(C7)

BLUEBERRY: Vaccinium corymbosum L.

CITRUS THRIPS CONTROL IN SOUTHERN HIGHBUSH BLUEBERRIES IN CALIFORNIA, 2006

David R. Haviland
University of California Cooperative Extension, Kern County
1031 South Mount Vernon Ave.
Bakersfield, CA 93907
Phone: (661) 868-6215
Fax: (661) 868-6208
E-mail: dhaviland@ucdavis.edu

Citrus thrips: *Scirtothrips citri* (Moulton)

Citrus thrips have recently become a significant pest of blueberries in the San Joaquin Valley of California; feeding by the thrips stunts plant growth, which can negatively impact the crop during the following spring. This trial was conducted just north of Delano, Kern Co., CA to evaluate the effectiveness of insecticides against the thrips.

A 4.8 acre portion of a mature blueberry field was divided into 56 plots, each 4 rows (44 ft) by 86 ft long. Each contained two rows (rows 1 and 3) planted to the variety 'Misty'. The other two rows (2 and 4) were planted to either the variety 'Georgia' or the variety 'O'Neal'. Blueberry bushes of all varieties were approximately 4 to 5 ft in height. Plots were organized into a RCBD with 4 blocks of 13 treatments and an untreated check. Treatments were applied at 100 gpa on 31 Jul 2006 using a commercial, wrap-around sprayer capable of treating two rows at a time. Nozzles on each boom were directed towards the blueberry canopy and penetration was facilitated by fans on each boom.

The effects of insecticide treatments were evaluated using beat samples from the center two rows of each plot. Samples were taken by beating an un-branched 6-in liter of new flush onto a black, 12-in by 12-in, piece of acrylic, and then counting the thrips. Ten beat samples were taken from row 3 ('Misty') on all evaluation dates and from row 2 ('Georgia' in blocks 1 and 2 and 'O'Neal' in block 4) on all dates except for the pre-counts. Data from block 3 were omitted from evaluations since half the plots contained 'Georgia' and half contained 'O'Neal'. Evaluation dates were 28 Jul (pre-counts), 4 Aug (4 DAT), 8 Aug (8 DAT), 11 Aug (11 DAT), 14 Aug (14 DAT), 18 Aug (18 DAT), 21 Aug (21 DAT) and 25 Aug (25 DAT). Data were analyzed by ANOVA using transformed data (square root $(x + 0.5)$) with means separated by Fisher's Protected LSD at $P > 0.05$.

Table 1 shows the effects of treatments on the density of citrus thrips in the variety 'Misty'. There were no significant differences in pre-counts which ranged from 23.8 to 36.8 thrips per beat sample. By 4 DAT all treatments with the exception of Diazinon, DPX, and Novaluron resulted in reductions in thrips density. Reductions to less than 10 thrips per beat sample were achieved by Agrimek, Assail, Carzol, Radiant, and Success. By 8 DAT through the final evaluations 25 DAT, these five products, with the addition of Novaluron, consistently had the lowest thrips densities. Carzol provided the best control, followed by Radiant and Success (both spinosyn products). Assail performed similar to Success, and resulted in statistically lower thrips densities than the other neonicotinoids in the trial (Actara and Venom). Agri-Mek and Novaluron also worked well, with Agri-Mek performing well through 14 DAT and then starting to break down while Novaluron (a growth regulator) performed poorly for a week and then suppressed thrips from 11 DAT through 25 DAT. Lannate, Danitol, Actara, and Venom resulted in moderate reductions through about 11 DAT while Diazinon, Surround, and DPX-E2Y45 were not effective against the thrips.

Table 2 shows the effects of insecticide treatments on the density of citrus thrips in the varieties 'Georgia' and 'O'Neal'. Despite overall lower thrips densities compared to 'Misty', the general trends in efficacy of the products was nearly identical to those previously described.

Table 1

Treatment/ Formulation	Rate amt product per acre or v/v	Mean number of citrus thrips per beat sample in the variety 'Misty'							
		Pre	DAT 4	DAT 8	DAT 11	DAT 14	DAT 18	DAT 21	DAT 25
Carzol 90SP	1 lb	30.0a	1.5a	1.2a	1.2a	1.1a	0.8a	1.8a	2.6a
Radiant SC	6 fl oz	33.0a	9.2bc	0.8a	0.9a	3.5ab	5.2b	8.2b	8.4b
Success 2SC	6 fl oz	31.3a	9.3bc	0.7a	2.3ab	8.2bc	10.4bc	10.2bc	16.4cd
Assail 30SG	6 oz	31.1a	5.0ab	3.1ab	5.3bc	5.8bc	8.4b	10.6bcd	12.8bc
Agri-Mek 0.15EC + oil	15 fl oz + 1%v/v	31.3a	4.5ab	5.2b	8.7cde	9.1c	17.2def	14.6cde	23.2de
Novaluron 0.83EC	12 fl oz	34.1a	30.5def	20.4cd	8.4cd	7.8bc	10.5bcd	7.6b	12.5bc
Lannate 90SP	1 lb	35.4a	10.4bc	14.2c	14.4ef	22.9de	22.6efg	20.4ef	24.8ef
Danitol 2.4EC	16 fl oz	36.8a	17.5cd	16.5cd	13.5def	20.2d	16.3cde	17.2de	21.6de
Actara 25WG	4 oz	23.8a	21.4de	23.2d	23.8gh	31.1efg	36.0h	28.1fg	33.5fg
Venom 70SG	3 oz	32.4a	22.3de	18.5cd	19.0fg	27.0def	30.0gh	39.0g	28.6efg
Diazinon 50WP	2 lb	34.8a	32.6efg	38.9e	27.1hi	35.3fg	35.1h	29.3fg	36.3g
Surround WP	25 lb	34.8a	25.4de	21.0cd	28.3hi	34.8fg	26.6fgh	37.1g	26.5efg
DPX-E2Y45	4 oz	29.7a	49.6g	41.4e	36.0i	41.0g	37.7h	31.9g	33.2fg
Untreated check		31.3a	46.9fg	42.5e	32.9i	32.1efg	27.6gh	38.1g	26.1ef
F		0.53	13.16	30.58	33.18	23.84	16.90	21.08	14.59
P		0.89	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001

Means in a column followed by the same letter are not significantly different ($P > 0.5$, Fisher's protected LSD) after square root (x + 0.5) transformation of the data. Untransformed means are shown.

Table 2

Treatment/ Formulation	Rate amt product per acre or v/v	Mean number of citrus thrips per beat sample in the varieties 'Georgia' and 'O-Neal'						
		DAT 4	DAT 8	DAT 11	DAT 14	DAT 18	DAT 21	DAT 25
Carzol 90SP	1 lb	2.5a	0.7a	1.0a	0.9a	0.5a	3.7a	2.2a
Radiant SC	6 fl oz	5.8a	0.5a	3.3ab	2.1ab	1.3ab	6.5a	5.6ab
Success 2SC	6 fl oz	7.0a	3.4abcd	7.5bc	8.8cde	6.0cde	8.8a	15.3defg
Assail 30SG	6 oz	3.2a	1.5ab	3.5abc	2.5abc	5.4bcd	5.3a	11.1bcdef
Agri-Mek 0.15EC + oil	15 fl oz + 1%v/v	1.6a	2.5abc	3.7abc	2.9abcd	5.5cde	9.3a	9.3bcde
Novaluron 0.83EC	12 fl oz	9.3a	6.2cde	4.5abc	2.8abc	2.0abc	6.3a	6.2abc
Lannate 90SP	1 lb	7.7a	9.4def	7.0bc	8.8de	8.4de	18.4a	15.2defg
Danitol 2.4EC	16 fl oz	4.4a	5.4bcde	9.0bcd	6.2bcde	6.6cde	12.7a	16.9defg
Actara 25WG	4 oz	6.4a	7.8cde	11.9cde	6.8bcde	11.2de	10.7a	23.0g
Venom 70SG	3 oz	4.8a	6.3cde	8.7bcd	9.1e	9.2de	13.5a	17.5efg
Diazinon 50WP	2 lb	6.5a	11.3efg	20.5ef	11.6ef	12.2e	16.7a	9.9bcde
Surround WP	25 lb	8.5a	6.1cde	16.5def	13.1ef	9.0de	10.2a	9.1bcd
DPX-E2Y45	4 oz	12.8a	15.5fg	23.1f	20.1f	10.4de	14.2a	20.3fg
Untreated check		16.2a	18.9g	24.1f	11.4ef	13.5de	16.5a	15.0cdefg
F		1.90	6.69	6.61	4.99	4.01	1.55	4.68
P		0.0787	< 0.0001	< 0.0001	0.0002	0.0013	0.1642	0.0004

Means in a column followed by the same letter are not significantly different ($P > 0.5$, Fisher's protected LSD) after square root (x + 0.5) transformation of the data. Untransformed means are shown.