

(E36)

LETTUCE (ROMAINE): *Lactuca sativa* L. var. *longiflora*, Lam. 'Fresh heart '

SYSTEMIC EFFICACY OF CORAGEN APPLIED THROUGH DRIP IRRIGATION ON ROMAINE LETTUCE, FALL 2007

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Cabbage looper (CL); *Trichoplusia ni* (Hubner)
Beet armyworm (BAW); *Spodoptera exigua* (Hubner)
Leafminers (LM); *Liriomyza* spp.

The objective of the study was to evaluate the systemic efficacy of the new compound Coragen (rynaxypyr) when applied to romaine lettuce using drip irrigation under large plot, desert growing conditions. Lettuce was direct seeded on 12 Sep 2007 at the Yuma Valley Agricultural Center, Yuma, AZ into double row beds on 42-inch centers. Stand establishment was achieved using overhead sprinkler irrigation and irrigated thereafter using a sub-surface irrigation system with emitters at 8 inch spacing; tape was placed 5 inch below the soil surface. Large plots were used in this study and consisted of a single bed, 600 ft long. Four replications of each treatment were arranged in a RCB design. Formulations and rates for each compound are provided in the tables. Treatments were applied through the drip irrigation system by diluting formulated material in 3000 ml of water and metering the total volume into the plots using a CO₂ injection system. Drip chemigations were made over a 4 h period by allowing the system to run for 1/2 h, injecting each material through the system for a 1.5 h, and then flushing the system for 2 h. A subsequent irrigation (6 h) was made 4 days following each injection. Two applications were made on 8 and 19 Oct. Evaluation of lepidopterous larvae efficacy was based on the number of live larvae per plant. Ten plants per replicate were destructively sampled on each sample date. The sample unit consisted of examination of whole plants for presence of small (neonate and 2nd instar larvae) and large (3rd or > instar) CL and BAW. At harvest (28 Nov), 20 mature plants per plot were randomly selected and assessed for presence of live larvae, feeding damage and frass on and within romaine hearts. A damage assessment of leafminer activity was conducted by counting all the visible mines present on leaves on 18 Nov (30 DAT-2). Assessments were made from 6 randomly selected plants and consisted of counting all mines on 10 leaves per plant from the basal node positions 11-20. Treatment means were analyzed using a 1-way ANOVA and means separated by a protected LSD ($P < 0.05$).

BAW and CL pressure was light-moderate. Pre-application counts were 2.0 larvae per 10 plants. At 5 days following the first chemigation, no significant differences were observed between the Coragen treatments and the untreated check (UTC) (Table 1). By 10 DAT-1, the Coragen treatments had significantly reduced larval numbers. Following the 2nd application, larvae were not detected in the Coragen treated plants for 14 days and were found at only very low numbers thereafter. At harvest (40 DAT-2), damage and larval contamination of romaine hearts was not significant in the Coragen treatments compared with the Alias and untreated check which were considerably higher than the USDA grading standards for marketable head lettuce (Table 2). In addition, assessments made at 30 DAT-2 showed that Coragen provided highly significant protection from LM (Table 3). The results of this trial further suggest that Coragen has acceptable systemic activity against key lepidopterous larvae and leafminers in lettuce when applied via sub-surface chemigation in desert growing conditions. No phytotoxicity was observed.

Table 1.

Treatment	Rate/ acre	Larvae/10 plants							Avg.
		5 DAT-1 Oct 13	10 DAT-1 Oct 18	8 DAT-2 Oct 27	14 DAT-2 Nov 2	21 DAT-2 Nov 9	30 DAT-2 Nov 18	40 DAT-2 Nov 28	
Coragen 1.6 SC	3.5 oz	2.5a	2.5b	0.0b	0.0b	1.0b	1.3b	0.0b	1.0b
Coragen 1.6 SC	5 oz	3.5a	0.7b	0.0b	0.0b	0.0b	0.0b	0.0b	0.6b
Coragen 1.6 SC	6.7 oz	2.1a	0.8b	0.0b	0.0b	0.0b	0.0b	0.0b	0.4b
Coragen 1.6 SC	7.7 oz	1.5a	0.7b	0.0b	0.0b	0.0b	0.0b	0.9b	0.4b
Alias 2F	16 oz	3.3a	6.5a	6.3a	5.3a	10.0a	12.5a	4.1a	6.8a
UTC	---	4.8a	7.4a	5.3a	4.4a	10.0a	13.0a	4.4a	6.9a

Means followed by the same letter are not significantly different, ANOVA; protected LSD ($P > 0.05$)

Table 2.

Treatment	Rate/ acre	Heart contamination (% infested)		
		Feeding damage	Frass	Larvae
Coragen 1.6 SC	3.5 oz	9.4b	3.1b	0.0b
Coragen 1.6 SC	5 oz	0.0b	0.0b	0.0b
Coragen 1.6 SC	6.7 oz	0.0b	0.0b	0.0b
Coragen 1.6 SC	7.7 oz	9.4b	6.3b	6.3b
Alias 2F	16 oz	84.5a	81.5a	46.9a
UTC	---	81.5a	84.0a	43.8a

Means followed by the same letter are not significantly different, ANOVA; protected LSD ($P > 0.05$)

Table 3.

Treatment	Rate/ acre	Mines/leaf at each basal node position										Mines/ plant
		11	12	13	14	15	16	17	18	19	20	
Coragen 1.6 SC	3.5 oz	0.2b	0.4b	0.4b	0.3b	0.2b	0.4ab	0.3b	0.1b	0.1b	0.1b	2.3b
Coragen 1.6 SC	5 oz	0.2b	0.3b	0.1b	0.2b	0.1b	0.3b	0.2b	0.1b	0.1b	0.3ab	1.7b
Coragen 1.6 SC	6.7 oz	0.1b	0.2bc	0.2b	0.3b	0.2b	0.35b	0.1b	0.1b	0.0b	0.0b	1.3b
Coragen 1.6 SC	7.7 oz	0.0b	0.0c	0.1b	0.2b	0.1b	0.1b	0.2b	0.1b	0.0b	0.0b	0.6b
UTC	---	2.9a	2.1a	1.8a	1.5a	1.7a	0.9a	1.0a	0.6a	0.7a	0.5a	13.7a

Means followed by the same letter are not significantly different, ANOVA; protected LSD ($P > 0.05$)