Project: **Insecticide Efficacy for Colorado Potato Beetle Control**
AIM WG: Science & Technology
Trial Year: 2025
Author: Ryan Barrett

Project Rationale:

In recent years, Prince Edward Island growers have been reported increased crop damage due to Colorado potato beetles (CPB). Since the introduction of neonicotinoid insecticides (first Admire, followed by Titan and Actara), CPB damage has been much less of a priority than in previous decades due to effective season-long control. Recent observations by producers as well as studies conducted by AAFC under the FVGC National Cluster Program have confirmed that insecticide resistance is building the neonicotinoid class of insecticides in PEI, as well as some level of reduced efficacy of other foliar insecticides that target CPB. While these studies have provided valuable insight into general levels of insecticide resistance, there has not been a comparative trial comparing commonly used insecticides side-by-side to assess relative levels of beetle control.

Evan MacDonald of Atlantic AgriTech presented the Science & Tech Working Group with an opportunity this year, as they had planted a plot trial for the purposes of a CPB trial for a private client. That client backed out of the trial after it had been planted, so our group was approached to see if we would be interested in taking advantage of these plots to investigate insecticide efficacy.

Project Overview:

The trial was planted on May 12th, 2025 with the long white variety Elland, sourced from Fox Island Elite Seed Farm. Whole seed was used to plant the trial, with an average seed piece size of 1.6 oz. A total of eight treatments (seven insecticide combinations plus an untreated check) were planted in a randomized complete block design (RCBD) at the Atlantic AgriTech site in New Annan, PEI. No in-furrow insecticide was applied in this plot trial.

The following insecticides were evaluated in this study:

Brand Name	Chemical name	IRAC Group	Application Rate	$/acre
Cimegra®	broflanilide	30	75 ml/ac	$44.30
Minecto® Pro	cyantraniliprole + abamectin	6 + 28	270 ml/ac	$50.00
Vayego®	tetraniliprole	28	60 ml/ac	$29.30
Delegate™	spinetoram	5	97 g/ac	$39.03
Coragen®	chlorantraniliprole	28	202 ml/ac	$43.65

Application rates used were the highest rate indicated on the label for each product. Dollars per acre for each product was calculated using retail product prices from a local agricultural product retailer using 2025 retail prices.

The following treatments were evaluated in this study:

Trt #	Trt Code	First Application	Second Application	$/acre
1	CHK	Untreated	Untreated	$0
2	CIM/MNP	Cimegra	Minecto Pro	$94.30
3	MNP/CIM	Minecto Pro	Cimegra	$94.30
4	COR/CIM	Coragen	Cimegra	$87.95
5	VAY/CIM	Vayego	Cimegra	$73.60
6	DEL/CIM	Delegate	Cimegra	$83.33
7	CIM/DEL	Cimegra	Delegate	$83.33
8	VAY/DEL	Vayego	Delegate	$68.33

The rationale for choosing these treatment combinations included the following objectives:

1. Assess at least one commonly used product among each of the four IRAC groups with available foliar products (5, 6, 28, 30).
2. The second insecticide application will be followed by an insecticide from a different IRAC group from the first application.

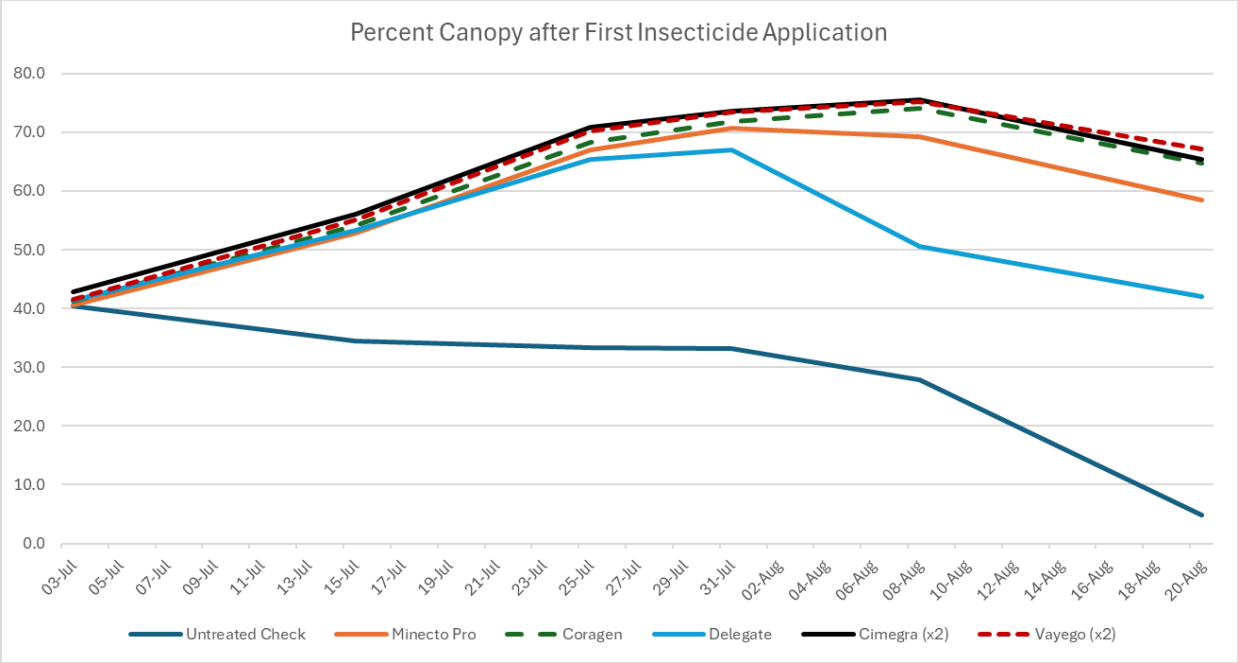
Prior to the first insecticide application, plots were evaluated for percent canopy cover and the number of small larvae, large larvae, and adult beetles per plant. The first insecticide application was applied on July 7th, with the second insecticide application applied on August 11th.

Larvae and beetle counts were subsequently conducted on July 10, July 14, July 21, July 25, August 4, and August 11. Percent defoliation was observed on July 7, July 10, July 14, July 21, and August 11. Percent canopy cover was observed (by drone) on July 3, July 15, July 25, July 31, August 8 and August 20. NDVI was observed (by drone) on August 20 and August 28.

Results:

Results for four primary metrics are presented in this report:

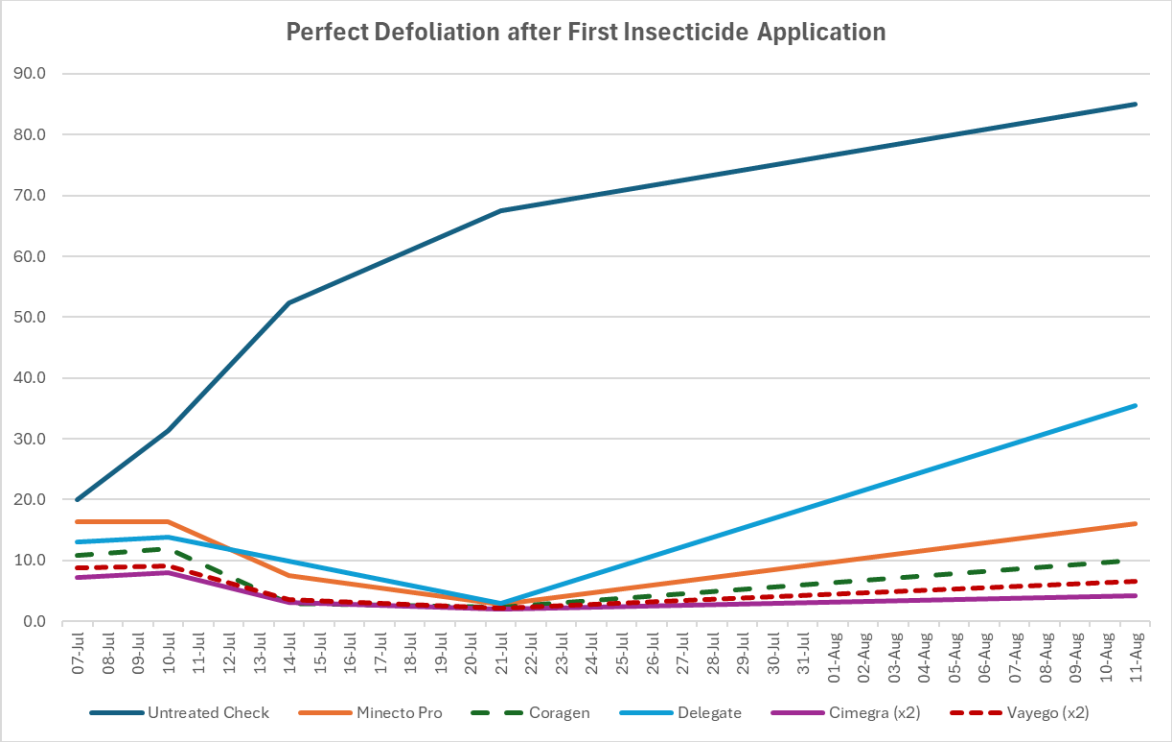
1. Percent Canopy Cover (collected by drone, analysed by Solvi)
2. Percent Defoliation
3. Beetle Counts (Larvae and Adults)
4. NDVI after 2nd Application (collected by drone)



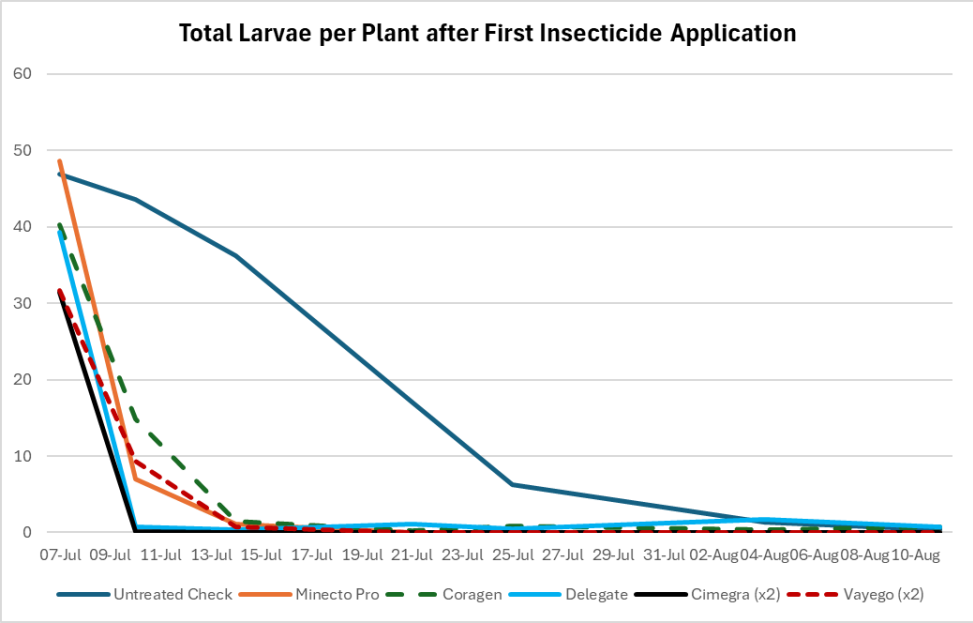
For the first 20 days after the first insecticide application, there is no difference in percent canopy coverage between any of the insecticide treatments. As there were two treatments each that had Cimegra and Vayego applied in the first application, results from those treatments were averaged.

After approximately 20 days after first application, we continue to see negligible difference in percent canopy coverage between Cimegra, Vayego, and Coragen. While there is a slight numerical decrease in canopy coverage for Minecto Pro, it is not statistically significantly different than the other three. It was noted by the project team that proximity of Minecto Pro plots to the untreated check may explain more of the observed variability than a deficiency in the product. There is a more distinct trend in lower percent canopy coverage for Delegate after July 31st compared to the other insecticides. All treatments had significantly higher percent canopy coverage than the untreated check, which was almost entirely defoliated by August 20th.

Photo of the Rep 1 block of this trial, taken by drone. The untreated check is the defoliated rep on the far right of the image. Photo courtesy of Evan MacDonald, Atlantic AgriTech.

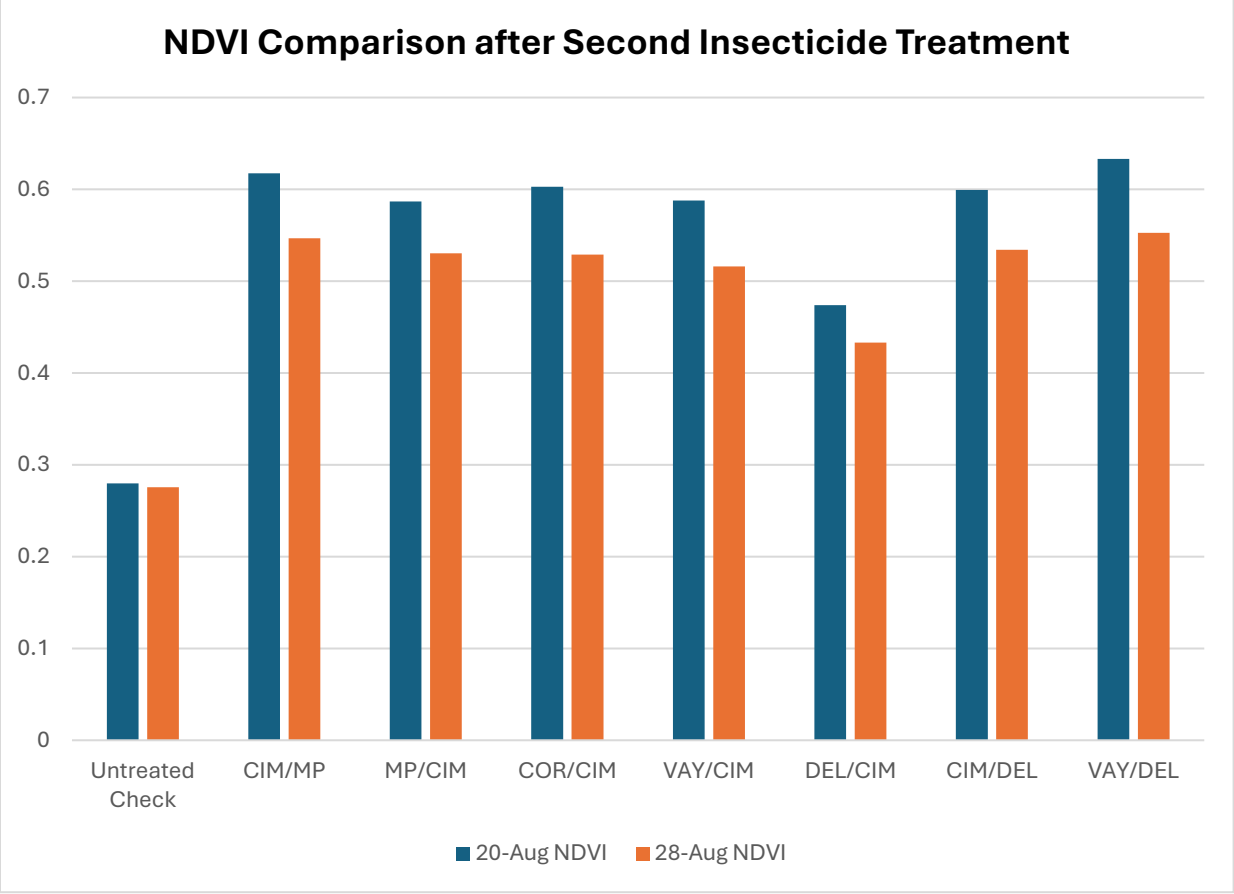


Percent defoliation shows a similar trend as the percent canopy coverage, except in reverse. There is no statistically significant difference in defoliation between Cimegra, Vayego, Coragen and Minecto Pro. Delegate produced very similar results to the other insecticides until August 11th, when it averaged more than 20% more defoliation than the average of the other insecticides. While this difference was not statistically significant at p=0.05, it would be significant at a slightly higher p value.



In comparing the number of total larvae per plant, larval populations were relatively similar on July 7th immediately prior to the first insecticide application. Larval counts were reduced effectively to zero in the Delegate and Cimegra treatments within four days, with the Minecto Pro, Vayego and Coragen treatments achieving similar levels of control within a week after treatment. Larval counts remained low for the rest of the period before the second insecticide application, with no statistical difference between the treatments.

There were effectively no adult beetles counted in all treatments (including the untreated control) between July 7th and July 21st. Starting July 25th, adult beetles started to be seen in higher numbers across the treatments but without any statistically significant difference in population between treatments. The number of adults peaks on July 25th, with slightly lower counts observed in early August but at levels meeting threshold for a second insecticide application.



NDVI was calculated per plot using a multi-spectral drone on August 20th and August 28th as a proxy for relative crop health. The only significant difference was between the untreated check and all the insecticide treatments. There is a bit of a numerical difference between the Delegate/Cimegra treatment compared with the others, with the other six

treatments being remarkably similar. Interestingly, the Cimegra/Delegate treatment (with the same products but in opposite application order) appeared to perform numerically better.

Key Observations and Considerations:

- There did not appear to be significant differences in canopy coverage, percent defoliation, or beetle counts between Cimegra, Vayego, Coragen, and Minecto Pro. There is a slight trend toward lower efficacy for Delegate; however, this difference was not statistically significant on most dates and was still significantly better than the untreated check.
- It is not surprising that Delegate may have slightly lower residual control than the other insecticides, as Group 5 active ingredients did show some indications of reduced susceptibility in the insecticide resistance survey study completed by AAFC in the last FVGC cluster.
- Given that there was no statistical difference between the insecticide treatments (except a trend for earlier failure of Delegate), the most cost-effective treatment in this study was Vayego/Delegate, followed by Vayego/Cimegra.
- Best practices to prevent insecticide resistance recommend that growers not use the same group of insecticides twice in the same growing season in order to reduce the risk of developing insecticide resistance.
- None of the treatments in this study had an in-furrow neonicotinoid insecticide used. Even if the level of control provided by the systemic insecticide is compromised, it may delay the first flush of larval feeding as well as controlling other insects such as flea beetles.
- Due to how this plot trial was set up prior to AIM involvement, an inadequate level of fertilizer was applied to bring this trial to tuber harvest. It was decided that relatively low levels of nitrogen and potassium (below recommended levels) as well as the extreme drought conditions faced in 2025 would make tuber yield data difficult to trust. If this trial is replicated in 2026, a full-season fertility rate will be applied to all plots and there would be a plan to harvest tubers from each plot.

Our thanks to Evan MacDonald, Doug MacDonald, Alex Ryan, and Marc Lamers of Atlantic AgriTech for their management of this trial.

Author's Note: No financial assistance or oversight was provided by any chemical company or crop protectant retailer in this project.