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IRM Guidelines for Beet Armyworm in Lettuce (August 20, 2014)

The beet armyworm (BAW) is the most common lepidopterous pest infesting lettuce throughout the desert southwest where larvae are most prevalent from August through November. Historically, PCAs have been able to effectively control this pest using available insecticides. Because many of the products have different modes of action (MOA) that can be alternated throughout the growing season, the rapid development of resistance by BAW to any of these insecticide compounds should not readily occur. In fact, resistance by BAW to insecticides has not been recorded in nearly 20 years in the desert as a result of the judicious usage of these insecticide chemistries. However, if an insecticide compound, or products with the same MOA, are used repeatedly for worm control in the same field, the risk of resistance increases significantly. This is particularly important with the Diamide group of insecticides (IRAC group 28) which can be applied as both foliar sprays and soil injections. With the recent registration of cyantraniliprole (Exirel and Verimark), PCAs now have eight different diamides insecticide products within the diamide chemistry (IRAC group 28) to choose from for worm control. Foliar uses include Coragen, Voliam Xpress, Voliam Flexi, Exirel, Belt and Vetica; Soil uses include Coragen, Durivo and Verimark. Applying these Diamide products to the soil at planting, and then following with foliar sprays of Dimades in the same field, can expose multiple generations of Lep larvae to the same MOA. This places increased selection pressure on populations. That's not a good way to use these products if you want them to remain effective for more than a couple of years. Since the Diamides, as well as the other products currently available (Radiant, Proclaim, Intrepid, Avaunt), are critical to effective management of worms in leafy vegetables, PCAs should consciously avoid the overuse of any of these compounds. The most effective way to delay the onset of resistance by BAW in leafy vegetables is to consider the recommendations provided in the guidelines recently prepared entitled Insecticide Resistance Management Guidelines for Beet Armyworm in Lettuce.

BAW Egg Mass and Neonates

Remember, When in Doubt . . . . . "Call Barry Tickes"

Click picture to listen to John's update 

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Insecticide Resistance Management For Beet Armyworm in Lettuce

THE UNIVERSITY OF ARIZONA | COLLEGE OF AGRICULTURE AND LIFE SCIENCES
COOPERATIVE EXTENSION
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The beet armyworm (BAW), *Spodoptera exigua* (Hubner) is the most common lepidopterist pest infesting lettuce throughout the desert southwest. It is most prevalent from August through November on fall-planted vegetables, and again from April through June on spring-planted melons. Historically, lettuce growers have been able to effectively control this pest using available insecticides. Resistance by BAW to insecticides has not been recorded in nearly 20 years due to the availability and judicious usage of several new products (Fig 1). However, eight insecticide products within the diamides chemistry (IRAC group 28), all with the same mode of action (MOA) and with both soil and foliar application patterns, are now available for management of BAW in lettuce. Growers and PCAs should be aware of the differences among the insecticides and their MOA and select products with which to rotate with throughout the season. An effective resistance management for BAW in desert lettuce approach should not be difficult to implement given the number of effective insecticide products with distinctly different MOA available that can be used for management of BAW larvae throughout the season (Fig 1).

Figure 1. Reference guide for selecting insecticides for BAW on relative efficacy and IRAC mode of action.

Product	IRAC [1] MOA	Beet armyworm	Cabbage looper	*Corn earworm*	Comments*
Lannate	1A	•••	•	•••	Tank mix with another product for broad spectrum Lep activity; provides thrips control; PHI: 10 d on lettuce; Use rates above 0.75 lb AI/ac.
Lorsban	1B	•••	•	•••	Tank mix with another product for broad spectrum Lep activity; For use on cole crops, PHI: 21 d; use top of label rates if possible.
Acephate	1B	•	••	••	Tank mix with another product for broad spectrum Lep activity; PHI: 21 d on head lettuce only.
Pyrethroids	3	•	•••	•••	Tank mix with another product for broad spectrum Lep activity; PHI: varies with products ; use high labeled rates
Radiant	5	•••	•••	•••	Stand alone Lep, leafminer, and thrips control; PHI: 1 day on lettuce; Use rates at 5-7 oz depending on pest spectrum.
Proclaim	6	•••	••	•••	Stand alone Lep control; use a penetrating adjuvant ; PHI: 7 day on lettuce; use at rates above 3.6 oz; if cabbage looper present tank-mixed with a pyrethroid.
Bt (i.e. Dipel)	11B	•	••	•	Tank mix with another product for broad spectrum Lep activity, numerous Bt products available; PHI: 0 d -good spray coverage desirable
Intrepid	18A	•••	•••	••	Tank mix with another product for broad spectrum Lep activity; PHI: 1 day; good spray coverage desirable; mix with a pyrethroid for best results
Avaunt	22	•••	•••	••	Tank mix with another product for broad spectrum Lep activity; PHI: 1 day, good spray coverage desirable, use higher rates for best control
Belt	28	•••	•••	•••	Stand alone Lep control; PHI: 1 day on lettuce, Use at higher rates.
Coragen	28	•••	•••	•••	Stand alone Lep and leafminer control; PHI: 1 day for lettuce- Use at or above 5 oz. for best residual effectiveness.
Exirel	28	•••	•••	•••	Foliar only; Stand alone Lep, whitefly and leafminer control; PHI: 1 day for lettuce- Use at or above 13 oz. for best residual effectiveness.
Verimark	28	•••	•••	•••	Soil only; Stand alone Lep, whitefly and leafminer control; Use at or above 10 oz. for best residual effectiveness.
Voliam Xpress	28+3	•••	•••	•••	Stand alone Lep and leafminer control; PHI: 1 day forlettuce; Use higher rates (8 oz or > for best residual effectiveness.
Volium Flexi	28+4A	•••	•••	•••	Stand alone Lep and leafminer control; PHI: 7 day for lettuce; Has aphid activity. Use higher rates for best residual effectiveness.
Durivo	28+4A	•••	•••	•••	Soil only; Stand alone Lep and leafminer control; PHI: 30 day for lettuce; Use at 13 oz. for best residual effectiveness. Has aphid activity.
Vetica	28+16	•••	•••	•••	Stand alone Lep control; PHI: 7 day for lettuce; Has whitefly immature activity. Use at 17 oz for best residual effectiveness.

•••	Good residual control (7-14 d)
••	Marginal residual control (4-6 d)
•	Poor residual control (1-3 d)

[1] IRAC Mode of Action - for more infor go to - http://www.irac-online.org/

*** always consult the label before applying any of these products**

General Resistance Management Tactics

- Apply insecticides only when needed. Time insecticide applications based on UA recommended action thresholds *(http://ag.arizona.edu/crop/)*.
- Ideally, the management strategy that presents the lowest risk to insecticide resistance is one where consecutive applications of the same product **are not** made in the same lettuce field. This can be achieved by rotating to an alternative product on each subsequent spray application to eliminate consecutive uses of the same MOA .
- Practically, in lettuce fields where a product/MOA is required more than once, limit the total usage of that product to 2 applications per field per crop season.
- Use only recommended products and rates necessary to accomplish desired control.
- Whenever possible, apply insecticides by ground sprays to optimize spray deposition and coverage.

Resistance Management Tactics for the Diamides **(IRAC group 28)**

- If a dimide product is applied as a foliar spray, consider using this MOA only once per lettuce field per crop season. If a Diamide spray is required more than once, limit the total usage to 2 foliar spray per field and do not use them in consecutive applications (Figure 2).
- **Do not** spray a foliar Diamide product **prior to** or **following** the use of a soil application of chlorantraniliprole (Coragen, Durivo) or cyantraniliprole (Verimark) (Figure 3 and 4).
- If a Diamide product is soil applied at-planting, as an in-furrow spray, shank injection, or drip chemigation **do not spray** a Diamide product on that crop at any time during the remainder of the crop season (Figure 4 and 5).
- Do not apply more than **1** application of a Diamide product to the soil regardless if chemigated through drip irrigation or soil applied at planting. If additional beet armyworm control is needed during the crop season, use a non-Diamide foliar alternative (Fig 1) with an alternative MOA.
- Consider using an adjuvant with foliar Diamide applications to assist in spray atomization and penetration, and to provide uniform deposition of spray droplets on foliage.
- In areas where alfalfa or cotton is grown in proximity to lettuce, avoid using a Diamide product in alfalfa or cotton at any time.

Figure 2. Potential use patterns for foliar applied diamides in Lettuce

Insecticde Use Patterns for Beet Armyworm in Head Lettuce

IRAC Group	Class	Germination	Seedling	Thinning Stage	5-10 Lf Stage	11-20 Lf Stage	Head Formation	Harvest
1A/1B	OP/Carbamate		1					
5	Spinosyns			2				7
6	Abamectins						6	
18A	Diacylhydrazines					4		
22	Indoxacarb					5		
28	Dimaides, *foliar*				3			
28	Diamides, *soil*							

Figure 3 **Potential use patterns for soil, at-plant applications of diamides in Lettuce**

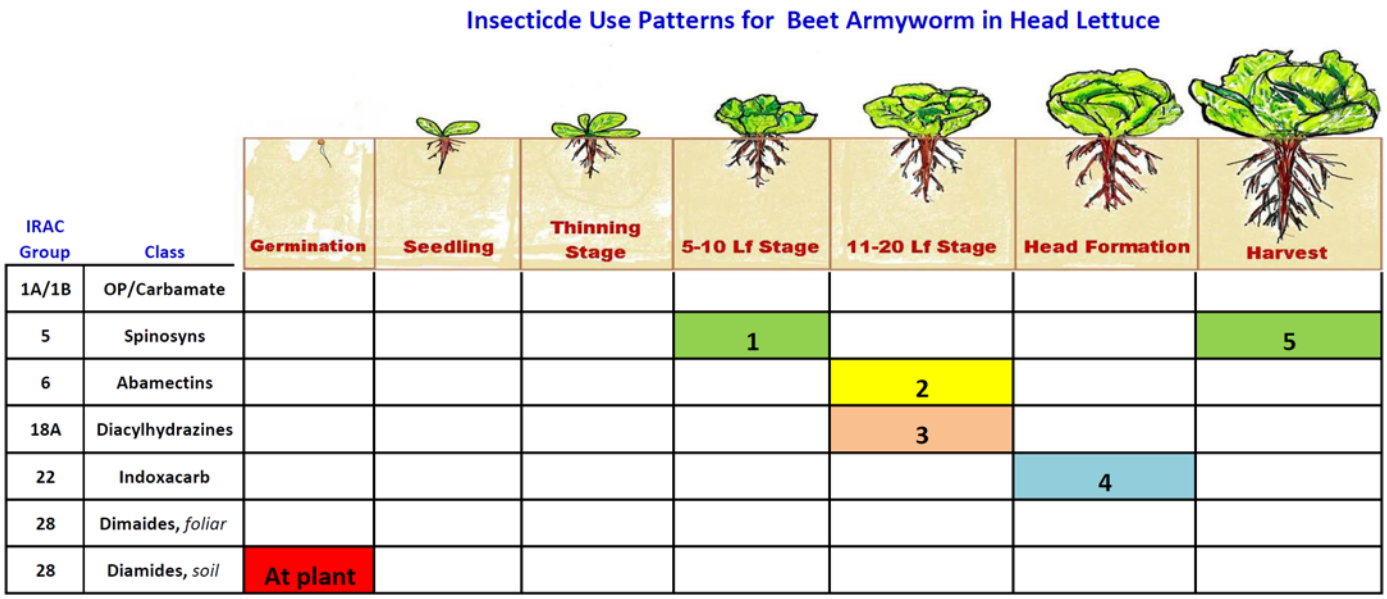

Figure 4 **Potential use patterns for soil, drip chemigated applications of diamides in Lettuce**