

**Project Name:** Leaf Spots & Anthracnose Efficacy

<b>New</b>	<b>Ongoing</b>	<b>Completed</b>	X	<b>Duration if ongoing or completed:</b>	1982-1988, 2014-2019
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**Project Description:**

Leaf spots and anthracnose diseases have routinely surfaced in the biennial survey of grower needs. While numerous classes and subclasses for fungal mode of action are currently available, growers continue to have difficulty managing these diseases.

**Research Project Abstract (if available):**

*Abstract from 2016 Leaf Spots & Anthracnose Efficacy*

At the IR-4 Ornamental Horticulture Program Workshop in 2013, leaf spots and anthracnose efficacy was selected as a high priority project to expand the knowledge and list of fungicides available to growers for these diseases. In addition to research collected through the IR-4 program, this summary includes a review of experiments conducted from 1987 to 2019 on environmental horticulture crops. Species tested included: *Alternaria alternata*, *Apiognomonina quercina*, *Cephaleuros virescens*, *Cercospora cornicola*, *Cercospora lythracearum*, *Colletotrichum navitas*, *Colletotrichum sp.*, *Corynespora cassiicola*, *Diplocarpon rosae*, *Discula destructiva*, *Drechslera setariae*, *Elsinoe corni*, *Entomosporium mespili*, *Marssonina populi*, *Myrothecium roridum*, *Phaeocryptopus gaeumannii* and *Septoria sp.* During this time period, numerous products representing 45 active ingredients were tested as foliar applications against these species causing various leaf spots and anthracnose. Most products are registered and commercially used. Although there were insufficient data for definitive conclusions, three new products that were included, Kleengrow, Orchestra, and Mural, looked promising. Compass, Pageant and Palladium provided variable efficacy depending on species. F9110, Proud 3, MBI-110, Milsana, Disarm, SP2770, SP2773 and ZeroTol were generally ineffective. Limited data on other relatively new products (NUP 09092, S2200, Tourney and Trinity) were inconclusive. The established standards Daconil and Eagle generally provided excellent efficacy; Chipco 26019 provided good efficacy, and Medallion provided variable efficacy depending on species. The data from these trials suggest that the effectiveness of some fungicides in controlling leaf spots and anthracnose is variable, depending on the pathogen species.

**Target Species (Phytotoxicity, or common and Latin name of arthropod, pathogen, weed):**

<p>Apple Scab (<i>Venturia inaequalis</i>)  Cercospora delphinii (<i>Cercospora delphinii</i>)  Cercospora rudbeckiae (<i>Cercospora rudbeckiae</i>)  Colletotrichum acutatum (<i>Colletotrichum acutatum</i>)  Colletotrichum sp. (<i>Colletotrichum sp.</i>)  Flower Blight, Ovulinia (<i>Ovulinia azaleae</i>)  Helminthosporium sp. (<i>Helminthosporium sp.</i>)  Leaf Spot, Alternaria (<i>Alternaria alternata</i>)  Leaf Spot, Entomosporium (<i>Diplocarpon (Entomosporium) mespili</i>)  Leaf Spot, Iris (<i>Cladosporium iridis (Didymellina macrospora)</i>)</p>	<p>Leaf Spot, Peony (<i>Graphiopsis chlorocephala</i>)  Leaf Spot, Zinnia (<i>Alternaria zinniae</i>)  Leaf Spots (<i>Alternaria (Alternaria sp.)</i>)  Liatris Leaf Spot (<i>Septoria liatridis</i>)  Marssonina Leaf Spot (<i>Marssonina sp.</i>)  Oak Anthracnose (<i>Apiognomonina quercina</i>)  Ramularia viburni (<i>Ramularia viburni</i>)  Rose Blackspot (<i>Diplocarpon rosae</i>)  Swiss Needle Cast (<i>Nothophaeocryptopus gaeumannii</i>)  Unknown Leaf Spot (<i>Unknown</i>)</p>
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Target Crops (list tested crops if ongoing or completed project)		
<i>Calathea sp.</i>	<i>Malus sp.</i>	<i>Rhododendron sp.</i>
<i>Cornus florida</i>	<i>Paeonia sp.</i>	<i>Rosa sp.</i>
<i>Delphinium sp.</i>	<i>Pelargonium sp.</i>	<i>Rudbeckia fulgida var. speciosa</i>
<i>Echinacea sp.</i>	<i>Photinia sp.</i>	<i>Sansevieria sp.</i>
<i>Impatiens hawkeri</i>	<i>Populus sp.</i>	<i>Viburnum dentatum</i>
<i>Iris germanica</i>	<i>Pseudotsuga menziesii</i>	<i>Zinnia elegans</i>
<i>Liatris spicata</i>	<i>Quercus sp.</i>	

Target Product(s) (list tested products or numbered compounds if ongoing or completed project)	
3336 WP 70% (Pennwalt) (Thiophanate-methyl) Affirm (Polyoxin D zinc salt) Alibi Flora SC (Azoxystrobin + difenoconazole) Astun (isofetamid) Badge X2 (Copper Oxychloride + Copper Hydroxide) Banner Heritage MAXX (Propiconazole + azoxystrobin) Baycor 25W (Bitertanol) Bayleton 25WP (Triadimefon) Benlate 50WP (Benomyl) CG100 (Caprylic acid) Chipco 26019 N/G 50WP (Iprodione) Compass (Trifloxystrobin) Compass 0 50WDG (Trifloxystrobin) Concert II (Propiconazole + chlorothalonil) Daconil 54EC (Chlorothalonil) Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil) Decree (Fenhexamid) Disarm 480SC (Fluoxastrobin) Dithane 75DF Rainshield (Mancozeb) EcoSwing (Swinglea glutinosa) Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion) Funginex (Triforine 18.2) (Triforine) Heritage (Azoxystrobin) Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin) Kocide 2000 (Dupont) (Copper Hydroxide) Kocide 3000 (Copper hydroxide) Medallion (Fludioxonil) Mural WDG (Azoxystrobin + benzovindiflupyr) Orkestra Intrinsic (Fluxapyroxad + pyraclostrobin)	Pageant Intrinsic (Boscalid + pyraclostrobin) Palladium (Cyprodinil + fludioxonil) Postiva (pydiflumetofen + difenoconazole) Prestop (Gliocladium catenulatum Strain J1446) Proud 3 (Thyme oil) Regalia MAXX (Extract of Reynoutria sachalinensis) Regalia O5 (MOI-10605) (Extract of Reynoutria sachalinensis) Regime (Banda de Lupinus albus doce (BLAD)) Rubigan 50WP (fenarimol) S2200 4SC (Mandestrobin) SP2480 (SP2480) SP2770 10WP (SP2770) SP2773 (SP2773) Spirato (Fludioxonil) Stargus (Bacillus nakamurai strain F727) Strike Plus 50WDG (Triadimefon + trifloxystrobin) Terraguard 50W (Triflumizole) Tilt 3.6E (Propiconazole) Torque 3.6SC (Tebuconazole) Tourney 50WDG (Metconazole) Trinity 2SC (Triticonazole) TXC2020 (Thyme oil) V-10135 (Fenpyrazamine) Vanguard 75WG (Cyprodinil) XDE-659 (florylpicoxamid) ZeroTol (Hydrogen dioxide) Zyban 75WP (Mancozeb + thiophanate methyl)

Product Registration and Research Status			
	Fully Screened (also includes standards)	Partially Screened through IR-4 <sup>1</sup>	Need Data Across Species?
Labeled Generally & Commercialized	Chipco 26019 DisArm 480SC	Insignia * Orkestra * Stargus *	Trinity
Labeled Generally But NOT Commercialized		Picatina Flora *	



# Environmental Horticulture Program Research Project Sheet

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

Labeled for Specific Diseases & Commercialized			
Labeled for Specific Diseases but NOT Commercialized			
Not yet registered or Labeled		Proud 3 S2200	
No longer available for development		<b>SP2770 10WP *</b> <b>SP2773</b>	
* IR-4 Data contributed to registration decision – either adding pest to label or not pursuing further research 1 At least one species screened fully			

PROS	CONS
A couple of new active ingredients are available in current and new MOA classes.	Many classes are currently available for growers
A few good products, but growers need more (need to test new product)	Difficult pathogen group
Several different genera cause these diseases and performance may not be similar	Several different genera cause these diseases and performance may not be similar
Leaf spot and anthracnose diseases can cause significant economic damage	Lack of potential researchers for certain diseases
Need rotational partners for fungicide resistance	Few products for conifer needlecast, difficult to inoculate and requires multiple years to evaluate

IR-4 Efficacy Trials to Date
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 ( <i>red text</i> ). 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 <b>green text</b> . For disease/product combinations that are blank, IR-4 has not screened this combination.

**Table 1 of 3**

MOA	Product (Active Ingredients)	<i>Alternaria alternata</i>	<i>Apiognomonia quercina</i>	<i>Colletotrichum acutatum</i>	<i>Colletotrichum sp.</i>
FRAC 1	3336 WP 70% (Pennwalt) (Thiophanate-methyl)				
FRAC 1	Benlate 50WP (Benomyl)				<b>3.0 (3 - 3) n2</b>
FRAC 11	Compass (Trifloxystrobin)				<i>2.0 (2 - 2) n1</i> <i>Labeled</i>
FRAC 11	Compass 0 50WDG (Trifloxystrobin)				
FRAC 11	Disarm 480SC (Fluoxastrobin)	5.0 (5 - 5) n1 Labeled			<i>2.0 (2 - 2) n1</i> <i>Labeled</i>
FRAC 11	Heritage (Azoxystrobin)				
FRAC 11	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)				
FRAC 11	S2200 4SC (Mandestrobin)	<b>5.0 (5 - 5) n1</b>	<i>1.0 (1 - 1) n1</i>	<b>5.0 (5 - 5) n1</b>	<i>2.0 (2 - 2) n1</i>
FRAC 11 + FRAC 7	Mural WDG (Azoxystrobin + benzovindiflupyr)				
FRAC 12	Medallion (Fludioxonil)				<i>1.0 (1 - 1) n1</i>
FRAC 12	Spirato (Fludioxonil)			5.0 (5 - 5) n1 Labeled	
FRAC 17	Decree (Fenhexamid)				
FRAC 17	V-10135 (Fenpyrazamine)				
FRAC 2	Chipco 26019 N/G 50WP (Iprodione)	5.0 (5 - 5) n1 Labeled			<i>2.0 (2 - 2) n1</i> <i>Labeled</i>
FRAC 3	Baycor 25W (Bitertanol)				
FRAC 3	Bayleton 25WP (Triadimefon)				3.0 (3 - 3) n2 Labeled
FRAC 3	Funginex (Triforine 18.2) (Triforine)				
FRAC 3	Rubigan 50WP (fenarimol)				<b>3.0 (3 - 3) n1</b>
FRAC 3	Terraguard 50W (Triflumizole)				
FRAC 3	Tilt 3.6E (Propiconazole)				<i>2.0 (2 - 2) n1</i>
FRAC 3	Torque 3.6SC (Tebuconazole)	5.0 (5 - 5) n1 Labeled	5.0 (5 - 5) n1 Labeled		
FRAC 3	Tourney 50WDG (Metconazole)				
FRAC 3	Trinity 2SC (Triticonazole)	4.0 (4 - 4) n1 Labeled			
FRAC 3 + FRAC 11	Banner Heritage MAXX (Propiconazole + azoxystrobin)				
FRAC 3 + FRAC M5	Concert II (Propiconazole + chlorothalonil)		<i>1.0 (1 - 1) n1</i>		

MOA	Product (Active Ingredients)	<i>Alternaria alternata</i>	<i>Apiognomonia quercina</i>	<i>Colletotrichum acutatum</i>	<i>Colletotrichum sp.</i>
FRAC 7	Astun (isofetamid)				
FRAC 7 + FRAC 11	Orkestra Intrinsic (Fluxapyroxad + pyraclostrobin)	5.0 (5 - 5) n1 Labeled	4.0 (4 - 4) n1 Labeled	5.0 (5 - 5) n1 Labeled	5.0 (5 - 5) n1 Labeled
FRAC 7 + FRAC 11	Pageant Intrinsic (Boscalid + pyraclostrobin)				
FRAC 7 + FRAC 3	Postiva (pydiflumetofen + difenoconazole)				
FRAC 9	Vangard 75WG (Cyprodinil)				
FRAC 9 + FRAC 12	Palladium (Cyprodinil + fludioxanil)				1.0 (1 - 1) n1 Labeled
FRAC BM01	EcoSwing (Swinglea glutinosa)				
FRAC BM01	Proud 3 (Thyme oil)	1.0 (1 - 1) n1	1.0 (1 - 1) n1	1.0 (1 - 1) n1	2.0 (2 - 2) n1
FRAC BM01	Regime (Banda de Lupinus albus doce (BLAD))	1.0 (1 - 1) n1	4.0 (4 - 4) n1	5.0 (5 - 5) n1	2.0 (2 - 2) n1
FRAC BM01	TXC2020 (Thyme oil)				
FRAC BM02	Prestop (Gliocladium catenulatum Strain J1446)				
FRAC M1	Kocide 2000 (Dupont) (Copper Hydroxide)				
FRAC M1	Kocide 3000 (Copper hydroxide)				
FRAC M3	Dithane 75DF Rainshield (Mancozeb)				
FRAC M3	Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion)				2.5 (2 - 3) n2 Labeled
FRAC M3+ FRAC 3	Zyban 75WP (Mancozeb + thiophanate methyl)				3.0 (3 - 3) n1
FRAC M5	Daconil 54EC (Chlorothalonil)				
FRAC M5	Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil)				
FRAC NC	CG100 (Caprylic acid)				
FRAC NC	ZeroTol (Hydrogen dioxide)				1.0 (1 - 1) n1 Labeled
IRAC UNF & FRAC BM02	Stargus (Bacillus nakamurai strain F727)			5.0 (5 - 5) n1 Labeled	1.0 (1 - 1) n1 Labeled
unknown	SP2480 (SP2480)				
unknown	SP2770 10WP (SP2770)	1.0 (1 - 1) n1	1.0 (1 - 1) n1		
unknown	SP2773 (SP2773)				
unknown	XDE-659 (florylpicoxamid)				

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MOA	Product (Active Ingredients)	<i>Diplocarpon</i> ( <i>Entomosporium</i> ) <i>mespili</i>	<i>Diplocarpon</i> <i>rosae</i>	<i>Graphiopsis</i> <i>chlorocephala</i>	<i>Helminthosporium</i> sp.	<i>Marssonina</i> sp.
FRAC 1	3336 WP 70% (Pennwalt) (Thiophanate-methyl)					2.4 (1 - 3) n5
FRAC 1	Benlate 50WP (Benomyl)					4.0 (4 - 4) n4
FRAC 11	Compass (Trifloxystrobin)					
FRAC 11	Compass 0 50WDG (Trifloxystrobin)					
FRAC 11	Disarm 480SC (Fluoxastrobin)			3.0 (3 - 3) n1 Labeled		
FRAC 11	Heritage (Azoxystrobin)					
FRAC 11	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)		5.0 (5 - 5) n1 Labeled			
FRAC 11	S2200 4SC (Mandestrobin)				1.0 (1 - 1) n1	
FRAC 11 + FRAC 7	Mural WDG (Azoxystrobin + benzovindiflupyr)				3.0 (3 - 3) n1 Labeled	
FRAC 12	Medallion (Fludioxonil)			1.0 (1 - 1) n1		
FRAC 12	Spirato (Fludioxonil)				3.0 (3 - 3) n1 Labeled	
FRAC 17	Decree (Fenhexamid)			2.0 (2 - 2) n1		
FRAC 17	V-10135 (Fenpyrazamine)			2.0 (2 - 2) n1		
FRAC 2	Chipco 26019 N/G 50WP (Iprodione)	1.0 (1 - 1) n1 Labeled		1.0 (1 - 1) n1 Labeled	1.0 (1 - 1) n1 Labeled	
FRAC 3	Baycor 25W (Bitertanol)					4.0 (4 - 4) n1
FRAC 3	Bayleton 25WP (Triadimefon)	4.5 (4 - 5) n2 Labeled				3.2 (1 - 4) n6 Labeled
FRAC 3	Funginex (Triforine 18.2) (Triforine)					2.3 (1 - 3) n4
FRAC 3	Rubigan 50WP (fenarimol)					
FRAC 3	Terraguard 50W (Triflumizole)					
FRAC 3	Tilt 3.6E (Propiconazole)	5.0 (5 - 5) n1				
FRAC 3	Torque 3.6SC (Tebuconazole)			5.0 (5 - 5) n1 Labeled		
FRAC 3	Tourney 50WDG (Metconazole)					
FRAC 3	Trinity 2SC (Triticonazole)			2.0 (2 - 2) n1 Labeled		
FRAC 3 + FRAC 11	Banner Heritage MAXX (Propiconazole + azoxystrobin)					
FRAC 3 + FRAC M5	Concert II (Propiconazole + chlorothalonil)					

MOA	Product (Active Ingredients)	<i>Diplocarpon (Entomosporium) mespili</i>	<i>Diplocarpon rosae</i>	<i>Graphiopsis chlorocephala</i>	Helminthosporium sp.	<i>Marssonina sp.</i>
FRAC 7	Astun (isofetamid)			1.0 (1 - 1) n1		
FRAC 7 + FRAC 11	Orkestra Intrinsic (Fluxapyroxad + pyraclostrobin)				1.0 (1 - 1) n1 Labeled	
FRAC 7 + FRAC 11	Pageant Intrinsic (Boscalid + pyraclostrobin)			5.0 (5 - 5) n1	3.0 (3 - 3) n1	
FRAC 7 + FRAC 3	Postiva (pydiflumetofen + difenoconazole)			4.0 (4 - 4) n1		
FRAC 9	Vanguard 75WG (Cyprodinil)					
FRAC 9 + FRAC 12	Palladium (Cyprodinil + fludioxanil)			2.0 (2 - 2) n1 Labeled		
FRAC BM01	EcoSwing (Swinglea glutinosa)			1.0 (1 - 1) n1		
FRAC BM01	Proud 3 (Thyme oil)			1.0 (1 - 1) n1	1.0 (1 - 1) n1	
FRAC BM01	Regime (Banda de Lupinus albus doce (BLAD))			2.0 (2 - 2) n1	1.0 (1 - 1) n1	
FRAC BM01	TXC2020 (Thyme oil)			1.0 (1 - 1) n1		
FRAC BM02	Prestop (Gliocladium catenulatum Strain J1446)			1.0 (1 - 1) n1 Labeled		
FRAC M1	Kocide 2000 (Dupont) (Copper Hydroxide)					1.5 (1 - 3) n4 Labeled
FRAC M1	Kocide 3000 (Copper hydroxide)			3.0 (3 - 3) n1		
FRAC M3	Dithane 75DF Rainshield (Mancozeb)					2.8 (2 - 3) n4
FRAC M3	Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion)					
FRAC M3+ FRAC 3	Zyban 75WP (Mancozeb + thiophanate methyl)					
FRAC M5	Daconil 54EC (Chlorothalonil)					3.0 (1 - 4) n4 Labeled
FRAC M5	Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil)	5.0 (5 - 5) n1 Labeled		3.0 (3 - 3) n1 Labeled		
FRAC NC	CG100 (Caprylic acid)					
FRAC NC	ZeroTol (Hydrogen dioxide)					
IRAC UNF & FRAC BM02	Stargus (Bacillus nakamurai strain F727)				1.0 (1 - 1) n1 Labeled	
unknown	SP2480 (SP2480)			1.0 (1 - 1) n1		
unknown	SP2770 10WP (SP2770)			1.0 (1 - 1) n1		
unknown	SP2773 (SP2773)			2.0 (2 - 2) n1		
unknown	XDE-659 (florylpicoxamid)			1.0 (1 - 1) n1		

**Table 3 of 3**

MOA	Product (Active Ingredients)	<i>Notho-phaeocryptopus gaeumannii</i>	<i>Ovulinia azaleae</i>	<i>Ramularia viburni</i>	<i>Venturia inaequalis</i>	Unknown Leaf Spot
FRAC 1	3336 WP 70% (Pennwalt) (Thiophanate-methyl)					
FRAC 1	Benlate 50WP (Benomyl)					
FRAC 11	Compass (Trifloxystrobin)					
FRAC 11	Compass 0 50WDG (Trifloxystrobin)	<b>4.5 (4 - 5) n2</b>				
FRAC 11	Disarm 480SC (Fluoxastrobin)					
FRAC 11	Heritage (Azoxystrobin)	<i>1.0 (1 - 1) n2</i>				
FRAC 11	Insignia 20WDG Intrinsic Brand Fungicide (Pyraclostrobin)			5.0 (5 - 5) n1 Labeled		
FRAC 11	S2200 4SC (Mandestrobin)					<i>1.0 (1 - 1) n1</i>
FRAC 11 + FRAC 7	Mural WDG (Azoxystrobin + benzovindiflupyr)					
FRAC 12	Medallion (Fludioxonil)					<i>2.0 (2 - 2) n1</i>
FRAC 12	Spirato (Fludioxonil)					<i>1.0 (1 - 1) n1 Labeled</i>
FRAC 17	Decree (Fenhexamid)					
FRAC 17	V-10135 (Fenpyrazamine)					
FRAC 2	Chipco 26019 N/G 50WP (Iprodione)					
FRAC 3	Baycor 25W (Bitertanol)					
FRAC 3	Bayleton 25WP (Triadimefon)		3.0 (3 - 3) n1 Labeled		3.0 (3 - 3) n1 Labeled	
FRAC 3	Funginex (Triforine 18.2) (Triforine)					
FRAC 3	Rubigan 50WP (fenarimol)					
FRAC 3	Terraguard 50W (Triflumizole)	<i>1.0 (1 - 1) n1</i>				
FRAC 3	Tilt 3.6E (Propiconazole)					
FRAC 3	Torque 3.6SC (Tebuconazole)					
FRAC 3	Tourney 50WDG (Metconazole)	<i>1.0 (1 - 1) n2 Labeled</i>				
FRAC 3	Trinity 2SC (Triticonazole)	<i>1.0 (1 - 1) n2 Labeled</i>				
FRAC 3 + FRAC 11	Banner Heritage MAXX (Propiconazole + azoxystrobin)	<i>1.0 (1 - 1) n2</i>				
FRAC 3 + FRAC M5	Concert II (Propiconazole + chlorothalonil)	<b>5.0 (5 - 5) n2</b>				
FRAC 7	Astun (isofetamid)					



MOA	Product (Active Ingredients)	<i>Notho-phaeocryptopus gaeumannii</i>	<i>Ovulinia azaleae</i>	<i>Ramularia viburni</i>	<i>Venturia inaequalis</i>	Unknown Leaf Spot
FRAC 7 + FRAC 11	Orkestra Intrinsic (Fluxapyroxad + pyraclostrobin)					3.0 (3 - 3) n1 Labeled
FRAC 7 + FRAC 11	Pageant Intrinsic (Boscalid + pyraclostrobin)	1.0 (1 - 1) n2				3.0 (3 - 3) n1
FRAC 7 + FRAC 3	Postiva (pydiflumetofen + difenoconazole)					
FRAC 9	Vanguard 75WG (Cyprodinil)	1.0 (1 - 1) n1				
FRAC 9 + FRAC 12	Palladium (Cyprodinil + fludioxanil)	1.0 (1 - 1) n2 Labeled				
FRAC BM01	EcoSwing (Swinglea glutinosa)					
FRAC BM01	Proud 3 (Thyme oil)					1.0 (1 - 1) n1
FRAC BM01	Regime (Banda de Lupinus albus doce (BLAD))					1.0 (1 - 1) n1
FRAC BM01	TXC2020 (Thyme oil)					
FRAC BM02	Prestop (Gliocladium catenulatum Strain J1446)					
FRAC M1	Kocide 2000 (Dupont) (Copper Hydroxide)					
FRAC M1	Kocide 3000 (Copper hydroxide)					
FRAC M3	Dithane 75DF Rainshield (Mancozeb)					
FRAC M3	Fore 80WP (Manganese + Zinc + Ethylene bis-dithiocarbamate Ion)					
FRAC M3+ FRAC 3	Zyban 75WP (Mancozeb + thiophanate methyl)					
FRAC M5	Daconil 54EC (Chlorothalonil)					
FRAC M5	Daconil Weather Stik (2787 Flowable Fungicide) (Chlorothalonil)	5.0 (5 - 5) n2 Labeled				
FRAC NC	CG100 (Caprylic acid)	2.5 (2 - 3) n2				
FRAC NC	ZeroTol (Hydrogen dioxide)					
IRAC UNF & FRAC BM02	Stargus (Bacillus nakamurai strain F727)					1.0 (1 - 1) n1 Labeled
unknown	SP2480 (SP2480)					
unknown	SP2770 10WP (SP2770)					
unknown	SP2773 (SP2773)					
unknown	XDE-659 (florylpicoxamid)					

\*\* Disarm 480SC is now known as Fame SC