

PEAR: *Pyrus communis* L., 'Bartlett', 'd'Anjou'**Chemical Control of Pear Psylla in Pear, 2018B****Robert Orpet,¹ Louis Nottingham,[⊙] Bruce M. Greenfield, and Elizabeth H. Beers**Washington State University, Tree Fruit Research and Extension Center, 1100 N Western Ave, Wenatchee, WA 98801, Phone: 509-663-8181 (robert.orpet@wsu.edu; louis.nottingham@wsu.edu; mcclaren@wsu.edu; ebeers@wsu.edu) and¹Corresponding author, e-mail: robert.orpet@wsu.edu

Subject Editor: John Wise

Pear | *Pyrus communis*Pear psylla (PP) | *Cacopsylla pyricola* (Förster)

The objective of this study was to assess efficacy of certified organic insecticides compared with a conventional insecticide program for control of PP in pear. This study was conducted within a 2-acre mixed-planting block of 'Bartlett' and 'd'Anjou' planted in 2007 at the Washington State University Sunrise orchard near Rock Island, WA. The block was maintained to commercial standards by weed, disease, and nutrient sprays, pruning, and under-tree sprinkler irrigation. The first spray for this study occurred at petal fall on 2 May 2018. There were five treatment types (including an untreated check) with 2 'Bartlett' and 2 'd'Anjou' replications each (four total replications) organized in an RCB design. All sprays were applied using an airblast sprayer (Pak-Blast, OVS McMinnville, OR) at 100 gpa. Plots consisted of four consecutive trees in the same row. Insect sampling was conducted on the two center trees of plots. PP eggs and nymphs were counted weekly from 29 May to 13 Jun by collecting 40 leaves per plot and brushing them in the lab with a leaf-brushing machine onto a revolving glass pate with undiluted dishwashing liquid. Each composite sample from 40 leaves was counted under a stereoscope. Adult PP were sampled with a beating tray in the field using four taps per replicate, each 'tap' referring to three strikes with a hard rubber hose on a branch, dislodging insects onto a 45 × 45 cm tray. The average number of PP adults counted on trays per replicate (four taps) was used for analysis. Data were analyzed in SAS 9.4. Response variables were PP eggs, early instars (first–third), and late instars (fourth and fifth) per leaf from leaf brushing, and adults per tap from beat trays. Mean response variables were compared

within each sample date and for season-long averages (calculated for each replication by averaging across dates, omitting pretreatment counts) using generalized linear mixed models (PROC = GLIMMIX) assuming lognormal distributions (DIST = LOGN). When there were significant treatment effects ($P < 0.05$), means separation was performed using Tukey's HSD multiple comparisons tests (ADJUST = TUKEY).

In comparison to the check, all spray treatments except Ecotec Plus significantly suppressed at least one PP life stage across the season (Table 1). At the 40 lb/acre rate, Celite 610 and the conventional treatment performed similarly, with lower seasonal means compared with the check for all PP life stages except late instars, whose seasonal mean counts were similar across all treatments (including the check). At the 20 lb/acre rate, Celite 610 had greater seasonal mean counts of PP early instars and adults compared with the conventional treatment, and similar seasonal mean counts compared with the check. Within individual sampling dates, PP counts did not usually show treatment differences. Before the first treatment applications, all PP life stages were present. Subsequently, all life stages tended to decrease or maintain their abundance except the adult stage, which increased in abundance across all treatments (including the check) with a peak on 24 May.

This research was supported in part by the Washington Tree Fruit Research Commission and by industry gifts of pesticides and research funding.

Table 1.

Treatment/formulation(s)	Rate/acre	Application dates ^a	Avg. PP eggs/brushed leaf							Seasonal mean ^b
			1 May	9 May	15 May	24 May	31 May	8 Jun	12 Jun	
Ecotec Plus	64 fl oz ^c	ABC	0.06	0.01	0.13	0.29	0.59	0.14	0.48a	0.27a
Celire 610	20 lb ^c	ABC	0.10	0.00	0.02	0.07	0.21	0.13	0.13b	0.09b
Celire 610	40 lb ^c	ABC	0.07	0.00	0.04	0.15	0.08	0.11	0.14b	0.08b
Assail 70WP; Rimon 0.83EC; Actara 25WDG;	3.4 oz ^d ; 32 fl oz ^d ;	AC; A; B; B	0.13	0.01	0.03	0.08	0.33	0.29	0.13ab	0.15ab
Delegate 25WG	5.5 oz ^d ; 7 oz ^d									
Untreated check	–	–	0.14	0.01	0.05	0.35	0.63	0.35	0.36ab	0.29a
			Avg. PP first-third instars/brushed leaf							
Treatment/formulation(s)	Rate/acre	Application dates ^a	1 May	9 May	15 May	24 May	31 May	8 Jun	12 Jun	Seasonal mean ^b
Ecotec Plus	64 fl oz ^c	ABC	1.80	0.35	0.11	0.41	0.10ab	0.44	0.86a	0.38a
Celire 610	20 lb ^c	ABC	1.93	0.32	0.13	0.16	0.01b	0.34	0.45ab	0.23ab
Celire 610	40 lb ^c	ABC	1.98	0.06	0.03	0.15	0.04ab	0.11	0.17bc	0.09bc
Assail 70WP; Rimon 0.83EC; Actara 25WDG;	3.4 oz ^d ; 32 fl oz ^d ;	AC; A; B; B	1.37	0.04	0.03	0.13	0.02ab	0.08	0.05c	0.06c
Delegate 25WG	5.5 oz ^d ; 7 oz ^d									
Untreated check	–	–	1.94	0.06	0.06	0.31	0.28a	1.16	1.56a	0.57a
			Avg. PP fourth and fifth instars/brushed leaf							
Treatment/formulation(s)	Rate/acre	Application dates ^a	1 May	9 May	15 May	24 May	31 May	8 Jun	12 Jun	Seasonal mean ^b
Ecotec Plus	64 fl oz ^c	ABC	0.12	0.10	0.14	0.03	0.04	0.03	0.04a	0.06
Celire 610	20 lb ^c	ABC	0.12	0.18	0.34	0.13	0.03	0.01	0.08a	0.13
Celire 610	40 lb ^c	ABC	0.07	0.06	0.26	0.08	0.00	0.03	0.02a	0.07
Assail 70WP; Rimon 0.83EC; Actara 25WDG;	3.4 oz ^d ; 32 fl oz ^d ;	AC; A; B; B	0.07	0.03	0.04	0.00	0.00	0.01	0.00b	0.01
Delegate 25WG	5.5 oz ^d ; 7 oz ^d									
Untreated check	–	–	0.19	0.11	0.17	0.01	0.01	0.08	0.11a	0.08
			Avg. PP adults/tap							
Treatment/formulation(s)	Rate/acre	Application dates ^a	1 May	9 May	15 May	24 May	31 May	8 Jun	12 Jun	Seasonal mean ^b
Ecotec Plus	64 fl oz ^c	ABC	1.56	1.63	10.6ab	25.4a	13.6	8.69b	7.94ab	11.3a
Celire 610	20 lb ^c	ABC	0.69	1.69	11.3a	20.1ab	11.8	8.94b	7.44ab	10.2a
Celire 610	40 lb ^c	ABC	0.75	1.75	6.1ab	10.6bc	9.00	4.25c	3.88b	5.94b
Assail 70WP; Rimon 0.83EC; Actara 25WDG;	3.4 oz ^d ; 32 fl oz ^d ;	AC; A; B; B	0.75	1.00	3.8b	8.94c	7.13	4.75bc	6.19ab	5.30b
Delegate 25WG	5.5 oz ^d ; 7 oz ^d									
Untreated check	–	–	0.94	2.81	8.ab	22.3a	9.38	18.6a	12.1a	12.3a

Means followed by same letters within the same column are not significantly different according to Tukey's HSD.

^aA, 2 May; B, 12 May; C, 22 May.

^bPosttreatment only (excludes 1 May).

^cMixed with 16 fl oz per acre Brandt 719.

^dMixed with 0.25% 440 oil.