

Control of Colorado Potato Beetle & Insecticide Resistance Management

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Introduction

There are a number of methods for controlling CPB. Rotating potato fields at least a quarter mile away from fields planted previously to potato (tomatoes or eggplant) is very effective. This strategy will delay and reduce the overall size of the CPB infestation. Other options such as trap cropping, use of beetle trenches and flammers have been used, but require more planning, labor and resources. These cultural approaches are described in the *Cornell Guidelines for Commercial Vegetable Production*, in hardcopy or at: <http://www.nysaes.cals.cornell.edu/recommends/24frameset.html> , and in the *Organic Potato Production Guide* at: http://nysipm.cornell.edu/organic_guide/default.asp .

For those who rely primarily or partly on insecticides, do you still use Admire® at planting to control CPB? Maybe you used to use Admire®, but now you treat your seed with CruiserMaxx®? In either case, this article should be worth reading. Admire®, CruiserMaxx® and similar products that contain a neonicotinoid insecticide may still work well for protecting your potato crop from CPB, but on some farms resistance has developed and control is failing. **The purpose of this article is to describe a strategy that should provide season-long control of Colorado potato beetles and prolong the effectiveness of insecticides, especially neonicotinoids, by using them in a manner that should delay the evolution of resistance.**

Current Management

Admire®, CruiserMaxx® or another neonicotinoid used at planting is still effective for controlling CPB infestations in many potato fields in New York. However, each year there are more instances where foliar insecticide sprays are needed to manage the second generation (**Figure 1**). In some cases, foliar insecticide sprays are needed for both the first and second generations, despite an application of Admire® at planting! The need for foliar insecticide applications in potato fields treated with a neonicotinoid insecticide at planting can be a definitive sign that the CPB population on your farm has

developed resistance. Admire® has been used on some farms every year since 1995 and on many others CruiserMaxx® has taken its place. **In addition, there are**

many other closely related insecticides that belong to the same Insecticide Resistance Action Committee (IRAC) Class 4 that may be used on potato: Provado®, Advise®, Alias®, Macho®, Montana®, Widow®, Gaucho®, Cruiser®, Assail®, Actara®, Platinum®, Couraze®, Impulse®, Nuprid®, Pasada® and Prey®. Using Admire®, CruiserMaxx® or any of these other products on an annual basis is a serious problem because the CPB population on the farm will become more resistant to ALL of these products each year.

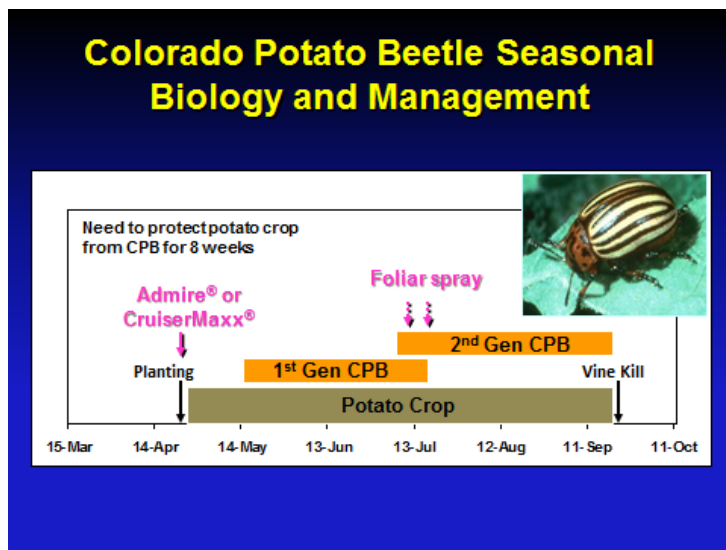


Figure 1. Approach for managing Colorado potato beetle in potatoes on some farms in New York.

One of the most important steps to slow down the development of insecticide resistance in Colorado potato beetle populations is to rotate different Classes of insecticides as often as possible.

Insecticides to Consider in Rotations

There are many insecticides registered for CPB control in potato (see the *Cornell Guidelines for Commercial Vegetable Production* in hardcopy or at: <http://www.nysaes.cals.cornell.edu/recommends/24frameset.html>). There are about two dozen products available for CPB control spanning over eleven unique classes of chemistry, meaning that there are many potential insecticide rotational strategies that could be used to slow insecticide resistance development. Ideally, only a single class of chemistry should be used to manage a single CPB generation. For example, an anthranilic diamide insecticide (e.g., Coragen®) could be used to manage the first generation, while a spinosyn (e.g., Radiant® SC or Blackhawk®) could be used to manage the second generation (Figure 2).

Be Wary of Products with Multiple Active Ingredients

There are several products labeled for CPB control that combine more than one class of chemistry. For example, Voliam Xpress®, Endigo ZC® and Leverage® 360 all include a pyrethroid insecticide and either an anthranilic diamide or a neonicotinoid insecticide. Use of these products may select the CPB population to simultaneously develop resistance to both classes of chemistry. To avoid this possibility, consider using products that have a single insecticide active ingredient. Alternatively, select one of these multiple active ingredient products in which one of the two active ingredients is not likely to be used as a “stand-alone” treatment. For instance, resistance to pyrethroids is widespread in CPB populations, making this class generally ineffective for managing this pest and is a low priority to conserve for future potato beetle management. Therefore, either Voliam Xpress® or Endigo ZC® could be a reasonable choice because the anthranilic diamide and neonicotinoid active ingredient is “doing most or all of the work” with little to no help from the pyrethroid component (although the pyrethroid may be useful for controlling other potato pests).

New Product in the Pipeline. A close cousin to Coragen® is in the pipeline for registration on potato for control of CPB adults and larvae, caterpillars and potato leafhopper. The active ingredient is called cyantraniliprole, which is an anthranilic diamide, and there will be two formulations. One formulation will be for use at planting called Verimark®, the other for use as a foliar spray called Benevia®. Both

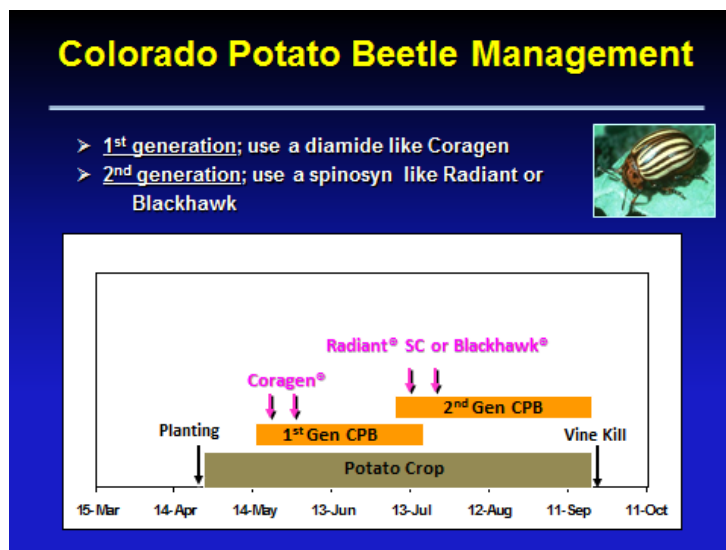


Figure 2. An approach for managing CPB that should provide great control, but also slow down insecticide resistance. Insecticides in different classes target only one generation.



CPB larvae (Brian Nault, Cornell)

products have systemic activity and are excellent against CPB. DuPont™ anticipates registration of these products in New York in time for the 2013 season.

Hypothetical Two-Year Insecticide Rotation for Near Future. There is a strong preference, by many potato growers, for using an insecticide at planting to control first-generation CPB. Currently, the only at-plant options include neonicotinoid products like Admire® and CruiserMaxx®. As mentioned above, the anthranilic diamide product Verimark® is likely to be available as an at-plant option beginning in 2013 (**Figure 3**).

For 2012, non-neonicotinoid options applied as foliar sprays that would control both adults and larvae include products similar to Verimark®, like Coragen® and Voliam Xpress® (**Figure 3**). Regardless of which option may be taken to manage the first-generation of CPB, a product belonging to a different class should be considered for managing the second generation. Possible options include a spinosyn like Radiant® SC or Blackhawk®, an avermectin like Agri-Mek® SC or Abba® 0.15EC, or an oxadiazine like Avaunt® (**Figure 3**). Others that might be considered for controlling larvae,

especially small larvae, include Neemix® 4.5, Ecozin® 3EC, Novodor®, Kryocide® or Trigard®. **Note that each insecticide class is represented only one time in 2 years** (**Figure 3**). This strategy should expose

only 1 generation out of every 4 generations on a farm to a particular class of chemistry and should slow down the evolution of resistance to any one of these products.

Additional Thoughts on Colorado Potato Beetle Control

Insecticide use for CPB control can be reduced by spraying potato field edges where the overwintered adults initially colonize rather than the entire field. Another tactic is to scout fields and time sprays following action thresholds. Scouting methods and thresholds are described in detail in the *Cornell Guidelines for Commercial Vegetable Production* in hardcopy or at <http://www.nysaes.cals.cornell.edu/recommends/24frameset.html>. In general, timing the first spray after most eggs have hatched, but before many large larvae are present, is recommended. A second application timed one week later may also be needed.

Colorado Potato Beetle Management Hypothetical 2-Year Rotation Program		
CPB Generation	Year 1	Year 2
First	CruiserMaxx, Admire, etc.	Verimark, Benevia, Coragen or Voliam Xpress
	Neonicotinoid	Anthranilic Diamide
	MoA Group – 4A	MoA Group - 28
Second	Radiant SC or Blackhawk	Agri-Mek or Avaunt
	Spinosyn	Avermectin or Oxadiazine
	MoA Group - 5	MoA Group – 6 or 22

Figure 3. Hypothetical two-year insecticide rotational program that should provide excellent season-long control of CPB and also slow down the evolution of resistance to any of these products. .