Arthropod Management Tests, 45(1), 2020, 1–2
doi: 10.1093/amt/tsaa046
Section C: Small Fruits

Insecticide Efficacy for Chilli Thrips Management in Strawberry, 2019

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Section Editor: John Wise

Chilli Thrips | Scirtothrips dorsalis Hood

Hosts: Strawberry | Fragaria spp.

Chilli thrips, *Scirtothrips dorsalis* Hood (Thysanoptera: Thripidae), are invasive economically damaging pests of strawberry in Florida. Several insecticides were compared for efficacy in the field for management of this pest in 2019 in the Gulf Coast Research and Education Center, University of Florida, Wimauma (Hillsborough County).

Bare-root short-day strawberry cultivar, 'Brilliance', was planted on 8 Oct 2019 in 32-ft-long strawberry plots with 10 ft buffer in a randomized complete block design. There were 50 plants per plot planted at 12-inch plant spacing. Five treatments and one untreated check were replicated four times in this study. Experimental plot maintenance involved the application of DiPel DF (2 lb/acre) for armyworm, *Spodoptera* spp. (Lepidoptera: Noctuidae) on a weekly basis from 18 Oct to 20 Dec, which was applied separately from treatments. All experimental products were tank mixed with a surfactant, Induce, at the rate of 0.25% (v/v). The application was done with the help of a backpack sprayer calibrated to 50 gallons per acre (GPA) and the applier used a metronome to calibrate their pace during insecticide application.

The pretreatment sampling was conducted on 3 Dec 2019. Insecticide treatments were applied on 4 Dec 2019 thereafter. Posttreatment sampling was conducted on 10, 18, and 24 Dec. Since chilli thrips prefer feeding on young foliage, young strawberry leaflets and flowers were collected from six random plants per plot in sealed bags and washed in 70% ethanol for counting of nymphs and adults on each sampling date. Each plot was assigned a damage rating on each sampling date. Fruits were also harvested on each sampling date followed by grading of fruits into marketable and damaged fruit and weighed.

Generalized linear-mixed model was used to model the effects of treatments on insect count, plant damage rating, and marketable yield (SAS 9.4, SAS Institute Inc. 2018). Data were fitted to Poisson distribution and normality of residuals were confirmed with diagnostic plots/student panels. Separation of means was done using the Tukey HSD test ($\alpha \leq 0.05$).

The pretreatment values of all the variables did not differ among treatments. The effect of treatments was evident on chilli thrips adults and nymphs on leaflets at 14 and 20 DAT, on nymphs on flowers at 6 DAT (Tables 1 and 2), and on seasonal mean of marketable yield (Table 3). Season end plant damage rating was not affected by insecticide treatments. Radiant significantly reduced chilli thrips adults and nymphs on leaflets at 20 DAT, and nymphs on flowers at 6 DAT compared to untreated check. Low rate of Exirel showed significant suppression of chilli thrips nymphs on leaflets at 14 DAT and high rate of Exirel significantly reduced both adults and nymphs on leaflets at 20 DAT. At 20 DAT, all insecticide treatments except Exirel at low rate, suppressed adults on leaflets compared to untreated check. Radiant had significantly high marketable yield compared to all other treatments. Results indicate that Radiant showed promising control of both adults and nymphs with significantly high marketable yield. After Radiant, Exirel at high rate showed promising control of both adults and nymphs. Therefore, Exirel can be rotated in spray program to reduce the selection pressure on insect pests. No phytotoxicity was observed.[1]

[1] This work was supported in part by the USDA National Institute of Food and Agriculture Hatch Project No. FLA-GCR-005888 and industry sponsors.

Table 1. Chilli thrips adult and nymph count per strawberry leaflet

Treatment[a]	Rate/acre	Pretreatment		6 DAT		14 DAT		20 DAT	
		Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs
Untreated Check	–	0.00	0.25	1.08	5.44	2.75a	10.90a	2.66a	15.39a
Apta	27 fl oz	0.13	1.25	1.73	2.64	0.25a	4.80ab	0.62b	10.25a
Exirel low	16 fl oz	0.00	0.50	1.13	2.25	0.25a	1.13b	2.38a	18.68a
Exirel high	20.5 fl oz	0.00	0.25	0.70	7.92	0.00a	4.65ab	0.63b	6.94b
Minecto Pro	10 fl oz	0.13	0.50	0.49	8.08	0.50a	6.18ab	0.42b	9.17a
Radiant	10 fl oz	0.00	0.00	0.24	1.80	0.00a	1.85ab	0.43b	0.49b
$F_{df1=5, df2=15}$		1.37	0.75	0.77	1.83	2.91	3.81	3.73	4.53
P		0.2896	0.5971	0.5856	0.1675	0.0495	0.0199	0.0216	0.0102

Means with the same letter in the columns are not significantly different (Tukey's HSD, $P > 0.05$).
[a]The surfactant Induce was included with all treatments at the rate of 0.25 % (v/v). df1 = num DF, df2 = den DF.

Table 2. Chilli thrips adult and nymph count per strawberry flower

Treatment[a]	Rate/acre	Pre-treatment		6 DAT		14 DAT		20 DAT	
		Adults	Nymphs	Adults	Nymphs	Adults	Nymphs	Adults	Nymphs
Untreated Check	–	0.08	0.23	16.81	16.99a	0.24	0.58	0.71	3.57
Apta	27 fl oz	0.00	0.11	5.84	12.50ab	0.74	1.50	0.69	4.77
Exirel low	16 fl oz	0.25	0.46	7.29	6.50ab	0.24	0.00	0.32	0.64
Exirel high	20.5 fl oz	0.00	0.11	15.91	10.50ab	1.09	1.00	1.19	1.85
Minecto Pro	10 fl oz	0.39	0.98	9.00	5.75ab	0.24	0.00	0.76	1.85
Radiant	10 fl oz	0.00	0.33	11.01	4.25b	0.47	0.25	0.24	1.19
$F_{df1=5, df2=15}$		0.27	1.84	0.65	3.97	0.86	1.09	0.39	1.07
P		0.8473	0.1934	0.6672	0.0171	0.5305	0.4057	0.8447	0.4201

Means with the same letter in the columns are not significantly different (Tukey's HSD, $P > 0.05$).
[a]The surfactant Induce was included with all treatments at the rate of 0.25 % (v/v). df1 = num DF, df2 = den DF.

Table 3. Plant damage rating (Dmg.) and marketable fruit yield (yield in grams)

Treatment[a]	Rate/acre	Seasonal	
		Dmg.[b]	Yield
Untreated Check	–	2.07	18.44b
Apta	27 fl oz	1.75	67.97b
Exirel low	16 fl oz	2.13	53.53b
Exirel high	20.5 fl oz	1.75	36.34b
Minecto Pro	10 fl oz	1.75	48.37b
Radiant	10 fl oz	1.33	136.47a
$F_{df1=5, df2=15}$		1.69	7.95
P		0.1976	0.0008

Means with the same letter in the columns are not significantly different (Tukey's HSD, $P > 0.05$).
[a]The surfactant Induce was included with all treatments at the rate of 0.25 % (v/v).
[b]Season end plant damage rating.