

Project Name: Mite Efficacy

New	Ongoing	X	Completed	Duration if ongoing or completed:	2009 – 2011, 2014 – 2015, 2022-2023
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Project Description:

Mite species can be very difficult to manage because of their often cryptic nature and ability to rapidly reproduce. The key to management is a combination of excellent product application techniques for optimal plant coverage and a good rotational program among different IRAC mode of action classes to reduce resistance development. Spider mites, often the most prevalent mite group, are well studied during the development process for new miticides. However, other species may not be screened including broad mites and eriophyid mites. This project started as a regional issue in 2009 screening currently registered products as well as new materials. Eriophyid and similar mites became a regional priority at the 2021 workshop.

Research Project Abstract (if available):

Abstract from 2019 Mite Efficacy: A Literature Review

From 1999 to 2016, 34 active ingredients were tested mainly as foliar applications against several genera and species of mite pests on ornamentals and vegetables. Mite species tested included: broad mite, *Polyphagotarsonemus latus*, Eriophyid mites including *Aceria* sp., *Aculops lycopersici*, *Aculus ligustri*, *Aculus schlechtendali*, *Epitrimerus pyri*, spider mites including *Tetranychus urticae*, *Oligonychus ilicis* and *Panonychus citri*, and the red palm mite *Raoiella indica*. Although there were insufficient data for definitive conclusions, Akari/Fujimite (fenpyroximate), Magus (fenazaquin) and Pylon (chlorfenaphyr), generally performed well on various species. Kontos/Movento/BYI 08330 (spirotetramat) looked promising on the Eriophyids *Aceria* sp. and *Aculus ligustri* and on the spider mites *P. citri* and *T. urticae*. Proclaim (emamectin benzoate) was promising on the Eriophyids *Aceria* sp. and *Aculus ligustri* and on *P. latus*. Mesa/Ultiflora (milbemectin) looked promising on the Eriophyids *A. ligustri*, *Aculus schlechtendali*, *Epitrimerus pyri* and *Aculops lycopersici*, and on the spider mites *T. urticae*. Shuttle (acequinocyl) looked promising on Southern red mite. On red palm mite, limited data indicated that Forbid/Judo (spiromesifen), Pylon, Sanmite (pyridaben), Shuttle (acequinocyl) and Sulfur/Thiolux (sulfur) performed well while Avid (abamectin), Hexygon (hexythiazox) and Tetrasan (etoxazole) were less effective. Tank-mix combination with oils generally improved mite control.

Research Target (Crop Safety, or common and Latin name of arthropod, pathogen, weed):

Broad Mite (<i>Polyphagotarsonemus latus</i>)	Mite, Southern red (<i>Oligonychus ilicis</i>)
Eriophyid Mite (<i>Aceria</i>) (<i>Aceria</i> sp.)	Red Palm Mite (<i>Raoiella indica</i>)
Hedge Privet Rust Mite (<i>Aculus ligustri</i>)	

Target Crops (list tested crops if ongoing or completed project)

<i>Cocos</i> sp.	<i>Impatiens hawkeri</i>
<i>Forestiera neomexicana</i>	<i>Ligustrum sinense</i>
<i>Ilex</i> sp.	

Target Product(s)(list tested products or numbered compounds if ongoing or completed project)

Akari 5SC (Fenpyroximate)	ISM-555 (ISM-555, A21377X)
Avid 0.15EC (Abamectin)	Judo 2SC (Spiromesifen)
Enfold (Emamectin benzoate)	Kontos 240SC (Spirotetramat)
Floramite (Bifenazate)	Magus (Fenazaquin)
Grandevo (MBI 203 DF) (<i>Chromobacterium subtsugae</i>)	NI02ES-1 (NI02ES-1)
NRRL B-30655)	OAT 1401E (RM-1963K) (RM-1963K)
Hexygon (Hexythiazox)	Ovation SC (Clofentezine)



Environmental Horticulture Program Research Project Sheet

<https://www.ir4project.org/ehc/ehc-registration-support-research/env-hort-extension-resources/>

Target Product(s)(Con't)	
Proclaim (Emamectin benzoate) Proclaim 5SG (Emamectin benzoate) Pylon (Chlorfenapyr) Sanmite (BASF) (Pyridaben) Shuttle 15SC (Acequinocyl) SP3014 (SP3014) SuffOil X (Synergy) (Mineral oil)	TetraCURB Max (castor oil + rosemary oil + clove oil + peppermint oil) Tetrasan (Etoxazole) Thiolux 80DF (Sulfur) TickEx EC (Metarhizium anisopliae) Ultiflora (Milbemectin)

Product Registration and Research Status				
	Fully Screened (also includes standards)	Partially Screened through IR-4 ¹	Need Data for Additional Species ?	
Labeled for Mites Generally & Commercialized	Akari Avid, Minx Dursban Horticultural Oil Scimitar		BotaniGard MAXX Floramite Grandevo Judo Kontos Magus	Met-52, Tick-Ex Pylon Tetrasan Ultiflora Xpectro OD
Labeled for Mites Generally But NOT Commercialized				
Labeled for Specific Mites & Commercialized		Hexygon Ovation Sanmite	Kelthane ProMITE	Sirocco Tame
Labeled for Specific Mites but NOT Commercialized				
Not yet registered or labeled for Mites		Emamectin benzoate MBI-203		Sultan Venerate (MBI 206 F)
No longer available for development for Mites				
* IR-4 Data contributed to registration decision – either adding pest to label or not pursuing further research				
1 At least one species screened fully				
2 Product not available for production ornamentals				

PROS	CONS
Little efficacy data available for non-spider-mite mites	Several IRAC classes are available for resistance management
Rose Rosette Disease (eriphyid mite)	Very few new tools for screening
New tool available (BASF)	Spider mites tend to be managed well with a few exceptions
Need new systemic tools (emamectin benzoate, tree injection, unsure of soil systemicity, translaminar foliar)	
New Bayer Biologics product for mite evaluation (EPA submission for Food Use already made)	
Eriophyid in aloe & agave plants, landscape/nursery. And market as containermaple spider mite issue increasing in southern region	

IR-4 Efficacy Trials to Date



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Page 3 of 4

Average rating on a scale of 1 – 5 with 1 = 0 to about 50% efficacy (not effective) and 5 = 95 to 100 efficacy (very effective); minimum to maximum rating; number of trials (See table on next page). For product/insect combinations that are blank, IR-4 has not screened this combination.

'Labeled' indicates that this disease species or genera is listed on the label. A rating of 2 or lower is considered unacceptable efficacy (*red text*). A rating of 3 or higher is considered commercially acceptable (black text). Non-labeled, completed product/disease combinations (3 or more trials) with an average rating of 3 or higher are highlighted with *green text*. For disease/product combinations that are blank, IR-4 has not screened this combination.

MOA	Product (Active Ingredients)	Broad Mite (<i>Polyphago- tarsonemus latus</i>)	Eriophyid Mite, Forestiera (<i>Aceria sp</i>)	Hedge privet rust mite (<i>Aculus ligustri</i>)	Mite, Southern red (<i>Oligonychus ilicis</i>)	Red Palm Mite (<i>Raoiella indica</i>)
FRAC BM02	Grandevo (MBI 203 DF) (Chromobacterium subtsugae NRRL B-30655)	1.0 (1 - 1) n1 <i>Labeled</i>				
FRAC M2	Thiolux 80DF (Sulfur)					3.0 (3 - 3) n1
FRAC NC	SuffOil X (Synergy) (Mineral oil)	3.0 (3 - 3) n1 <i>Labeled</i>				
IRAC 10A	Hexygon (Hexythiazox)		1.0 (1 - 1) n1	1.0 (1 - 1) n1		1.0 (1 - 1) n1
IRAC 10A	Ovation SC (Clofentezine)				5.0 (5 - 5) n1	2.0 (2 - 2) n1
IRAC 10B	Tetrasan (Etoxazole)					1.7 (1 - 3) n3
IRAC 13	Pylon (Chlorfenapyr)	5.0 (5 - 5) n1 <i>Labeled</i>		5.0 (5 - 5) n1 <i>Labeled</i>		2.0 (2 - 2) n1 <i>Labeled</i>
IRAC 13 +	Tank Mix: Pylon + Horticultural Oil (Chlorfenapyr + Mineral oil)	5.0 (5 - 5) n1				
IRAC 13 +	Tank Mix: Pylon + SuffOil X (Chlorfenapyr + Paraffinic oil)	5.0 (5 - 5) n1				
IRAC 20B	Shuttle 15SC (Acequinocyl)				5.0 (5 - 5) n1	3.0 (3 - 3) n1
IRAC 20D	Floramite (Bifenazate)				5.0 (5 - 5) n1	
IRAC 21	Sanmite (BASF) (Pyridaben)				5.0 (5 - 5) n1 <i>Labeled</i>	5.0 (5 - 5) n1 <i>Labeled</i>
IRAC 21A	Akari 5SC (Fenpyroximate)		2.0 (2 - 2) n1	5.0 (5 - 5) n1		
IRAC 21A	Magus (Fenazaquin)	3.0 (3 - 3) n1 <i>Labeled</i>	4.0 (4 - 4) n1 <i>Labeled</i>	5.0 (5 - 5) n1 <i>Labeled</i>		
IRAC 23	Judo 2SC (Spiromesifen)					5.0 (5 - 5) n1 <i>Labeled</i>
IRAC 23	Kontos 240SC (Spirotetramat)	2.0 (2 - 2) n2	3.0 (3 - 3) n1	5.0 (5 - 5) n1		5.0 (5 - 5) n1
IRAC 6	Avid 0.15EC (Abamectin)	5.0 (5 - 5) n1 <i>Labeled</i>		5.0 (5 - 5) n1 <i>Labeled</i>		2.3 (1 - 5) n3 <i>Labeled</i>
IRAC 6	Enfold (Emamectin benzoate)		4.0 (4 - 4) n1			
IRAC 6	Proclaim 5SG (Emamectin benzoate)	5.0 (5 - 5) n1		5.0 (5 - 5) n1		
IRAC 6	Ultiflora (Milbemectin)		1.0 (1 - 1) n1	5.0 (5 - 5) n1		2.0 (2 - 2) n1
IRAC 6 +	Tank Mix: Avid 2EC + Oil (Abamectin + Oil)		4.0 (4 - 4) n1			
IRAC UNF	TickEx EC (Metarhizium anisopliae)			3.0 (3 - 3) n1 <i>Labeled</i>		