

# Bayer CropScience

## LABEL UPDATE



**Santa Maria**  
**Phil McNally**  
**March 2014**



Bayer CropScience

# Industry Update Bayer CropScience







Luna<sup>®</sup>



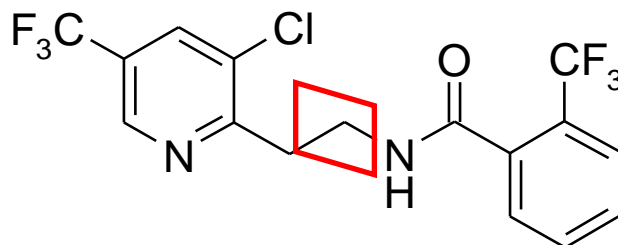
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	Signal word	PPE	FRAC Chemical class	REI (hours)
	Caution	Long-sleeved shirt Long pants Shoes plus socks Chem-resistant gloves	Group 7 (SDHI) Group 3 (DMI)	12 hrs <i>(Except for cane tying, turning, or girdling on wine grape which is 5 days)</i>
	Caution	Same	Group 7 (SDHI) Group 9 (AP)	12 hrs



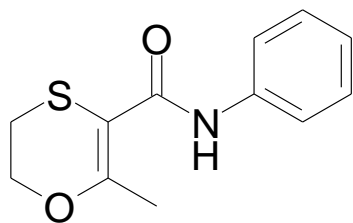
	Crop	PHI (days)	Crop Safety	Adjuvants
	Wine grape	14	Never seen on these crops	<u>No restrictions</u> <i>Adjuvants improve disease control</i>
	Wine Grape	7	Never seen on these crops	<u>No restrictions</u> <i>Adjuvants improve disease control</i>

**Fluopyram**  
 Chemistry is close to Pristine, but different...and better.

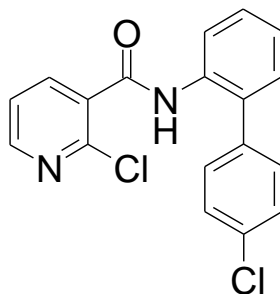


Succinate dehydrogenase inhibitor

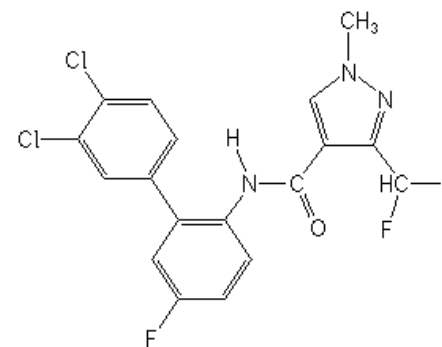
Luna = fluopyram  
 pyridinylethylbenzamide (pyramide)



Carboxin  
 oxathiincarboxamide



Boscalid  
 pyridinecarboxamide

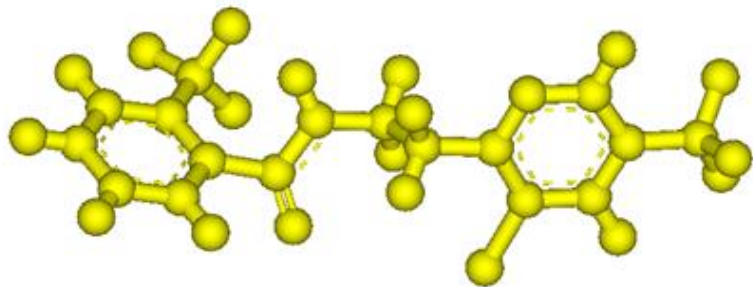


Bixafen  
 pyrazolecarboxamide

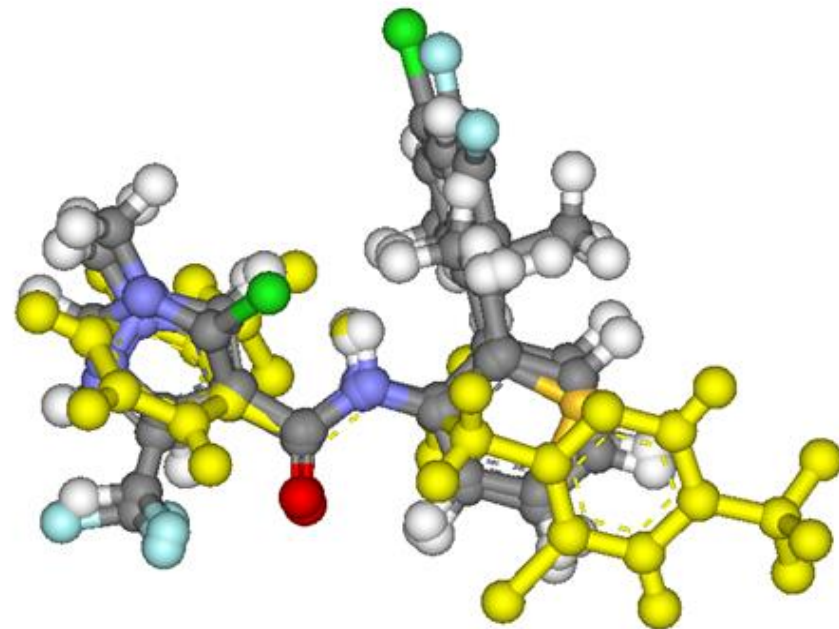


## Fluopyram - Molecular Structure

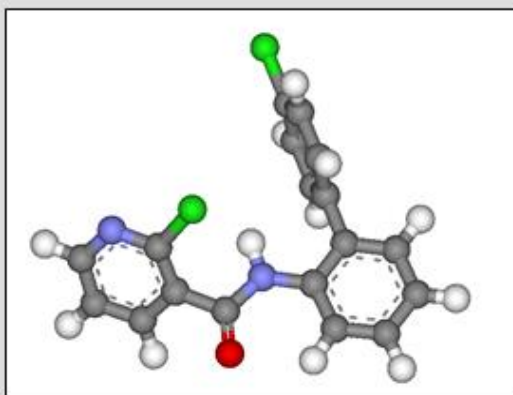
Fluopyram, a pyrimidine, has a different molecular shape compared to the carboxamides which may improve its ability to bind where structural mutations have resulted in resistance.



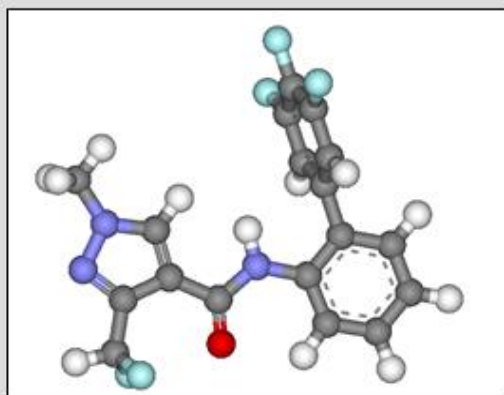
**Luna  
(Fluopyram)**



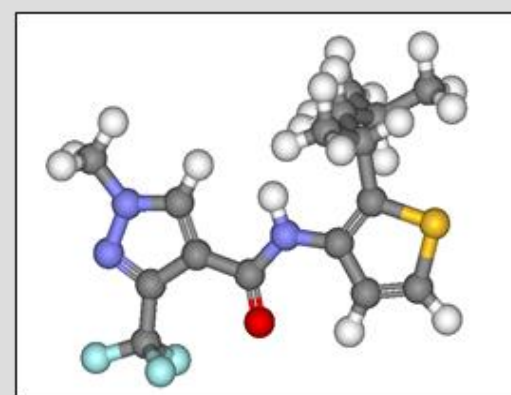
**All four structures superimposed  
(Fluopyram in yellow)**



**Pristine (component)  
(Boscalid)**



**Vertisan, Fontelis  
(Penthiopyrad)**



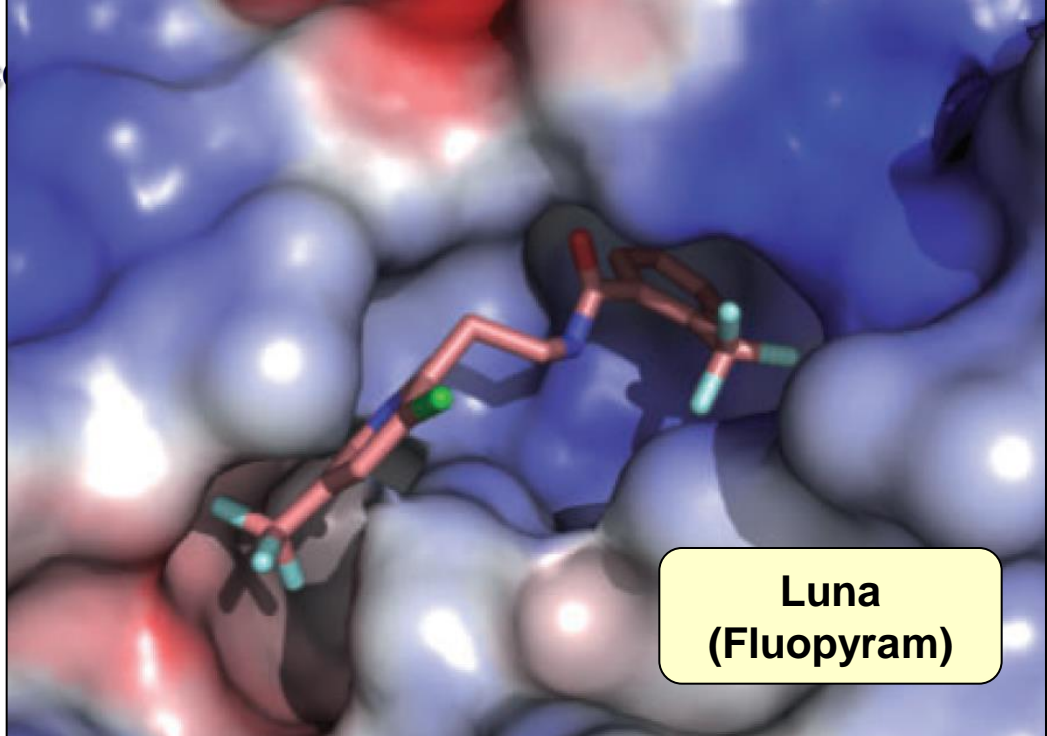
**Merivon (component)  
(Fluxapyroxad)**

**Luna™**

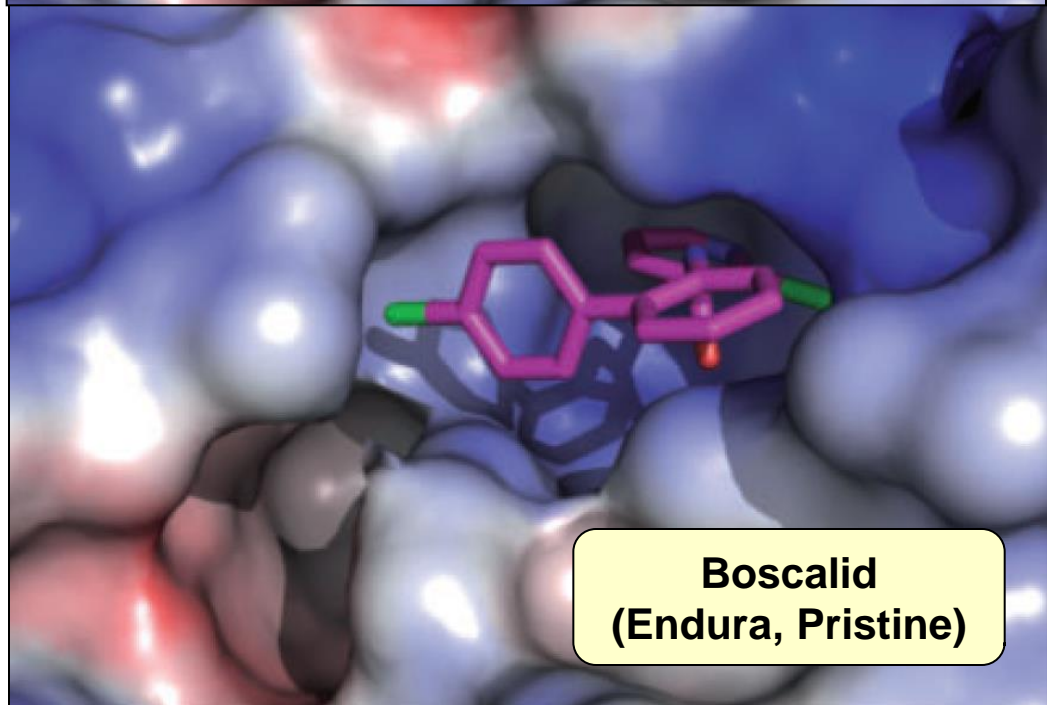


“This suggests very **tight binding** for fluopyram”

*FRAAIJE, MOLECULAR PLANT PATHOLOGY  
13(3), 263–275. (2012)*



**Luna  
(Fluopyram)**



**Boscalid  
(Endura, Pristine)**



# CARBOXAMIDE RESISTANCE

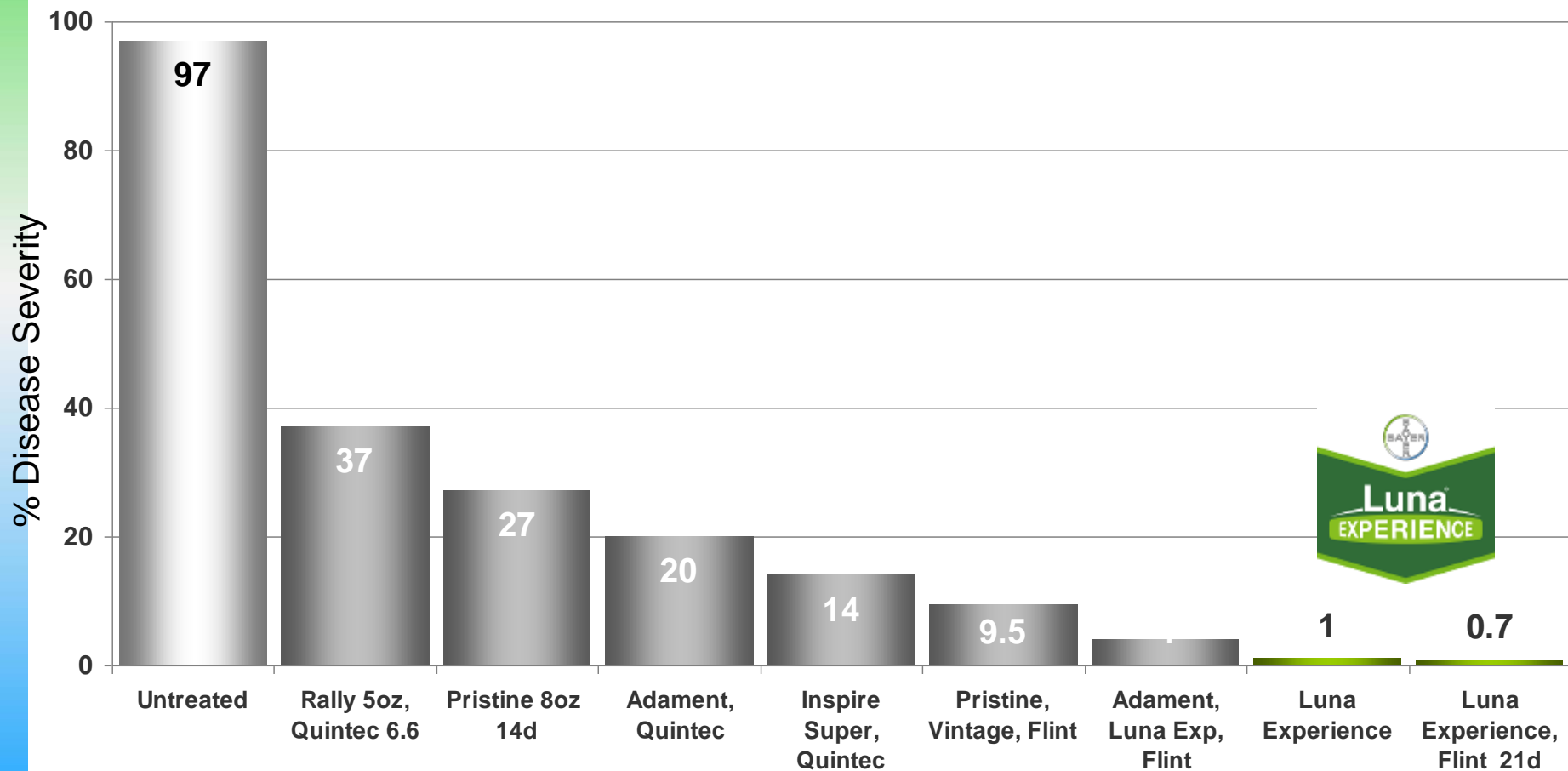
## Boscalid resistance detected

Leaf spot of Pistachio and Almond	<i>Alternaria alternata</i>	USA – CA
Grey mold of Grape	<i>Botrytis cinerea</i>	France
Grey mold of Strawberry	<i>Botrytis cinerea</i>	Florida
Powdery mildew of Cucumber	<i>Podosphaera xanthii</i>	Japan
Corynespora leaf spot of Cucumber	<i>Corynespora cassicola</i>	Japan
Gummy stem blight of Watermelon	<i>Didymella bryoniae</i>	USA - GA
Grey mold of Apples	<i>Botrytis</i> spp. (storage)	Washington
Early blight of Potato	<i>Alternaria solani</i>	Idaho



# Grape – Powdery Mildew

» D. Gubler, Davis CA, 2009



# GRAPE – Botrytis

Bettiga, UCCE, Salinas Valley, 2013

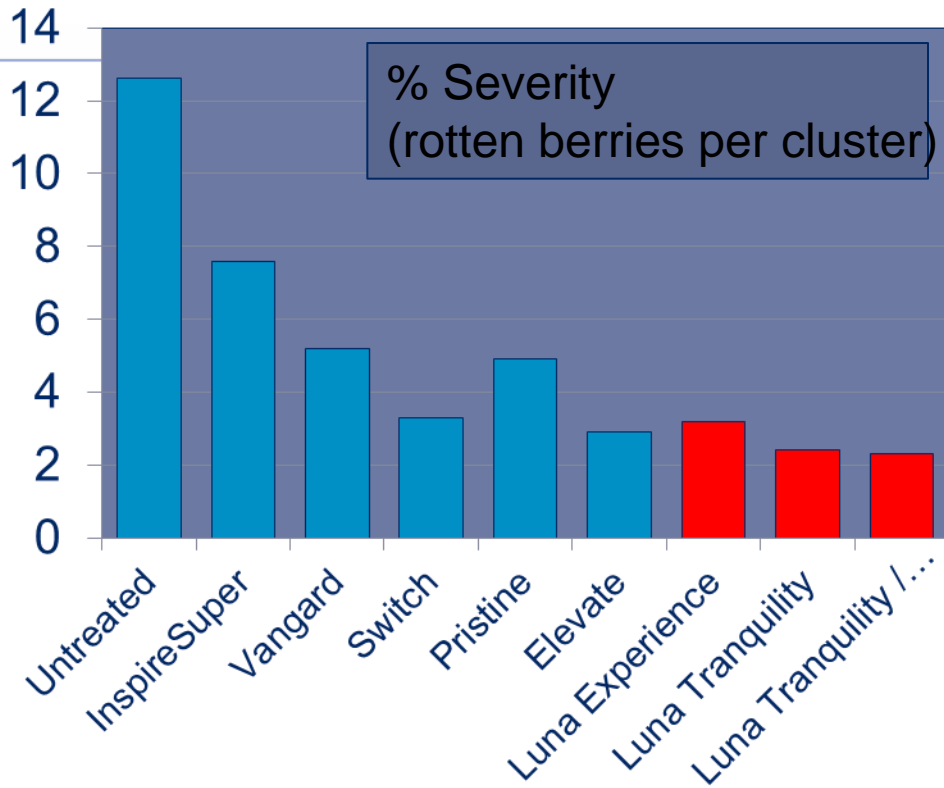


Table 1. Fungicide treatments evaluated for Botrytis bunch rot control.

Treatment	Application Timing*	Product Rate/Acre
1. Untreated Control	---	---
2. Vangard 75 WG	B, PC, V	10 oz
3. Switch 62.5 WG	B, PC, V	14 oz
5. Inspire Super 338 EW	B, PC, V	20 fl oz
6. Pristine 38 WG	B, PC, V	23 oz
7. Elevate 50 WG	B, PC, V	1 lb
8. Luna Experience 400 SC	B, PC, V	8 fl oz
9. Luna Tranquility	B, PC, V	16 fl oz
10. Luna Tranquility	B, V	16 fl oz
Serenade Optimum	PC	1 lb

\* B, PC, and V are full bloom, cluster pre-close, and veraison respectively.

- Good results Luna programs compared to competition
- Some weaker treatments not included in this graph
- Incidence ratings (% rotten clusters) similar

# Wine Grape Fungicide MRLs in ppm

( as of January, 2014 - mrldatabase.com)

**Luna™**

	Codex	Australia	Canada	Japan	Korea	Taiwan
Luna E (fluo/teb)	2/6	---	2/5	10/10	2/2	---
Luna T (fluo/pyrim)	2/4	---	2/2	10/10	2/5	---
Flint	3	0.5	2	5	1	2
Scala	4	5	5	10	5	4
Pristine (bos/pyraclostrobin)	5/2	4/2	3.5/2	10/3	5/3	1/2
Vivando	---	4.5	4.5	---	5	2
Mettle	---	0.5	---	0.5	2	0.5
InspireSuper (difencon/cyprodinil)	0.1	4	4	0.5	1	1
Vanguard	3	2	2	5	5	2
Elevate	15	10	4	20	3	4
Sovran	1	---	1	15	5	5
Tebuconazole	6	2	5	10	2	2
Quintec	2	0.6	0.5	2	2	2
Viticure	---	0.5	2.5	2	2	1
Rally	1	1	1	1	2	1
Abound	2	2	3	10	3	2



# Luna – Tier II Crops - 2015

Bayer CropScience intends to offer Luna on a wider range of fruit and vegetable crops in late 2015 pending additional registrations in:

*Stone fruit, Pome fruit, Strawberry, Leafy brassica vegetables, Fruiting vegetables, Brassica vegetables, Bulb vegetables, Carrots, Cucurbits, and others.*





# MRL Update

## **Vegetable disease targets**

**Phytophthora and Pythium, Alternaria (Early blight, Purple blotch)  
Downy mildew, White rust, Cavity spot and other Pythium**



REASON<sup>®</sup>

1/ Changed in Aug. 2013. Was 15 ppm for head and 20 ppm for leaf lettuce  
2/ Established in August 2013.

**REASON –  
MRLs (ppm)- 2013**

	EU	Mexico	Canada	Japan
Lettuce, Head	2	60.0	<b>60</b> <sup>1</sup>	20
Lettuce, Leaf	2	60.0	<b>60</b> <sup>1</sup>	20
Broccoli, Cauliflower	0.02	5.0	<b>5.0</b>	5
Broccoli, Chinese	0.02	5.0	<b>5.0</b>	---
Cabbage	0.02	5.0	<b>5.0</b>	5
Bok Choy, collards, kale	0.02	5.0	<b>55.0</b>	---
Carrot	0.02	0.15	<b>0.02</b> <sup>2</sup>	0.15
Celery	0.02	60.0	<b>60.0</b> <sup>2</sup>	---
Peppers	0.02	1.0	<b>1.0</b> <sup>2</sup>	1
Tomatoes	0.02	1.0	1	1
Spinach	0.02	60.0	<b>60.0</b> <sup>2</sup>	---
Onions, Bulb	0.02	0.2	0.2	0.2
Onions, Green	---	1.5	1.5	---
Cucumbers	0.02	0.15	0.15	0.3
Watermelon	0.02	0.15	0.15	0.15



# MOVENTO™

## Label updates 2014

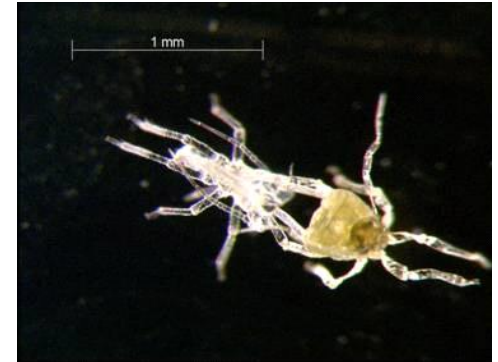




## Industry Update Bayer CropScience

Unique mode of action and symptoms in sucking pests

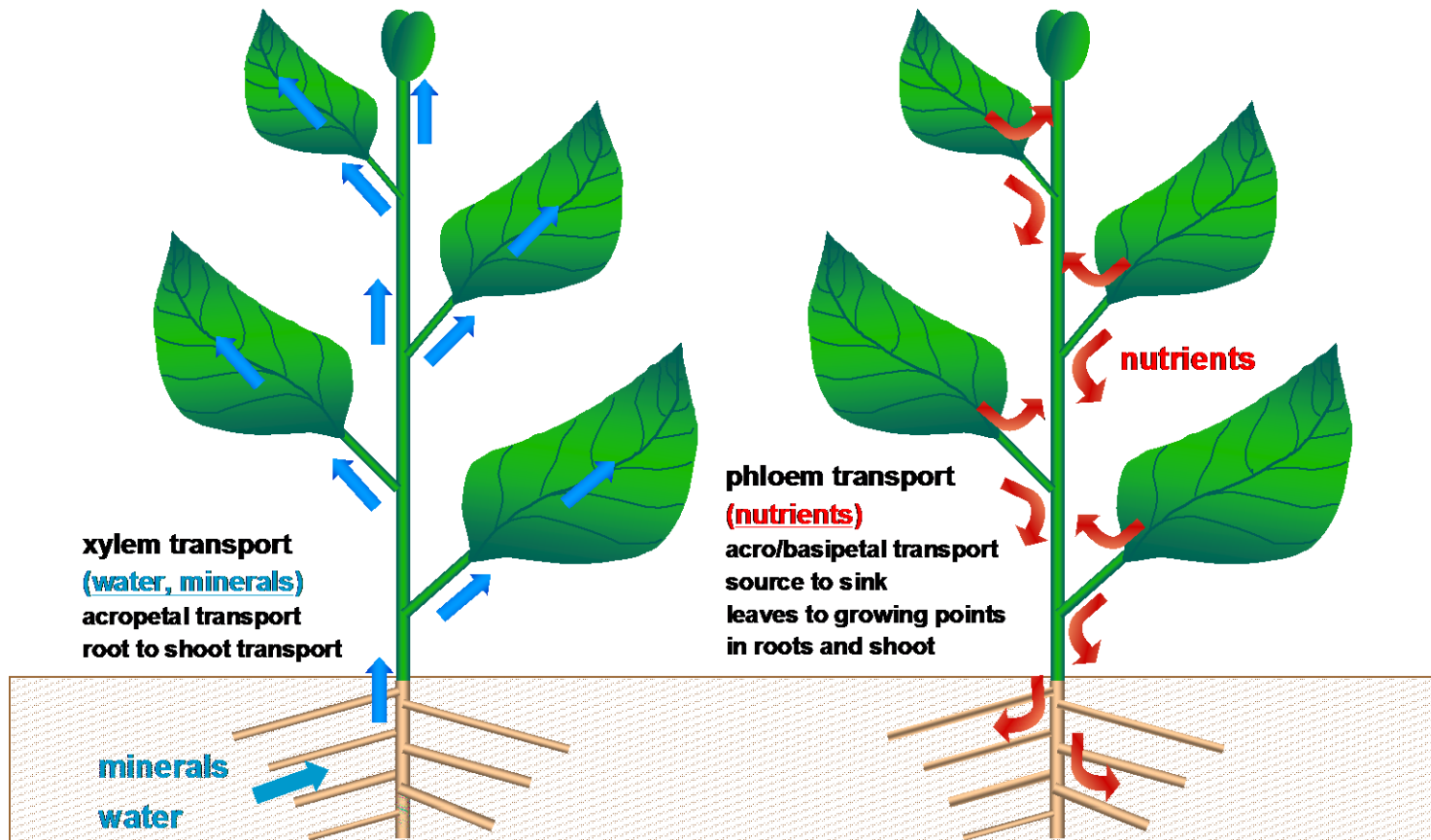
- **A unique mode of action against several key target pests, Lipid Biosynthesis Inhibitor (LBI)**
- **Nymphs have incomplete molting, or dehydration and subsequent death**
- **Adult females accumulate nymphs and die**
- **Strong effects on fecundity, fertility, and survivability of progeny**



Incomplete molting  
(aphid)

## Industry Update Bayer CropScience

In plants two transport systems coexist - **xylem (one-way)** and **phloem (two-way)**



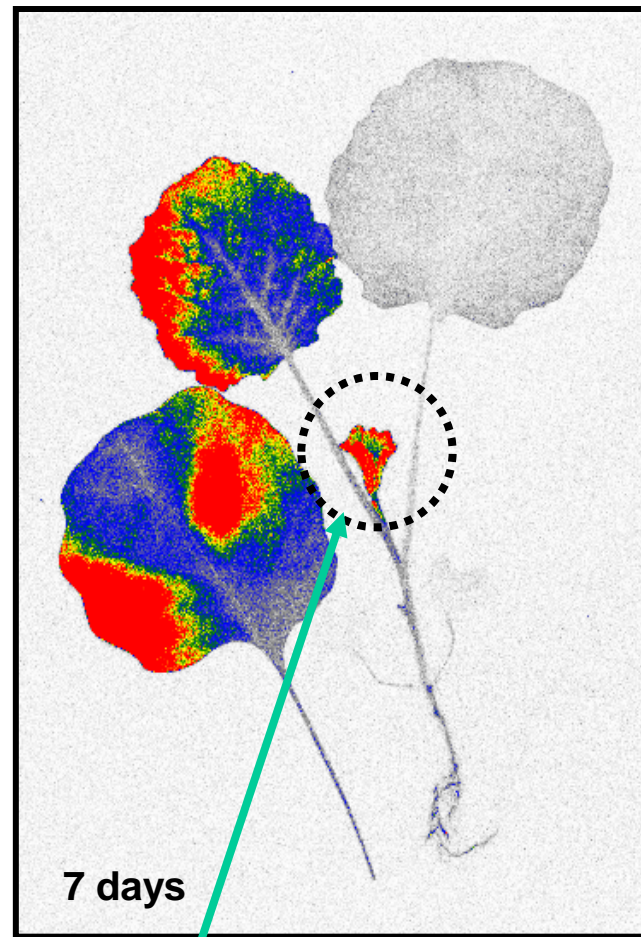
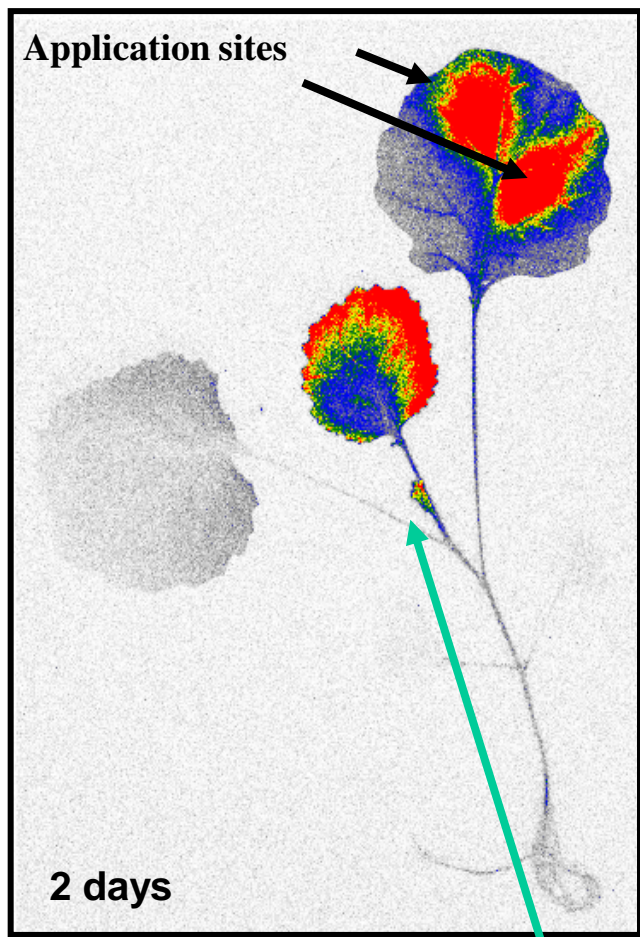
The active ingredient is absorbed into the leaf, readily hydrolyzed to spirotetramat-enol – which translocates.



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# $^{14}\text{C}$ autoradiograph of systemic movement and protection of new leaves...and roots?



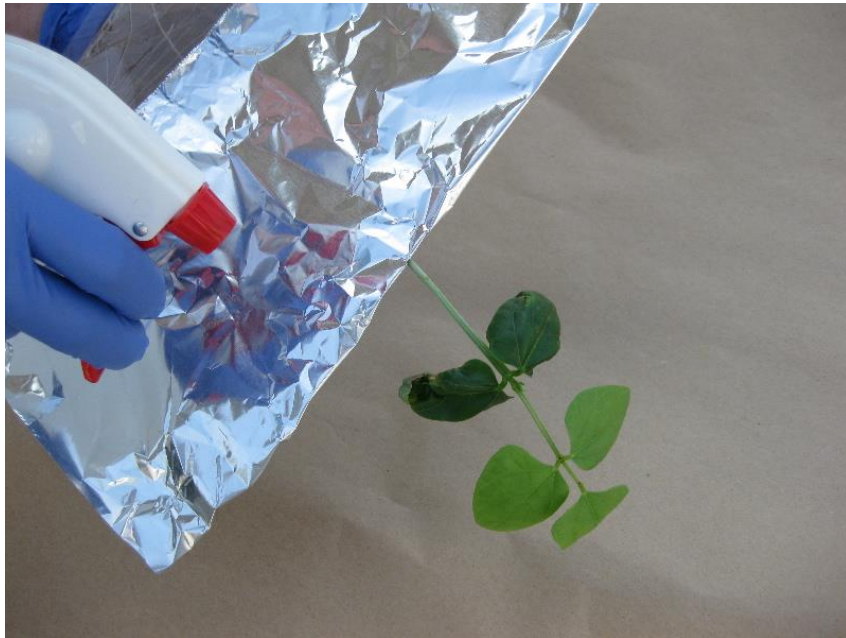
Systemic movement of spirotetramat into new leaves



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Industry Update Bayer CropScience

# Rootknot nematodes-cowpeas- UCR, Phil Roberts



Industry Update Bayer CropScience

# Nematodes-cowpeas- UCR, Phil Roberts

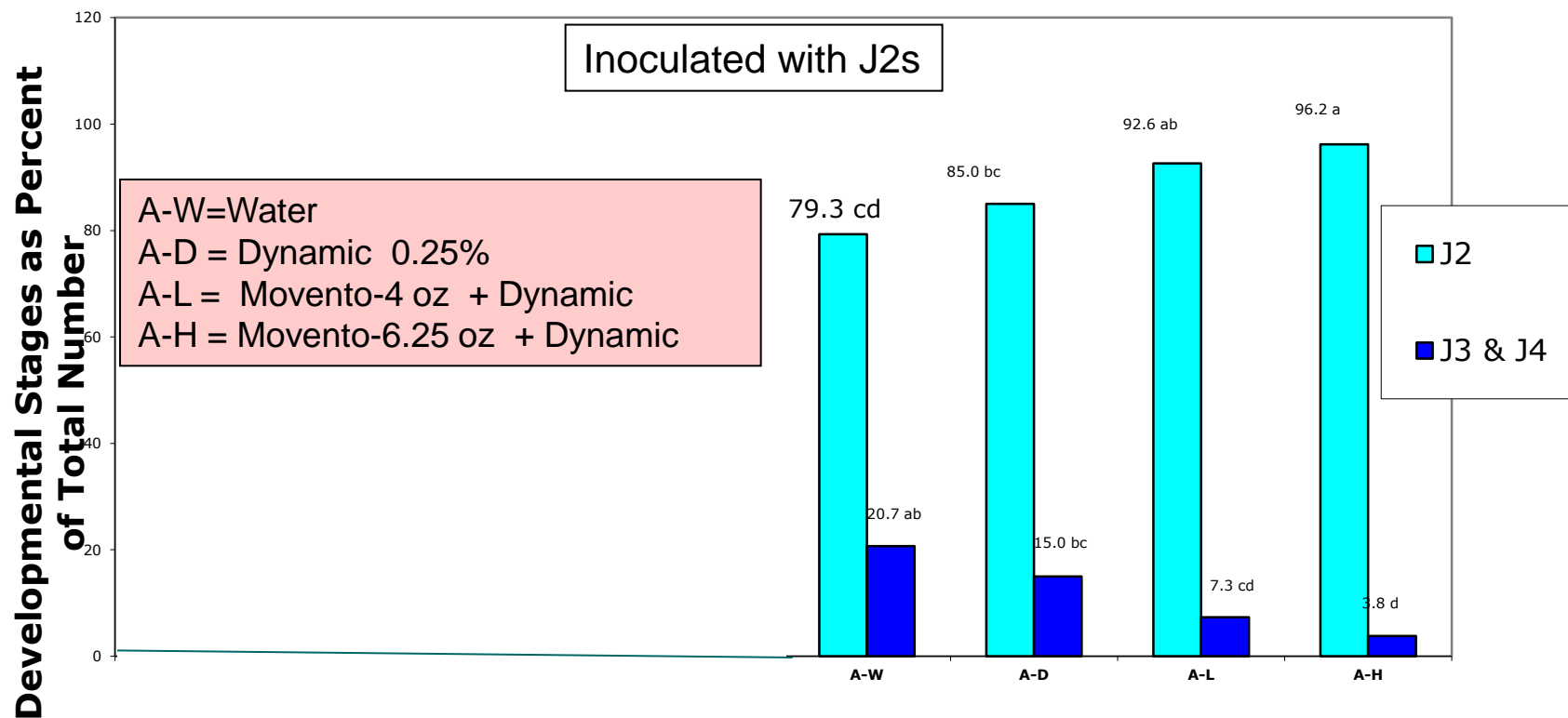


# Nematodes-cowpeas- UCR, Phil Roberts

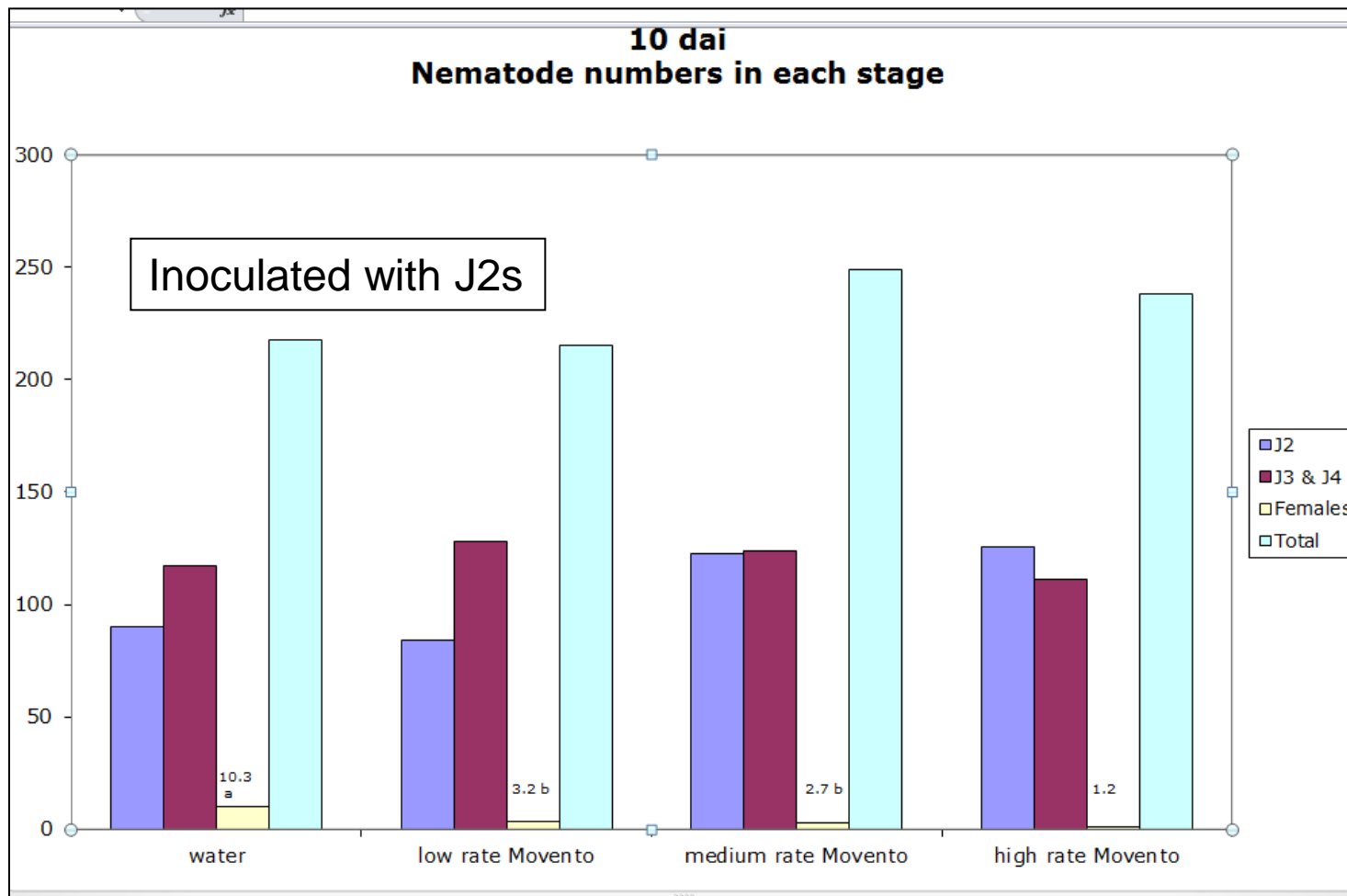


## Rootknot nematodes-cowpeas- UCR, Phil Roberts, 2010- Juveniles (J3-4s) impacted

### Movento Trial Roots Stained 1 Week After Inoculation



## Nematodes-cowpeas- UCR, Phil Roberts, 2011- Adults impacted



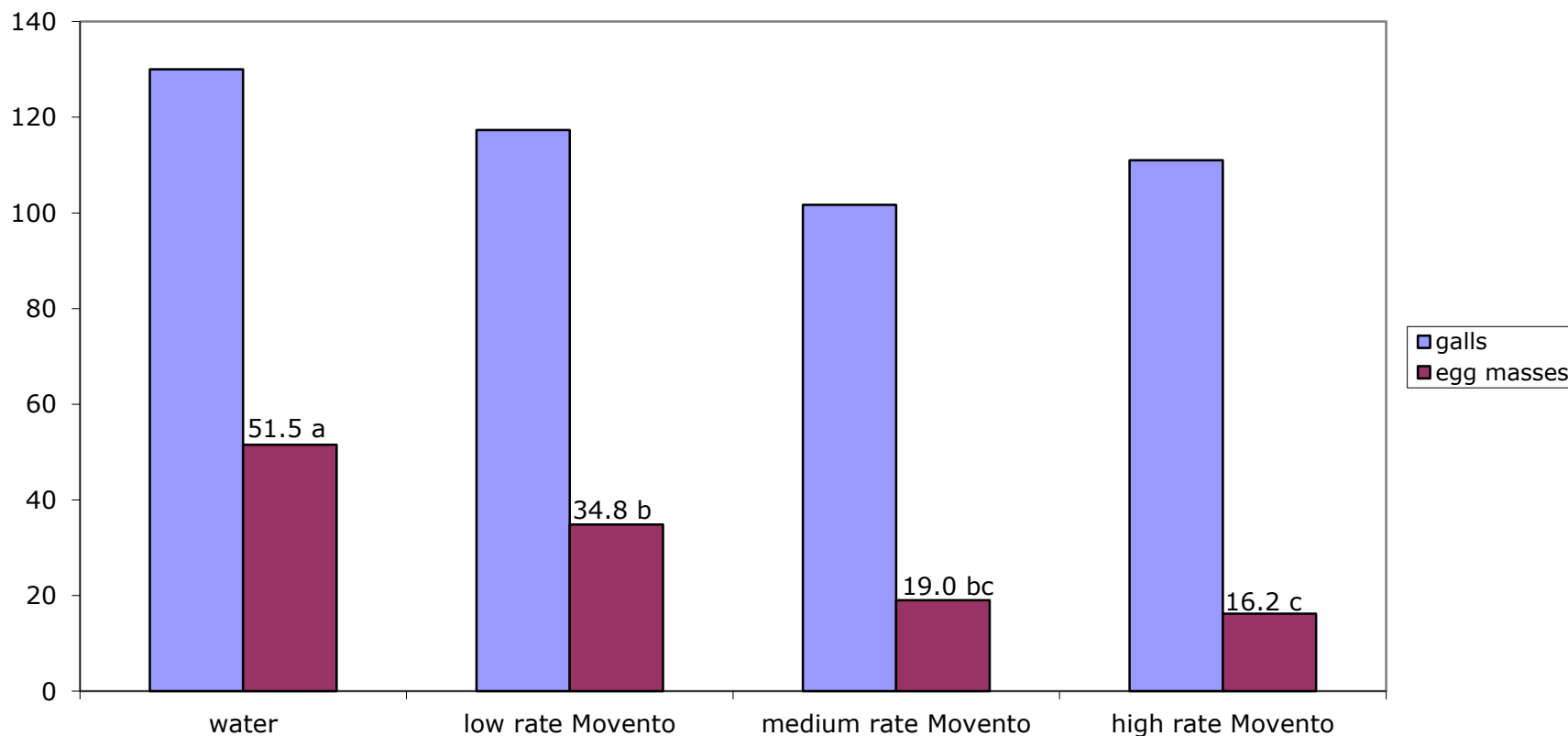
Movento rates: 2.5 , 4.0, 6.5 oz/acre equivalent



## Rootknot nematodes-cowpeas-2011 UCR, Phil Roberts, Egg masses impacted

Inoculated with J2s

Movento II  
20 dai



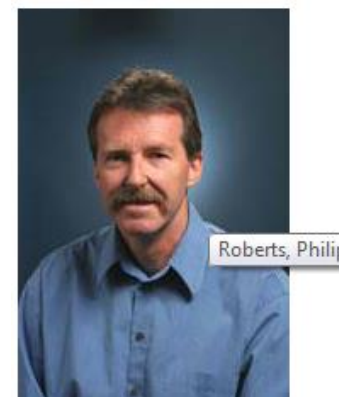
Movento rates: 2.5 , 4.0, 6.5 oz/acre equivalent



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## **Movento/rootknot nematode control Conclusion – Phil Roberts, UCR-2011**

- **“For seedlings, these results suggest early season protection of annual host plants from nematode infection and damage could be achieved from Movento treatment at the seedling stage.”**





## **Movento: New crops - 2014**

- **Additional crops**
  - **Tropical crops**
    - Banana and Plantain
    - Coffee
    - Pineapple
    - Taro
  - **Globe artichokes**
  - **Pomegranates**
  - **Watercress**



## Movento: new crops– 2014

- **Additional crops**
  - **Bulb Vegetables**
    - Onions
  - **Bushberry & low growing berry subgroup**
    - Blueberries
    - Cranberries
    - Currants



## Movento new crops: 2015

- **2014 submission: June, 2014 (registration 2Q, 2015)**
  - **Strawberries – aphids, whiteflies, mites**
  - **Cucurbits (no bloom restriction)**
  - **Sugar beets**
  - **Cotton**
  - **Carrots (IR-4)**

(Updated March 27, 2014 – S. Maria meeting)



# New Strawberry MRL for Canada

Strawberry - Trifloxystrobin							
US !	Cod !	EU !	Aus !	Can !	Jpn !	Kor !	Tai !
1.1	{1}	{0.5}	2	1.1	{0.2}	{0.05}	{0.01}





## A New Insecticide from Bayer CropScience



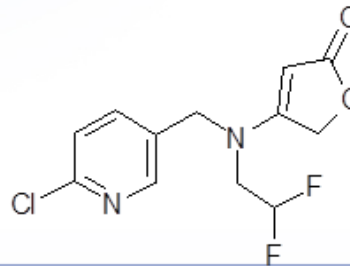
Science For A Better Life



Registration Pending



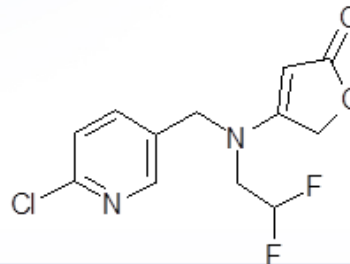
# Sivanto/Origin



- Chemical class: **Butenolide**
- Bayer synthesized new compounds based on derivations of the natural alkaloid **Stemofoline**, identified in *Stemona japonica* (monocot group from Asia/Australia).
- This new class of compounds are called **Butenolides**, and
  - Act on the Nicotinic acetylcholine receptor (**nAChR**) agonist **IRAC Group 4D**
  - Show no cross resistance on imidacloprid-resistant whiteflies.
  - These compounds have shown insecticidal activity
    - In foliar, soil, and seed applications.
    - No phytotoxic effects observed.



# Product Overview



- Chemical class: **Butenolide**
- Core formulation: 200 SL
- Mode of action: Contact and ingestion activity
- Pest Spectrum: **Aphids, Leafhoppers, Whiteflies, Scales, Psyllids, Scirtothrips**
- Application Methods: Foliar and **Soil**
- REI: 4 hours, 12 hrs in CA
- PHI: Foliar - 0-14 days dependent on crop  
Soil – 21-45 days dependent on crop



# Registration Schedule

Submission (EPA & CDPR) : July 2012

Positioned as **reduced risk** 18 month PRIA review

Registration Expected : October 2014 –

Full Market Launch : 2015

TNV, **Vegetables, Grapes, Strawberries**, Cotton, Alfalfa, Cereals

Tier II submission in 2015

Stone fruit, greenhouse tomatoes and cucumbers,  
pomegranates, avocados, cactus, caneberries



# MRLs

Sivanto - MRL Establishment (anticipated, best estimates)							
Crop	U.S.	CODEX	E.U.	Canada/Mex, Australia	Japan	Korea	Taiwan
Label	Q3 2014	Q3 2016	Q1 2016	Q3 2014	Q1 2016	2017 or 2016 if CODEX accepted	Q1 2016

# Biological Characteristics

- Activity via ingestion and contact
- Adult knockdown, nymph & egg control
- Rapid and strong feeding cessation effect – **Disease transmission inhibition (CYSDV, HLB?, leafroll virus?)**
- Xylem systemic from root uptake, translaminar / locally systemic from foliar applications
- Excellent residual control
- Excellent honey bee safety profile



Whitefly



Scale



Psyllid



Aphid



Leafhopper

# Soil App.- **CYSDV** - Melons - 68 DAT





Sivanto:

# Effects on honey bee foraging/brood



Studies indicate Sivanto has no adverse effects on mortality, foraging activity, brood development, hive vitality and overwintering.

Test Substance	Study Type/Duration	Ecotox Endpoint (LD50)
Sivanto	Oral 48 h	3.2 ug AI/bee
Sivanto (technical)	Contact 48 h	>200 ug AI/bee
Sivanto	Foliar residue @ 3,8, 25 h	No toxicity @ 205 g AI/ha

Note: Azole fungicides inhibit metabolism of Sivanto



Bayer CropScience

Registration Pending

# Bayer Biologics

## Not just for organic programs



### Fungicides

SERENADE  
MAX

SERENADE  
ASP

SONATA

BALLAD  
PLUS

SERENADE  
SOIL

OPTIVA

### Insecticides

REQUIEM

- Rotational options (res mngt)
- 0-day PHI for all crops
- No MRL issues



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