	•	•	•																
T25 = UTC-Lygus																						

* Induce (0.5%)
 ** Penetrator Plus (0.5%)
 † 1st spray made 2-weeks prior to threshold
 †† Plus 1 Carbine spray (last)

Maintenance Sprays

7/21 Knack @ 8 oz/A: whiteflies
 8/17 Courier @ 12.4 oz/A: whiteflies

Production Information

12 rows by 40 ft plots with 7 ft alleys & 2 row skips between plots.
 Planted on 5/26/09 & watered up on 5/27/09 with DP161B2RF.



Trt Product	Date ==>			8/4		8/12		8/17		8/24		9/8		Mites (0-9)	
	10-Jul TN	20-Jul TN	28-Jul TN	T/100	N/100	T/100	N/100	T/100	N/100	T/100	N/100	T/100	N/100	5-Sep	Your Rating?
1 Reduced-risk rotation Carbine fb Vydate C-LV fb acephate				11	1.5	37	11	22	3	47	13	20	5	2.5	
2 Orthene 97				10.5	1	37	6	39	12	40	10	20	5	6.25	
3 BAS320001**				18	7	57	27	66	31	91	54	48	31	1.5	
4 Carbine				11	4.5	33	3	25	5	40	9	14	5	2	
5 Carbine Lo*				24.5	12	61	22	21	1	47	15	11	4	1.25	
6 Belay Med.				13	5.5	53	6	17	5	48	19	14	5	3.5	
7 Belay Hi				17.5	9.5	51	8	27	6	47	26	20	7	2	
8 Belay Lo + Orthene 97				16.5	4	40	8	31	10	67	22	30	12	4.5	
9 Leverage360 Lo*				60.5	37	95	32	47	14	46	18	76	53	6.5	
10 Leverage360 Hi*				71	50	102	31	63	20	68	27	89	74	4.25	
11 Endigo*				80.5	57	106	44	91	44	71	23	78	54	4.25	
12 Hero				59	42	55	20	46	18	69	22	102	70	1.25	
13 Diamond Lo*	2.4\0.4	15.2\0.4	33\21	23.5	11	60	24	62	20	61	30	36	26	2	
14 Diamond Med*				19	7.5	46	15	44	7	52	17	38	27	2.5	
15 Diamond Hi*				16	5.5	56	24	57	10	50	20	39	24	3.5	
16 Diamond Lo + Carbine Lo*				16.5	7	39	13	35	3	29	5	30	22	3.5	
17 UA-EXP32 R1*				12	4	83	22	38	8	63	26	31	21	1.5	
18 UA-EXP32 R2*				11.5	1	41	5	25	5	92	50	37	14	2	
19 UA-EXP32 R3*				14	6.5	40	8	23	4	38	16	23	13	1	
20 UA-EXP32 R4*				10	0.5	44	8	27	5	41	17	23	13	1.5	
21 UA-EXP32 R5*				7	2.5	30	5	21	8	37	15	17	10	1.5	
22 Oberon*††				83.5	53	102	39	64	29	66	32	17	3	0.25	
23 Agrimek*††				29	21	88	25	72	26	75	39	16	3	0.25	
24 Agri-Flex*††				77	46	95	39	94	50	66	23	27	9	0	
25 UTC-Lygus				91	64	126	41	69	24	76	29	65	37	0.5	

* + Induce at 0.5% (v/v)

** + Penetrator Plus at 0.5% (v/v)

† 1st spray made 2-weeks prior to threshold

†† Plus 1 Carbine spray (last)

☐ = significantly lower than the UTC

☐ = significantly higher than the UTC

Threshold: 15 Total Lygus with 4 nymphs / 100 sweeps

☐ = significantly higher than Oberon