

An aerial photograph of a cemetery. In the foreground, there are several large, white, rectangular greenhouses with glass roofs, arranged in a row. To the left of the greenhouses is a large, red brick building with a white roof. The cemetery is filled with numerous trees and rows of graves. A paved road with a few cars is visible in the background.

Plant Health Care

Kelley Andrew Sullivan

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Mount Auburn Cemetery's Greenhouses

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Mount Auburn Cemetery

Greenhouses & Gardens



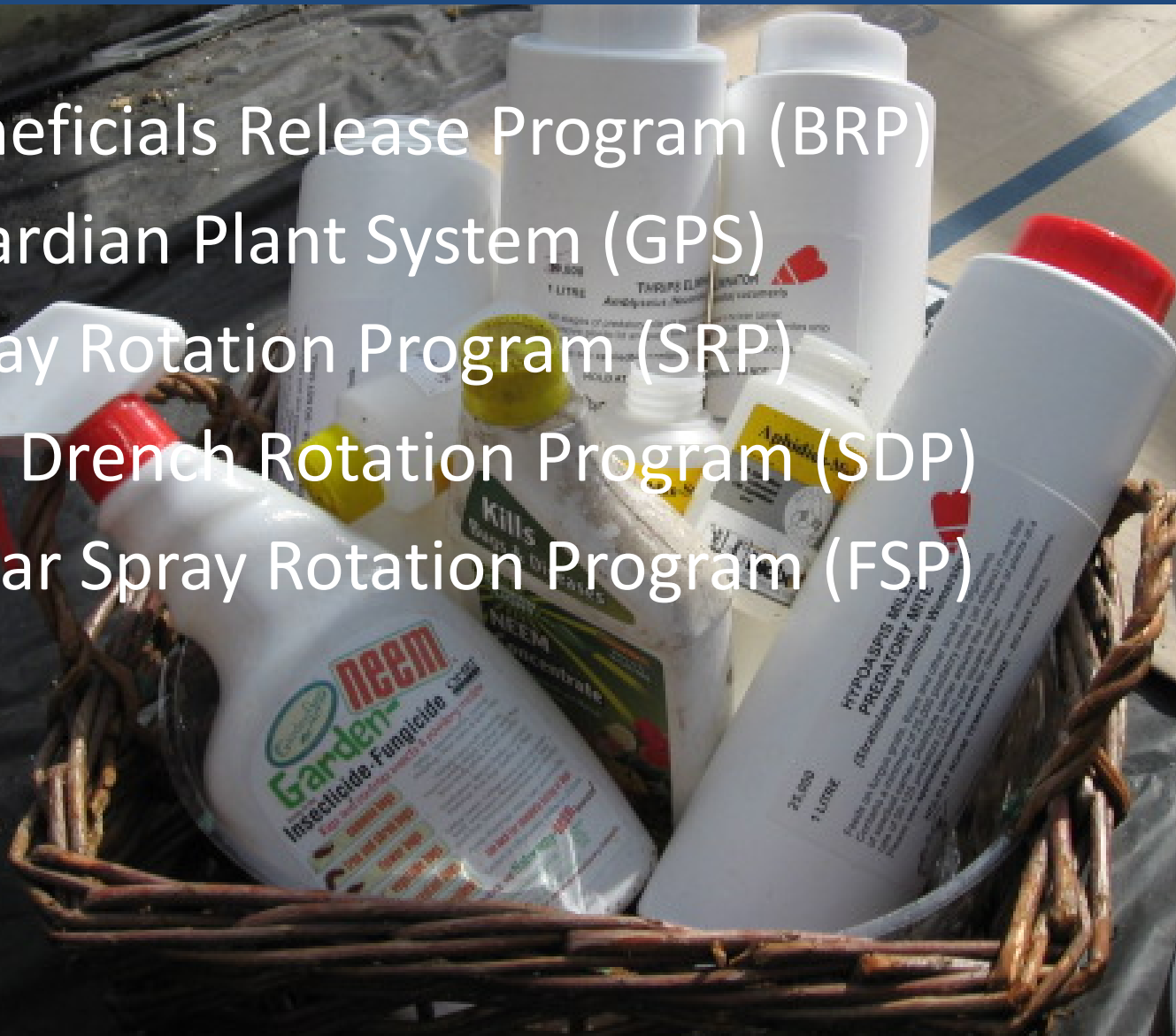
Mount Auburn Cemetery
Greenhouses

PHC Management Schedule

Date	Treatment	Problem	Action	Frequency	Effects
Sep WK1	Gnatrol	caterpillars, fungus gnat larvae	Inoculate the soil of any trays as they are placed in the greenhouse	Three weekly treatments	Gnatrol is the bacteria Bt and targets soil larvae through ingestion.
Sep WK1	Actinovate	root rot	Inoculate the soil after potting.	Once	naturally occurring bacterium that colonizes growing root tips and parasitizes root decay fungi, and produce antibiotics that act against these fungi.
Sep WK1	Sensor Cards		Monitoring Tool: start when trays are first placed in the greenhouse	Weekly or Biweekly	
	Neem/Oil	shoreflies, fungus gnats	Knockdown treatment when pests become a nuisance	anytime necessary. Once in a week	
	Neem/Oil	mites	Spray the leaf undersides when mites are observed and before releasing beneficial mites	once	Apply along with cold water treatment to knock back the mites. The mites tend to slow down production and activity when cold water is applied. Neem and oil are effective at knocking back the population and hinder reproduction.
	Scouting	mites eggs & nymphs	The presence of nymphs and eggs is an indicator of whether more adult mites will be emerging or not	Weekly	Eggs start clear, then opaque, then straw-colored. Straw-colored indicates close to hatching. Nymphs indicate newly hatched mites. If absent then most likely the population will not increase.
Sep WK4	Beneficials Release Program	spider mites	Release <i>Neoseiulus californicus</i> at the start of the crop cycle	weekly	

Plant Health Care (PHC) Program

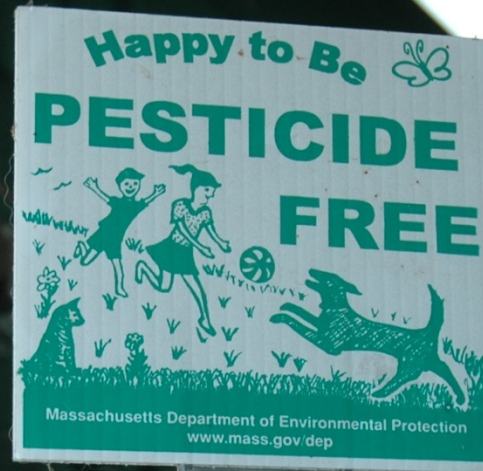
- Beneficials Release Program (BRP)
- Guardian Plant System (GPS)
- Spray Rotation Program (SRP)
- Soil Drench Rotation Program (SDP)
- Foliar Spray Rotation Program (FSP)



Activity Records

Application Date	G H	Bench	Activity	Plant(s)	Pest or Disease	Treatment	Application	Rate/Unit	Units Used	By:	Notes
7/12/2013	5	LSB	Started Monitoring	pachysandra, lamiastrum, waldstenia							Fall Groundcover Management
9/22/2013	5	LSB	SRP 1	pachysandra	spider mites	Green-Light Neem / Ultra-fine oil	4 gal tank spray	Neem 6 tbl, oil 10 tbl / 3 gal water	1.00	ks	1st Treatment. Before treatment spider mites found on the leaf undersides throughout the trays of pachy. No leaf damage observed.
9/26/2013	5	LSB	BRP	pachysandra	spider mites	<i>Neoseiulus californicus</i>	bottle; 1k is 1 unit	broadcast	1.00	ks	1st of 3 monthly releases
10/5/2013	5	LSB	SRP 1	pachysandra	spider mites	Green-Light Neem / Ultra-fine oil	4 gal tank spray	Neem 6 tbl, oil 10 tbl / 3 gal water	1.33	ks	2nd Treatment. Before treatment spider mites still found on leaf undersides in high numbers among all rooted pachy. Leaves with the mites have stippling.
10/17/2013	5	LSB	SRP 1	pachysandra	spider mites	Green-Light Neem / Ultra-fine oil	4 gal tank spray	Neem 6 tbl, oil 10 tbl / 3 gal water	1.00	ks	3rd Treatment. Before treatment; Live adults and nymphs reduced significantly. Moults and bloaters observed on all RM leaves. No viable eggs observed since 1st treatment.

Beneficials Release Program



- Aphid Wasps
- White Fly Wasps
- Predatory Mites



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Guardian Plant System

- Aphid Bankers
- Thrips-Marigolds



Biological Control Orders

Weekly Orders
by Crop / Greenhouse

Calculates the amount of control needed based on the
Greenhouse area, recommended rates (IPM Labs), and
your own experience

Calculates each shipments
costs and total costs for
the year

Order Status	Crop(s) Order Date	Agent Delivery Date	GH	Problem Action	Freq	Release Rate		Total Release		Shipping & Hanling not included				Total Cost
						Amt	per Area (Sq Ft)	Area (sq ft)	Amt	Unit Qty	Cost per Unit	Units Needed	Cost per Release	
Fall Groundcovers Management														
	ground covers	<i>N. californicus</i>	5	spider mites	once per month for three releases	1	1	1560	1560	1000	\$10.00	1.0	\$10.00	
shipped	9/25/2013	9/272013	5	Shipping & Handling									\$29.05	\$39.05
	ground covers	<i>N. californicus</i>	5	spider mites	2nd of 3 monthly releases	1	1	1560	1560	1000	\$10.00	1.0	\$10.00	
shipped	10/20/2013	10/232013	5	Shipping & Handling									\$29.05	\$39.05
	ground covers	<i>N. californicus</i>	5	spider mites	3rd of 3 monthly releases	1	1	1560	1560	1000	\$10.00	1.0	\$10.00	
Waiting	11/20/2013	11/232013	5	Shipping & Handling									\$29.05	\$39.05
Fall Groundcovers Management Total Costs														\$117.15

PHC Watch List

Location	Date	Crop	Problem	Actions	Comments
GH Old1	3/16/2013	Pansies	Thrips	SRP II	
GH3	3/16/2013	Ageratum	Aphids	SRP I	Prevent.
HH Area	3/21/2013	Pansies	Frost	none	white necrotic blotches caused by freezing then thawing.
GH Old1	3/22/2013	Rosemary	Leafhoppers	SRP I Green-lite neem	
GH Old1	3/24/2013	Magnolia	Aphids	SRP I neem / oil	Pale green leaves and aphids.
GH Old1	3/24/2013	Magnolia	Caterpillars	Gnatrol Foliar Spray	
GH Old1	3/24/2013	Hollies	Scales	SRP II	
GH3	3/24/2013	Geraniums	Tomato Ring Spot	none	Goes away when sunnier and warmer (Ball, 27).
GH3	3/28/2013	Ageratum	Fungus gnats	none	Fungus gnats present but no symptoms yet.
GH3	3/30/2013	Vinca	Root Rot	SRP II Actinovate	Separate bad from good. Vinca really struggled this year.
GH Old1	4/1/2013	Cole Crops	Aphids	SRP II	
GH Old1	4/1/2013	Peppers	Aphids	SRP II	
GH Old1	4/1/2013	Petunias	Thrips	SRP II	Shook out a few thrips, none in the hanging crops.
GH3	4/5/2013	Heuchera	Powdery Mildew	SRP II Actinovate	

Use to keep track of current plant health issues and to have a simple list for review at the year's end

Spray Rotation Program

- Neem
- Suffoil-X
- Botanigard
- Molt-X
- Aphids
- Thrips
- White Flies
- Spider Mites
- Leafhoppers

SRP Decision Making Chart

Week	Decision	Action	Notes
WK1	Initial Scouting	Foliar & sensor card inspection	
	If > Threshold	Start Knockdown	
WK2	Scouting	Foliar & sensor card inspection	
	If > Threshold	2 nd Knockdown	
WK3	Scouting	Foliar & sensor card inspection	
	If > Threshold	3 rd Knockdown	
WK2 WK3	Else	Systemic treatment	
WK3 WK4	Scouting	Foliar & sensor card Inspection	
	If > Threshold	Continue systemic	
WK5	Scouting	Foliar & sensor card Inspection	
	If > Threshold	Restart Knockdown	
WK1 WK3 WK4	Else	Continue scouting	

Random 'Hot Spots' Monitoring

Aphids Management

Date	Chart X-Axis Categories	G H	Bench Location	Plant(s)	Action	Plants	Pest Count Level	Infested Plants	Plants with Nymphs	Leaf Curling (Y/N)	Mummies (Y/N)	Monitoring Notes
09/05/13	9/5/13; SRP II, 2nd Treatment	4	all	mums	Botanigard / Molt-X / Suffoil-X	5	2	100%	80%	0%	0%	Winged aphids on all mums checked and lots of nymphs. Leafhopper casts also found on yellow cards.
09/06/13	9/6/13; none	4	all	mums	none	5	1	100%	0%	0%	0%	Live aphids were usually one adult barely moving. All nymphs were dead. 300+ casts found on yellow cards.
09/19/13	9/27/13; SRP I, 3rd Treatment	4	all	mums	Green-Light Neem / Ultra-fine oil	5	2.5	100%	100%	0%	0%	The mums on the floor are covered with aphids on leaf undersides. Testing neem-oil as a knockdown (See activity record).
10/03/13	10/5/13; SRP I, 4th Treatment	4	all	mums	Green-Light Neem / Ultra-fine oil	5	1	60%	0%	0%	0%	Four days after neem/oil treatment the leaves were washed off with water.
10/12/13	10/12/13; none	4	all	mums	none	5	0.5	20%	20%	0%	0%	Recommendations: Start with neem/oil as the initial knockdown for aphids then maintain low levels with botanigard/oil and molt-x then beneficials.

Other Rotation Programs

Soil Drench Program

- Actinovate
- Cease
- RootShield
- Gnatrol
- Dipel

Foliar Diseases Program

- Actinovate
- MilStop
- Cease

Greenhouse Flower Gardens



Year Round Inhabitants

Non-released Residents

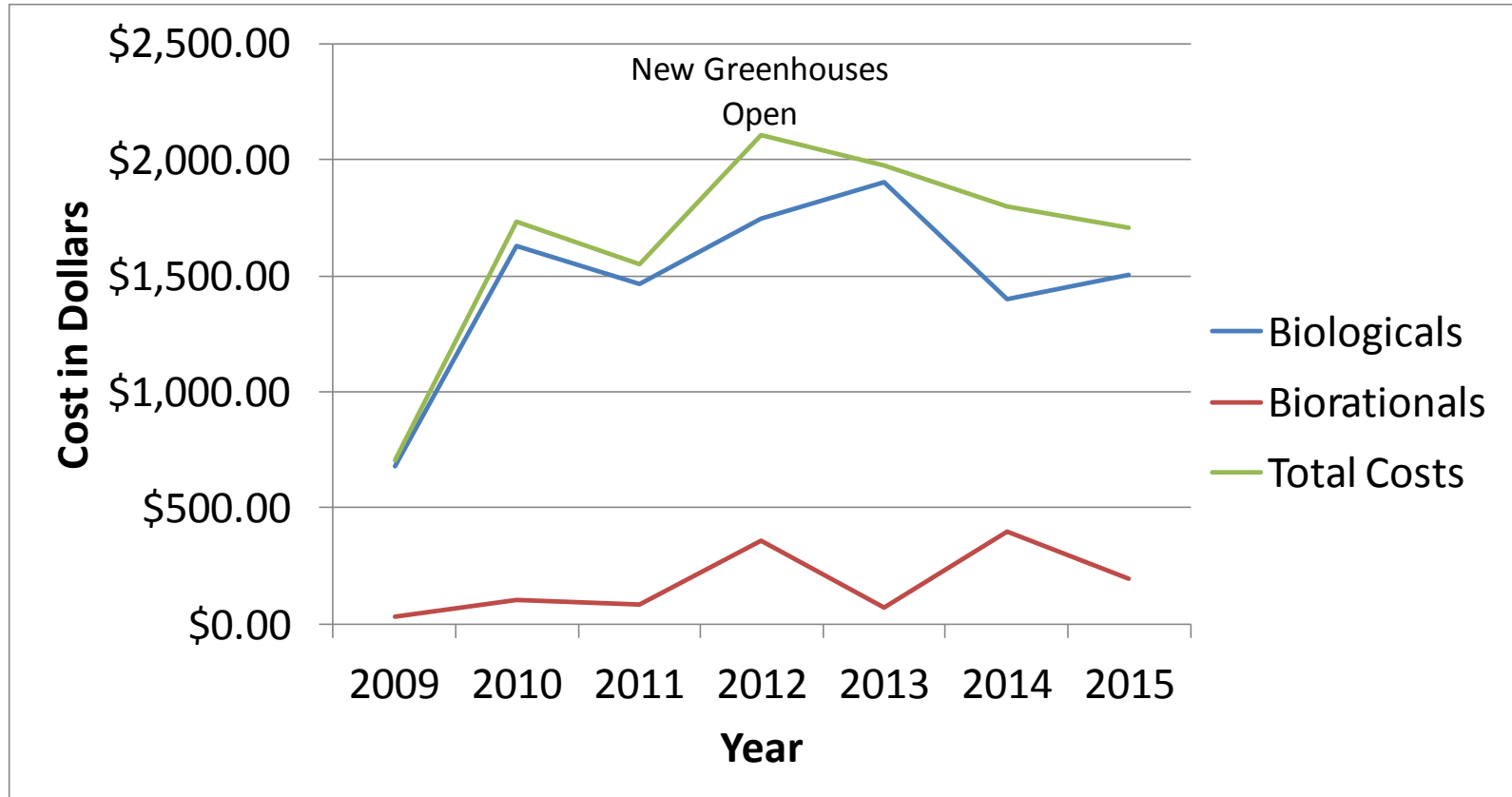
- Hunter Flies
- Pirate Bugs
- Robber Flies
- Hover Flies
- Tachinid Flies



Released Residents

- Aphid Wasps
- White Fly Wasps
- Predatory Mites

PHC Program Year-End Costs



An aerial photograph of a cemetery. In the foreground, there are several large, white, rectangular greenhouses with glass roofs, arranged in a row. To the left of the greenhouses is a large, red, multi-story building with a prominent gabled roof. The cemetery is filled with numerous trees and rows of graves. A paved road with a few cars is visible on the left side of the image. The entire scene is overlaid with a semi-transparent blue rectangle containing text.

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