

Pea Aphid Control on Lentil, 2010

The purpose of this study was to evaluate the efficacy of insecticides at pre-bloom, early pod, and late pod timings for the control of pea aphid on lentil. The experiment was conducted at the North Central Experiment Station south of Minot, ND. 'CDC Maxim CL' lentils were planted on 29 Apr, at a rate of 55 lbs/acre into tilled ground with a 7.5 inch, 1560 John Deere no-till drill. The pre-emergent herbicides Prowl and Spartan were applied on 29 Apr at rates of 2 pt/acre and 2 oz/acre, respectively. The post-emergent herbicide, Raptor was applied at a rate of 3 oz/acre on 9 Jun with the non-ionic surfactant, Preference, at a rate of 0.25%. The desiccation spray was applied on 11 Aug in a spray volume of 18 gal/acre. Plots were desiccated with Gramoxone Inteon at a rate of 2 pints/acre with the non-ionic surfactant, Preference, at a rate of 0.25%. Plots were 10 ft by 30 ft. Treatments were replicated four times in a RCB design. Pre-bloom applications of insecticides were made on 21 Jun. The pre-bloom insecticides included azadirachtin (Aza-Direct, 8 fl oz/acre), bifenthrin (Sniper, 6.4 fl oz/acre), and bifenthrin plus imidacloprid (Swagger, 11 fl oz/acre, ½ lb/gal of each AI). The early pod insecticides were applied on 6 Jul when pods had started to form on approximately half of the field. In addition to the insecticides applied at pre-bloom, Aza-Direct was also applied at the 16 fl oz/acre rate and beta-cyfluthrin (Baythroid) was applied at a rate of 3.2 fl oz/acre. Late pod insecticides were applied on 19 Jul. In addition to the insecticides applied at pre-bloom, beta-cyfluthrin (Baythroid) was applied at a rate of 3.2 fl oz/acre. Insecticides were applied using a carbon dioxide propelled back pack sprayer and a hand boom with flat fan nozzles at a volume of approximately 10 gal/acre.

Pea aphid populations were assessed by counting the number of aphids on the top 8 inches of 10 lentil plants per plot and taking five sweeps per plot with a 15 inch diameter sweep net. Pea aphid counts were taken 2-3 d after each of the three applications and 23-24 d after the pre-bloom and early pod applications. Counts were not taken 23-24 d after the late pod application because part of the lentil field was senescent. Data were transformed $\log(x+1)$ prior to analysis. Data were analyzed with ANOVA and treatment means were separated using the Tukey's honestly significant difference (HSD) test, $P = 0.05$.

Pea aphid populations were below threshold (20 aphids per plant, 52 aphids per sweep) 2-3 d after pre-bloom, early pod, and late pod applications (Table 1). Pea aphid populations peaked 23 d after the early pod application (approximately 3 wk before harvest). This was the only sampling period pea aphids were over threshold. The ratio of the sweep netting to the plant sampling technique ranged from approximately 1.7 to 2.7:1.

Baythroid, Sniper, and Swagger gave 97.5 to 100% control 2-3 d after they were applied against aphid populations over threshold. When pea aphid pressure was greatest, 23-24 d after the late pod application, Baythroid, Sniper, and Swagger gave 53.8, 88.2, and 88.1% control, respectively. All three of these insecticides significantly reduced pea aphid numbers relative to the check more than 3 wk after they were applied (Table 2). Neither the 8 ounce nor the 16 ounce/acre rate of Aza-Direct was effective against pea aphids.

This research was supported by a grant from the Northern Pulse Growers Association.

Table 1. Pea aphid counts 2-3 days after insecticide application date.

Treatment	Rate/acre	Pea aphids/10 plants			Pea aphids/5 sweeps		
		21-Jun	6-Jul	19-Jul	21-Jun	6-Jul	19-Jul
Aza-Direct 0.0987EC	8.0 fl oz	0.5ab	17.0a	47.5a	3.8a	30.3a	81.3a
Aza-Direct 0.0987EC	16 fl oz	--	24.5a	--	--	47.0a	--
Baythroid XL 1EC	3.2 fl oz	--	1.8bc	0.8b	--	3.5b	1.8b
Sniper 2EC	6.4 fl oz	0.5ab	1.0bc	0.0b	1.8a	0.0b	1.5b
Swagger 0.5EC	11 fl oz	0.0b	0.25c	0.0b	0.3a	0.0b	2.3b
Check		1.3a	15.3ab	54.3a	3.5a	35.8a	90.5a

Table 2. Pea aphid counts 23-24 days after insecticide application date.

Treatment	Rate/acre	Pea aphids/10 plants		Pea aphids/5 sweeps	
		21-Jun	6-Jul	21-Jun	6-Jul
Aza-Direct 0.0987EC	8.0 fl oz	48.5a	137.8a	98.0a	303.0a
Aza-Direct 0.0987EC	16 fl oz	--	162.5a	--	361.5a
Baythroid XL 1EC	3.2 fl oz	--	71.3b	--	161.0b
Sniper 2EC	6.4 fl oz	17.3b	15.3c	50.0b	47.3b
Swagger 0.5EC	11 fl oz	16.3b	16.3c	47.3b	46.0b
Check		50.0a	157.8a	88.3a	340.3a

Data was transformed $\log(x+1)$ prior to analysis, untransformed means shown. Means within the same column followed by the same letter are not significantly different, Tukey's HSD ($P = 0.05$).