Toxicity and Longevity of New Reduced Risk Insecticides for Codling Moth Control

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Altacor 35WG

chlorantraniliprole = Rynaxypyr™

Anthranilamide

It is derived from
Ryania speciosa

Altacor 35WG

New mode of action

Ryanxypyr activates the insects ryanodine receptors causing a release of stored calcium in the muscle. Ryanxypyr has greater affinity for insect receptors compared to mammalian receptors.

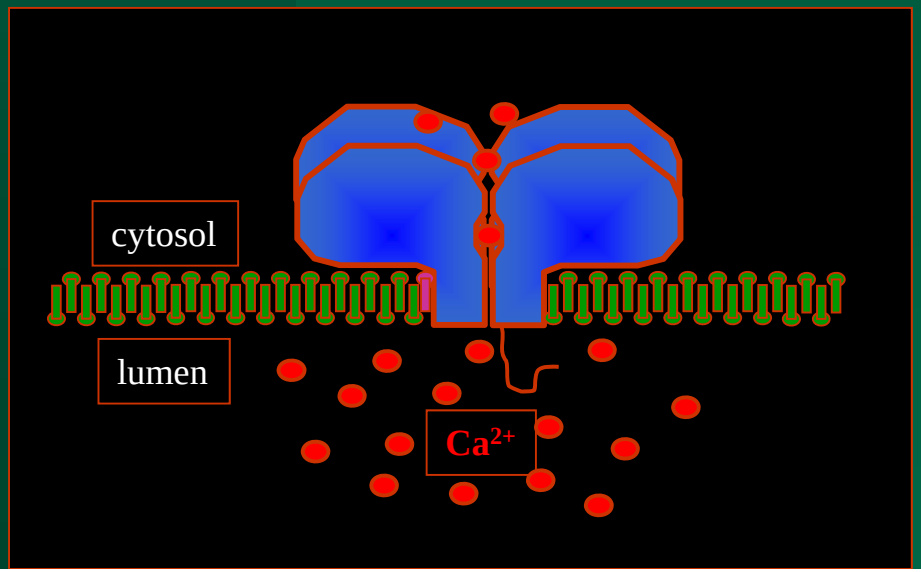
DuPont™ RynaXypyr™ Novel Mode of Action

Activates Insect Ryanodine Receptors

Ryanodine Receptor:

Plays a critical role in

muscle contraction



RynaXypyr™:

Rynaxypyr binds to this receptor, causing uncontrolled release of calcium,

to the point of depletion

Result: muscle paralysis

Delegate 25WG

Chemically modified isomers of spinosyn (Second generation spinosyns)

Origins of Spinosad

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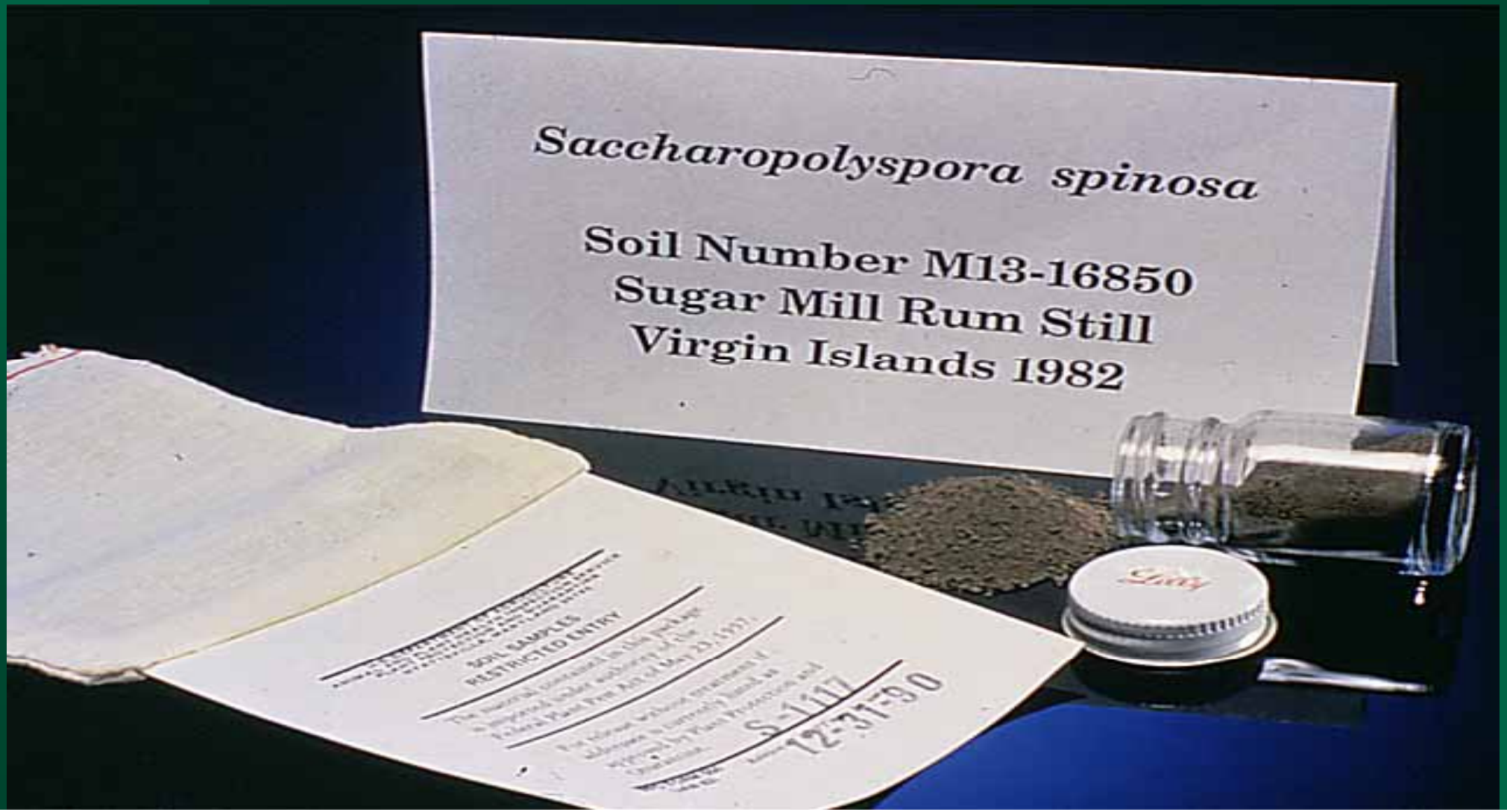
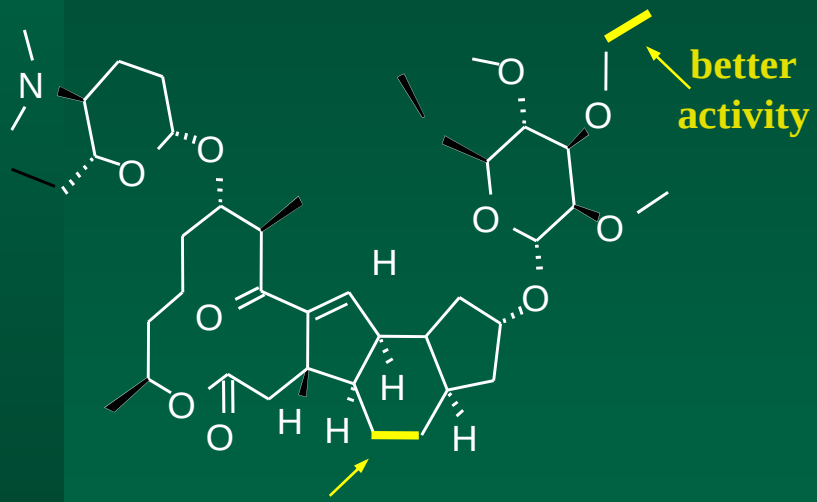
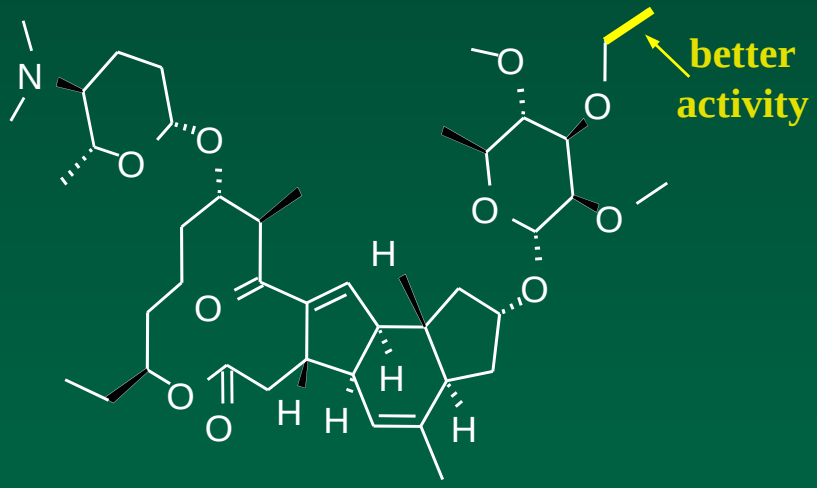


Spinetoram

Major component



Minor component



Chemical modification of spinosyn that resulted in increased photostablity and improved efficacy

Larval Toxicity and Longevity of Altacor & Delegate

Standard Methods

- Toxicity & Longevity trials
  - 5 treatments replicated 4 times
  - Applied using hand-held orchard sprayer at 200 gal/ac
  - Applied at 1B timing (5/22) and 2A timing (6/26)

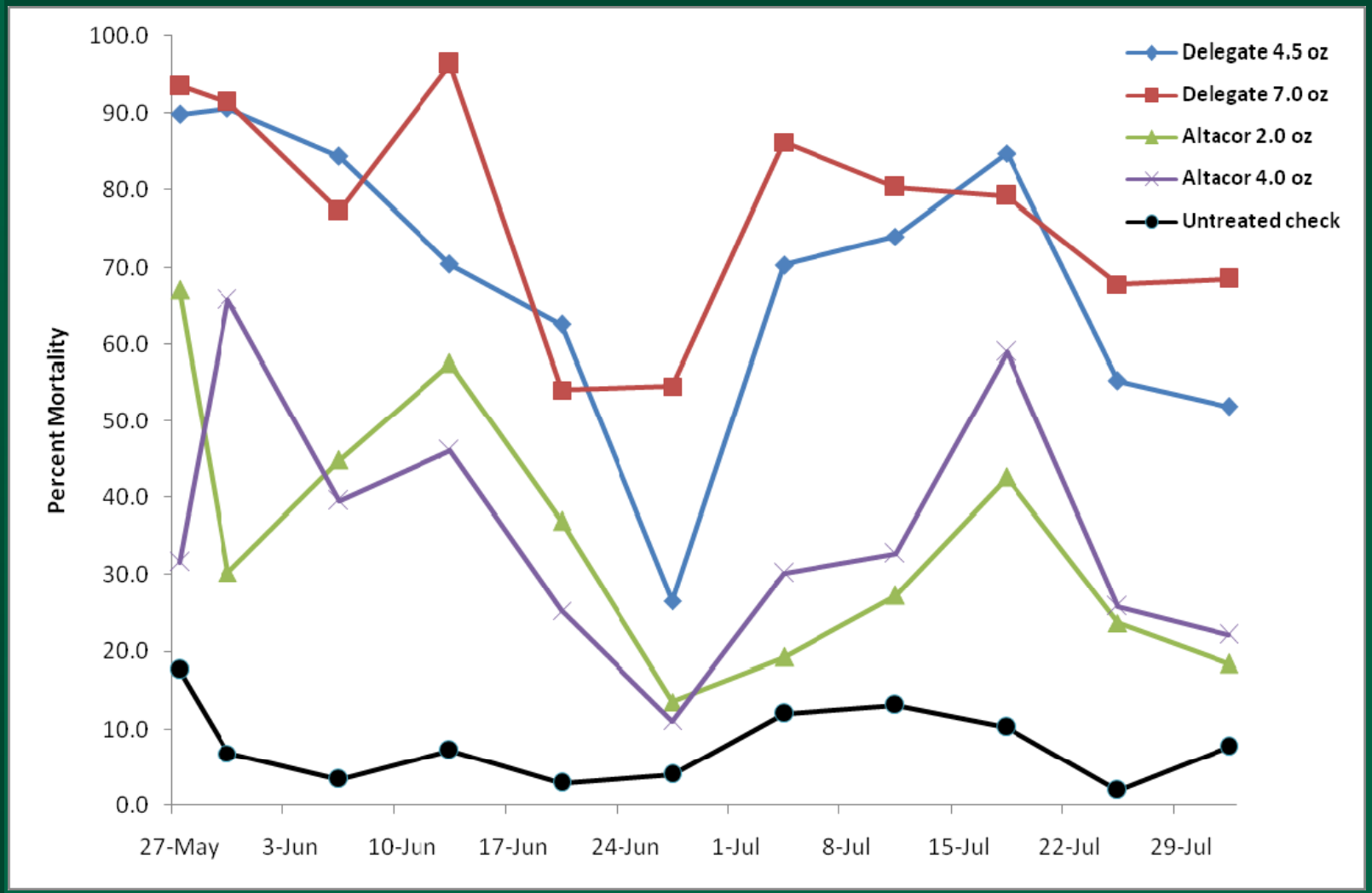
Standard Methods: Treatments

- CM Treatments
  - Delegate at 4.5 oz/ac applied at 1B & 2A
  - Delegate at 7.0 oz/ac applied at 1B & 2A
  - Altacor at 2.0 oz/ac applied at 1B & 2A
  - Altacor at 4.0 oz/ac applied at 1B & 2A
  - Untreated Check

Evaluation Procedures

- Treatments assessed weekly
  27 May-1 Aug
- Two capsules (containing 2 neonate CM larvae) were attached to the pear
- 13 fruit were infested per replicate
- Mortality determined after 24 hrs

Mean CM Larval Mortality Over Time



Conclusions

- Delegate had significantly greater larval mortality compared to Altacor
- Delegate provided 21 days of control
- Little rate difference with either Delegate or Altacor

Ovicidal Experiment with Altacor & (Delegate)

Standard Methods: Altacor Ovicide Study

- Altacor applied to apple halves prior to and after oviposition by dipping or spraying
- Applied 20 ppm prior to, 100 ppm after oviposition
- Applied using Potter spray tower

Standard Methods: Altacor Ovicide Study

- Min. of 10 eggs per fruit
- Apples held at 25°C with photoperiod 18:6 (L:D)
- Mortality determined after 6 days

CM Insecticides

Application Method	Rate/Form	Mean Mortality	
		Altacor	Control
Dip Before	20 ppm	59.7 b	13.0 a
Dip After	100 ppm	44.1 b	9.2 a
Spray Before	20 ppm	58.5 b	9.0 a
Spray After	100 ppm	42.7 b	14.3 a

Conclusions:

- Altacor is an effective ovicide.
- Maximum efficacy achieved with application prior to oviposition
- Similar mortalities achieved at 20 ppm prior and 100 ppm after oviposition.

Timing Experiment with Altacor & Delegate

Standard Methods - Field Trial

- CM Trials in Fairfield
  - 6 treatments replicated 4 times
  - Applied using hand-held orchard sprayer at 200 gal/ac
  - Applied at 1A & 1B timing (4/22 & 5/22) and 2A & 2B timing (6/26 & 7/17)

Standard Methods: Treatments

- CM Treatments
  - Delegate at 4.5 & 7.0 oz/ac applied 1A & 1B, Altacor at 2.0 & 4.0 oz/ac applied 2A & 2B
  - Altacor at 2.0 & 4.0 oz/ac applied 1A & 1B, Delegate at 4.5 & 7.0 oz/ac applied 2A & 2B

Standard Methods: Treatments

- CM Treatments
  - Grower Standard (Warrior II + Agri-Mek, Warrior II + Assail, Warrior II + Assail, Imidan)
  - Untreated Check

CM Evaluation

- Control of 1st gen on 8 Jun (125 fruit/rep)
- Control at harvest 5 Aug (250 fruit/rep)

Secondary Pest Evaluation

- Twospotted Spider Mites & Pear Psylla
  - 10 exterior & 10 interior leaves per week
  - Weekly examinations: 1st June to 27th July
  - Brushed and counted under magnification (20X)

CM Insecticides

Treatment	lb(AI)/ac	No. Appl.	% Infestation
Delegate 25WG	4.5 oz	2	0.4 a
Altacor 35 WG	2.0 oz	2	
Delegate 25WG	7.0 oz	2	0.4 a
Altacor 35WG	4.0 oz	2	
Altacor 35WG	2.0 oz	2	0.7 a
Delegate 25WG	4.5 oz	2	
Altacor 35WG	4.0 oz	2	0.6 a
Delegate 25WG	7.0 oz	2	
Warrior II +	2.56 oz	1	0.0 a
Agri-Mek 0.15EC[1]	16.0 oz		
Assail 30WG +	6.0 oz	2	
Warrior II	2.56 oz		
Imidian 70WP[2]	5.5 lb	1	
Untreated Control	—	—	31.6 b

[1] Purespray Green horticultural oil was applied at 1.0% on 22 Apr at 288 DD from 1st biofix.
[2] Imidian was adjusted to a pH of less than 5.0.

Secondary Pests (TSSM)

Treatment	Rate lb(AI)/ac	No. App.	Mean Total No. TSSM/20 Leaves 1st Gen	2nd Gen	Season
1.Delegate 25WG	4.5	2	11.0 ab	16.0 a	27.0 ab
Altacor 35WDG	2.0	2			
2.Delegate 25WG	7.0	2	14.0 ab	30.8 a	44.8 ab
Altacor 35WDG	4.0	2			
3.Altacor 35WDG	2.0	2	20.5 bc	30.0 a	50.5 b
Delegate 25 WG	4.5	2			
4.Altacor 35WDG	4.0	2	21.5 bc	38.0 a	59.5 b
Delegate 25WG	7.0	2			
5.Warrior II +	2.56	1	0.8 a	6.8 a	7.5 a
Agri-Mek 0.1EC[1]	16.0				
Assail 30WG +	6.0	2			
Warrior II	2.56				
Imidian 70WP[2]	88.0	1			
6.Untreated	—	—	31.5 c	35.0 a	66.5 b

[1] PureSpray Green horticultural oil was applied at 1% on 22 Apr at 288 DD from 1st biofix

[2] Treatment pH was adjusted to less than 5.5

Secondary Pests (Pear Psylla)

Treatment	Rate lb(AI)/ac	No. App.	Mean Total No. Pear Psylla/20 Leaves 1st Gen	2nd Gen	Season
1.Delegate 25WG	4.5	2	55.8 ab	19.5 a	75.3 ab
Altacor 35WDG	2.0	2			
2.Delegate 25WG	7.0	2	57.0 ab	27.8 a	84.8 abc
Altacor 35WDG	4.0	2			
3.Altacor 35WDG	2.0	2	88.3 bc	53.5 ab	141.8 bcd
Delegate 25 WG	4.5	2			
4.Altacor 35WDG	4.0	2	94.8 c	78.5 b	173.3 d
Delegate 25WG	7.0	2			
5.Warrior II +	2.56	1	26.3 a	22.0 a	48.3 a
Agri-Mek 0.1EC[1]	16.0				
Assail 30WG +	6.0	2			
Warrior II	2.56				
Imidian 70WP[2]	88.0	1			
6.Untreated	—	—	90.3 bc	67.0 ab	157.3 cd

[1] PureSpray Green horticultural oil was applied at 1% on 22 Apr at 288 DD from 1st biofix

[2] Treatment pH was adjusted to less than 5.5

Conclusions

- CM control with Delegate and Altacor similar & independent of order.
- Delegate had lower pear psylla rates if applied first.