

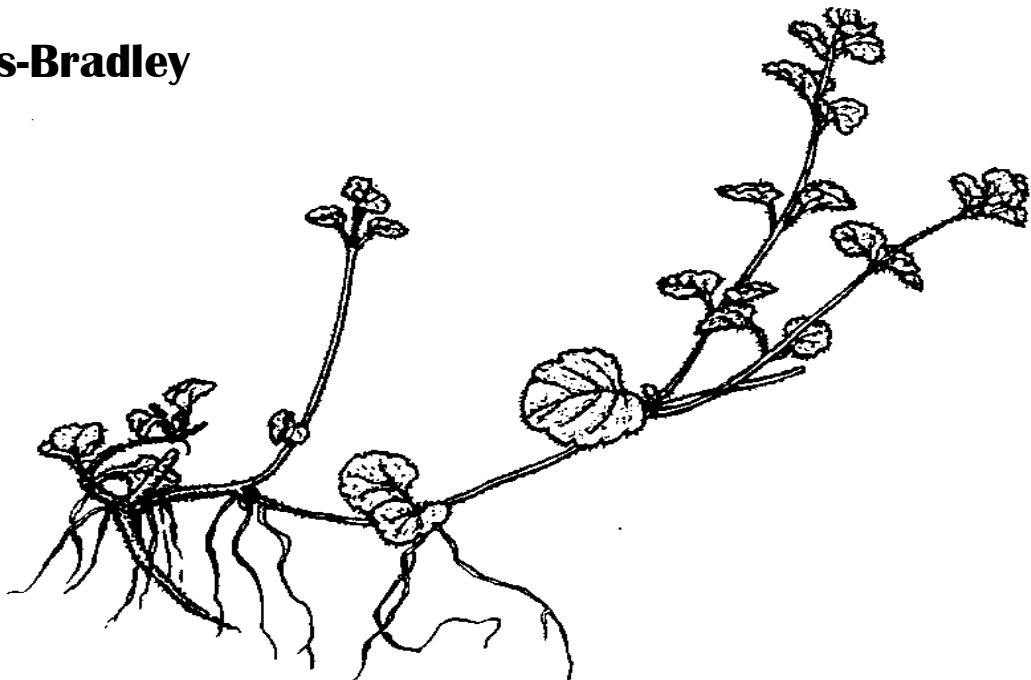
Weed Management Research in Ornamentals, Turfgrass, Vegetables & Fruit

2009 DATA SUMMARY

**Cornell University Cooperative Extension of Suffolk County
Long Island Horticultural Research and Extension Center
Riverhead, New York**

Weed Science Research Report No. 22

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ACKNOWLEDGMENTS

We wish to thank all of the individuals and organizations who contributed financial support, materials, and/or personnel to assist in the execution of these experiments.

The following companies and organizations provided financial and material contributions. Without such contributions, the experiments summarized herein would not have been possible.

Friends of Long Island Horticulture	Cornell University, Department of Integrated Pest Management
IR-4 Center for Minor Crop Pest Management	Viticulture Consortium and New York Wine & Grape Foundation
New York State Department of Agriculture and Markets	BASF Corporation
New York State Department of Transportation	Bayer Corporation
US Department of Agriculture CSREES	Dow AgroSciences
USDA Sustainable Agriculture Research & Education Project	DuPont Crop Protection
New York Farm Viability Institute	ISK Corporation
Nassau Suffolk Landscape Gardeners Association	Lebanon Seaboard Corporation
Suffolk County Agricultural Stewardship Program	Olympic Horticultural Products
	Syngenta Corporation
	Valent USA Corporation

We thank the following growers and individuals for providing plant material fertilizers, potting mixes, chemicals, and other support for the weed science program.

Half Hollow Nursery	Van de Wetering Greenhouses
Spring Meadow Nursery	Ball Seed
Pinewood Perennials	Yoder Brothers
Friar's Head Golf Course	Forrest Keeling Nursery

We also gratefully acknowledge the support of the staff of the Long Island Horticultural Research and Extension Center.

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INTERNET RESOURCES

Cornell University Cooperative Extension of Suffolk County
ccesuffolk.org

Long Island Horticultural Research and Extension Center
www.longislandhort.cornell.edu

Cornell University Department of Horticulture
hort.cals.cornell.edu

All-star Groundcovers for Weed Suppression
entomology.cornell.edu/Extension/Woodys/CUGroundCoverSite/GroundcoverMain.html

Pest Management Guide for Commercial Production and Maintenance of
Trees and Shrubs
ipmguidelines.org/treesandshrubs

Pest Management Guide for Commercial Production and Maintenance of
Herbaceous Perennials
ipmguidelines.org/HerbaceousPerennials

GENERAL COMMENTS

Unless otherwise noted, liquid herbicide applications were made with a C02 backpack sprayer equipped with spray systems 8003 or 8003LP flat fan nozzles operating at appropriate spray boom pressures to deliver 30 GPA. Granular herbicides were applied with hand held shakers. Long Island weather data is included in the back of this document.

Weed control and crop response ratings vary among experiments due to local conditions at the time of evaluation. However, unless otherwise noted the evaluations follow the guidelines below.

Crop: 0%-100% (or 0-10) Crop Injury Scale

An initial survey of the entire test area is conducted. The condition and appearance of the untreated, handweeded plots is presumed to be the standard for no injury or a '0%' rating. A rating of '50%' represents plants or a plot that is 50% injured, reduced in vigor, stunted, or delayed (in germination, flower production, etc.) compared to the untreated plants. A rating of '100%' represents dead plants. If plants are dead or injured due to non-treatment effects, they are ignored in the rating and removed from the test.

Weeds: 0%-100% (or 0-10) Weed Cover or Control

A survey of the test area is conducted to assess the weed population. In unseeded field plots, weed species that are present in less than 50% of the test plots and border area are generally omitted from the rating. Ratings include general or overall weed control for Grasses and Broadleaves as well as individual weed species.

Percent weed cover or control is evaluated depending on the crop. A '100%' weed cover rating represents a very weedy plot indeed, where the weeds cover 100% of the plot area. If a percent weed control rating is used, then a '100%' represents a clean, weed-free plot, and '0%' means no apparent weed control was observed. A rating of '50%' represents plants or a plot where the weeds are 50% injured, suppressed, reduced in vigor, stunted, or delayed (in germination, flower production, etc.) or where there are 50% fewer weeds, or a combination of these factors, compared to the untreated plants.

Generally, the container potting media used for these trials was a nursery mix containing 70:20:10 fine bark:compost:sand with Harrell's 20-5-10 (10-12 month) and dolomitic lime with an approximate pH of 6.4 was used. Field tests were conducted at the Long Island Horticultural Research and Extension Center in Riverhead, New York in Riverhead Sandy Loam with approximately 2.8% organic matter and an approximate pH of 6.1.

Additional information, such as weather at time of application, irrigation and maintenance regime, plant culture is available upon request.

The authors hope you will find the information within this document helpful, but caution the reader not to extend undue interpretations from this single season's data. Important findings will be duplicated and reported as appropriate.

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ORNAMENTAL

LIHREC ORN 01 09

Efficacy and Phytotoxicity of Applications to Deeply Dormant Ornamentals

A study was conducted at the Long Island Horticultural Research and Extension Center to evaluate the tolerance of several container-grown woody ornamentals to dormant applications of SureGuard at three rates as compared to BroadStar and Ronstar. Physocarpus opulifolius 'Nugget', Hydrangea arborescens 'Hayes Starburst', Hypericum kalmianum 'Gemo', and Cornus sanguinea 'Cato' ('Arctic Sun') were treated on January 12, 2009. Phytotoxicity evaluations began at bud break on April 27 and continued through June 22. Cornus was significantly injured by all rates of SureGuard and Ronstar. Hypericum was slightly injured by all treatments. Physocarpus and hydrangea exhibited no injury symptoms throughout the trial.

Percent Injury

			Hypericum kalmianum 'Gemo'				
Treatment	Form	Rate lb/a a.i.	@ Bud	2 WA	4 WA	6 WA	8 WA
			Break	BB	BB	BB	BB
Untreated	~	~	0	0	0	3	0
SureGuard	51WDG	0.25	3	3	5	8	5
SureGuard	51WDG	0.5	5	5	11	13	13
SureGuard	51WDG	0.75	10	10	18	13	13
BroadStar	0.25G	0.5	3	3	10	10	13
Ronstar	2G	2.0	8	8	10	0	13
<i>Fisher's LSD @ 0.05</i>			6	6	6	7	12

			Cornus sanguinea 'Cato' ('Arctic Sun')				
Treatment	Form	Rate lb/a a.i.	@ Bud	2 WA	4 WA	6 WA	8 WA
			Break	BB	BB	BB	BB
Untreated	~	~	0	0	0	0	0
SureGuard	51WDG	0.25	88	70	83	75	83
SureGuard	51WDG	0.5	85	68	85	80	85
SureGuard	51WDG	0.75	88	70	88	83	94
BroadStar	0.25G	0.5	0	0	0	0	0
Ronstar	2G	2.0	48	53	60	58	56
<i>Fisher's LSD @ 0.05</i>			37	58	29	21	31

"Bud Break" (or BB) date = 4/27/09.

Use of Granular Herbicides in Mixed Planting Beds

A study was conducted at the Long Island Horticultural Research and Extension Center to determine the potential use by homeowners of granular herbicides in established mixed planting beds. *Abelia zanderi* 'Little Richard', *Aster novi-belgii* 'Winston Churchill', *Carex glauca*, *Clethra alnifolia* 'September Beauty', *Juniperus communis* 'Gold Totem Pole', *Nepeta x faassenii* 'Walker's Low', and *Rhododendron x 'Fantastica'* were planted during September of 2008 into Riverhead sandy loam. Treatments (BroadStar 0.25G flumioxazin and Miracle Gro Weed Preventer 1.47G trifluralin) were applied the following spring on May 26, 2009 to actively growing plants. For one treatment of BroadStar, granules were brushed off plants after over-the-top application; for all other treatments granules were not brushed off. Plots were maintained with hand weeding and irrigated as needed. *Abelia*, *Carex*, *Clethra*, *Juniper*, *Rhododendron*, and *Nepeta* appeared to be extremely tolerant of all treatments and exhibited little injury with recovery by trial end. No injury was observed throughout the trial for *Aster*.

Percent Injury							
Treatment	Rate lb/a a.i.	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT
		<i>Abelia zanderi</i> 'Little Richard'					
Handweeded Untreated	~	0	0	0	0	0	0
Broadstar	0.1875	0	0	0	3	1	0
Broadstar	0.375	0	1	4	6	0	0
Broadstar	0.75	0	3	4	8	0	0
Broadstar	1.5	0	3	4	8	1	0
Broadstar (gran brushed off)	1.5	0	0	4	6	3	0
Miracle Gro Weed Preventer	4.0	0	1	3	4	3	0
<i>Fisher's LSD @ 0.05</i>		<i>na</i>	3	3	3	4	<i>na</i>
<i>Clethra alnifolia</i> 'September Beauty'							
Handweeded Untreated	~	0	0	0	0	0	0
Broadstar	0.1875	3	6	6	4	0	0
Broadstar	0.375	4	8	8	6	0	0
Broadstar	0.75	4	9	9	6	0	0
Broadstar	1.5	5	10	11	6	0	0
Broadstar (gran brushed off)	1.5	3	4	5	5	0	0
Miracle Gro Weed Preventer	4.0	4	5	5	3	0	0
<i>Fisher's LSD @ 0.05</i>		4	4	5	4	<i>na</i>	<i>na</i>
<i>Carex glauca</i>							
Handweeded Untreated	~	0	0	0	0	0	0
Broadstar	0.1875	0	0	0	0	0	0
Broadstar	0.375	0	1	1	0	0	0
Broadstar	0.75	0	3	3	0	0	0
Broadstar	1.5	0	0	0	0	0	0
Broadstar (gran brushed off)	1.5	0	0	0	0	0	0
Miracle Gro Weed Preventer	4.0	0	3	3	0	0	0
<i>Fisher's LSD @ 0.05</i>		<i>na</i>	4	3	<i>na</i>	<i>na</i>	<i>na</i>

continued

Percent Injury							
Treatment	Rate lb/a a.i.	1 WAT	2 WAT	4 WAT	6 WAT	8 WAT	10 WAT
		<i>Juniperus communis</i> 'Gold Totem Pole'					
Handweeded Untreated	~	0	0	0	0	0	0
Broadstar	0.1875	0	0	1	4	0	0
Broadstar	0.375	0	0	3	6	0	0
Broadstar	0.75	0	0	3	6	0	0
Broadstar	1.5	0	0	3	6	0	0
Broadstar (gran brushed off)	1.5	0	0	0	3	0	0
Miracle Gro Weed Preventer	4.0	0	0	0	0	0	0
<i>Fisher's LSD @ 0.05</i>		<i>na</i>	<i>na</i>	4	4	<i>na</i>	<i>na</i>
<i>Nepeta x faassenii</i> 'Walker's Low'							
Handweeded Untreated	~	0	0	0	0	0	0
Broadstar	0.1875	0	0	0	3	0	0
Broadstar	0.375	0	0	1	3	0	0
Broadstar	0.75	0	0	1	3	0	0
Broadstar	1.5	0	0	0	4	0	0
Broadstar (gran brushed off)	1.5	0	1	0	3	0	0
Miracle Gro Weed Preventer	4.0	0	0	0	0	0	0
<i>Fisher's LSD @ 0.05</i>		<i>na</i>	1	2	3	<i>na</i>	<i>na</i>
<i>Rhododendron x 'Fantastica'</i>							
Handweeded Untreated	~	0	0	0	0	0	0
Broadstar	0.1875	0	3	5	6	3	0
Broadstar	0.375	3	3	3	4	0	0
Broadstar	0.75	6	4	4	3	0	0
Broadstar	1.5	8	5	5	4	0	0
Broadstar (gran brushed off)	1.5	1	3	4	5	3	0
Miracle Gro Weed Preventer	4.0	1	0	0	0	0	0
<i>Fisher's LSD @ 0.05</i>		4	3	3	4	4	<i>na</i>

Efficacy and Phytotoxicity of Late Dormant Landscape Applications

A study was conducted at the Long Island Horticultural Research and Extension Center to determine the efficacy and phytotoxicity of BroadStar at two timings and two application methods in established mixed landscape beds. *Hydrangea arborescens* 'Annabelle', *Panicum amarum*, *Ilex glabra* 'Densa', *Phlox paniculata*, and *Taxus baccata* were planted on September 10, 2008 into Riverhead sandy loam. Plots were treated with BroadStar (flumioxazin 0.25G at 0.375 lb. A.I./ac) applied either over-the-top or directed at plant base and with Snapshot (isoxaben+trifluralin 2.5G at 3.75 lb. A.I./ac) applied over-the-top on April 28, 2009 at which time some species had just broken dormancy while others had not. On May 26, the remaining plots received the same treatments while plants were actively growing. *Panicum* exhibited no injury throughout the trial, while *Ilex* and *hydrangea* exhibited little injury. *Taxus* was minimally injured by all treatments. *Phlox* exhibited the greatest injury although the dormant application of BroadStar directed at the plant base was the safest and injury was minimal. Weed control (data collected on local weed population, no introduced weeds) was fair to good with all treatments although supplemental hand weeding was performed regularly.

		Percent Injury								
Chemical	Application Timing/Method	5/4	5/11	5/18	6/1	6/10	6/22	7/2	7/20	8/3
		<i>Hydrangea arborescens</i> 'Annabelle'								
Untreated	~	0	0	0	0	0	0	0	0	0
BroadStar	Dormant, over the top	3	3	10	0	0	0	0	0	0
BroadStar	Dormant, at plant base	1	0	8	0	0	0	0	0	0
Snapshot	Dormant, over the top	4	3	5	0	0	0	0	0	0
BroadStar	Active, over the top	~	~	~	0	0	0	0	0	0
BroadStar	Active, at plant base	~	~	~	0	0	0	0	0	0
Snapshot	Active, over the top	~	~	~	0	0	0	0	0	0
<i>Fisher's LSD @ 0.05</i>		5	6	5	na	na	na	na	na	na
<i>Ilex glabra</i> 'Densa'										
Untreated	~	0	0	0	0	0	0	0	0	0
BroadStar	Dormant, over the top	0	0	3	0	0	0	0	0	0
BroadStar	Dormant, at plant base	0	0	5	3	0	0	0	0	0
Snapshot	Dormant, over the top	0	0	3	0	0	0	0	0	0
BroadStar	Active, over the top	~	~	~	0	0	0	0	0	0
BroadStar	Active, at plant base	~	~	~	0	0	0	0	0	0
Snapshot	Active, over the top	~	~	~	0	0	0	0	0	0
<i>Fisher's LSD @ 0.05</i>		na	na	8	3	na	na	na	na	na
<i>Phlox paniculata</i>										
Untreated	~	0	0	0	0	0	0	0	0	0
BroadStar	Dormant, over the top	18	23	18	10	10	9	8	13	18
BroadStar	Dormant, at plant base	8	8	10	10	3	3	5	13	20
Snapshot	Dormant, over the top	15	15	20	13	13	20	25	50	60
BroadStar	Active, over the top	~	~	~	20	45	40	35	30	28
BroadStar	Active, at plant base	~	~	~	13	15	13	13	23	28
Snapshot	Active, over the top	~	~	~	8	10	10	10	28	25
<i>Fisher's LSD @ 0.05</i>		9	11	11	5	6	7	9	14	19
<i>Taxus baccata</i>										
Untreated	~	0	0	0	0	0	0	0	0	0
BroadStar	Dormant, over the top	10	5	15	15	13	13	15	15	15
BroadStar	Dormant, at plant base	0	3	5	3	5	5	5	8	8
Snapshot	Dormant, over the top	10	10	10	10	13	13	13	13	13
BroadStar	Active, over the top	~	~	~	10	8	8	8	8	10
BroadStar	Active, at plant base	~	~	~	13	15	14	8	8	8
Snapshot	Active, over the top	~	~	~	0	10	10	10	15	15
<i>Fisher's LSD @ 0.05</i>		10	5	7	5	7	8	7	9	9

continued

Weed Control

Chemical	Application Timing/Method	Percent Control - May			Percent Weed Cover		
		Ann Grass	Chick- weed	Wild Radish	Jun	Jul	Aug
Untreated	~	0	0	0	70	70	55
BroadStar	Dormant, over the top	10	50	75	9	33	43
BroadStar	Dormant, at plant base	13	55	55	16	45	43
Snapshot	Dormant, over the top	15	65	75	25	25	30
BroadStar	Active, over the top	~	~	~	35	40	30
BroadStar	Active, at plant base	~	~	~	33	60	23
Snapshot	Active, over the top	~	~	~	28	33	20
<i>Fisher's LSD @ 0.05</i>		11	18	25	10	18	16

Container Crop Tolerance to Herbicides: IR-4

Herbicide tolerance of several container grown herbaceous and woody ornamentals was tested at the Long Island Horticultural Research and Extension Center through the IR-4 Program. Two trials were conducted with herbicides applied at transplant and 6 weeks later at IR-4 1, 2, and 4X rates. The first included the herbicides Certainty, Freehand Snapshot, and F6875 which were applied to newly transplanted ornamentals on 5/20/09 and six weeks later on 7/28/09. The second included herbicides Freehand and Tower which were applied to new transplants on 6/17/09 and six weeks later on 7/28/09 (except on Oenothera which was treated on 7/28/09 and 9/14/09). Visual phytotoxicity was evaluated at one, two, and four weeks after the first treatment and at one, two, and four weeks after the second treatment. Most species were injured and much of it was severe and significant during at least part of the season. Few species saw complete recovery by season end.

			Percent Injury											
			5/27	6/3	6/17	7/8	7/15	7/29	5/27	6/3	6/17	7/8	7/15	7/29
Treatment	Form	Rate lb/a a.i.	Lamium maculatum 'White Nancy'						Symphyotrichum ericoides 'Snow Flurry'					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
Certainty	75WDG	0.059	0	3	7	10	10	10	0	0	0	0	5	5
Certainty	75WDG	0.117	0	3	17	33	20	20	0	0	0	0	5	5
Certainty	75WDG	0.234	0	5	20	40	30	30	0	0	0	7	10	10
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	3	7	10	10	10	<i>na</i>	<i>na</i>	<i>na</i>	0	5	5
			Chrysogonum virginianum var. australe						Gazania splendens 'Kiss Lemon Shades'					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
Certainty	75WDG	0.059	0	3	13	13	33	63	0	0	0	0	0	0
Certainty	75WDG	0.117	0	5	23	37	43	70	0	2	2	10	0	0
Certainty	75WDG	0.234	0	8	27	43	50	77	0	5	5	20	0	0
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	3	13	13	33	63	<i>na</i>	5	5	7	<i>na</i>	<i>na</i>
			Chelone lyonii 'Hot Lips'						Lobelia cardinalis					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
Certainty	75WDG	0.059	0	0	10	10	17	23	0	0	8	0	7	10
Certainty	75WDG	0.117	0	0	23	23	37	33	0	0	20	13	12	15
Certainty	75WDG	0.234	0	0	37	37	53	47	0	0	33	37	37	43
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	<i>na</i>	10	10	17	23	<i>na</i>	<i>na</i>	8	7	7	10
			Armeria maritima 'Splendens'						Verbena stricta					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
Certainty	75WDG	0.059	0	10	10	10	27	30	0	2	7	17	23	20
Certainty	75WDG	0.117	0	13	20	30	40	60	0	5	23	30	37	33
Certainty	75WDG	0.234	0	27	30	60	70	83	0	12	33	50	47	47
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	10	10	10	27	30	<i>na</i>	2	7	17	23	20
			Helianthus microcephalus 'Lemon Queen'											
Untreated	~	~	0	0	0	0	0	0						
Certainty	75WDG	0.059	0	8	27	40	47	63						
Certainty	75WDG	0.117	0	17	33	57	60	73						
Certainty	75WDG	0.234	0	27	43	87	80	90						
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	8	27	40	47	63						

continued

Percent Injury

Treatment	Form	Rate lb/a a.i.	5/27 6/3 6/17 7/8 7/15 7/29							5/27 6/3 6/17 7/8 7/15 7/29					
			Amsonia hubrichtii							Chelone lyonii 'Hot Lips'					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0	
Freehand	1.75G	2.65	0	5	0	0	2	3	0	0	0	0	3	7	
Freehand	1.75G	5.3	0	5	7	10	5	3	0	0	0	3	7	10	
Freehand	1.75G	10.6	0	8	13	20	8	7	0	0	7	23	23	28	
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	5	0	7	2	3	<i>na</i>	<i>na</i>	0	7	3	7	
			Veronica spicata 'Red Fox'							Gladiolus x 'Glamini Charlotte'					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0	
Freehand	1.75G	2.65	0	0	13	10	30	50	0	0	0	0	10	5	
Freehand	1.75G	5.3	0	0	20	20	43	73	0	0	0	10	20	10	
Freehand	1.75G	10.6	0	0	27	27	57	83	0	0	0	23	27	13	
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	<i>na</i>	13	10	30	50	<i>na</i>	<i>na</i>	<i>na</i>	7	10	5	
			Verbena stricta							Vernonia noveboracensis					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0	
Freehand	1.75G	2.65	0	0	0	0	0	0	0	7	10	2	2	3	
Freehand	1.75G	5.3	0	0	0	0	2	5	0	7	17	10	3	5	
Freehand	1.75G	10.6	0	8	5	10	7	12	0	10	27	13	10	10	
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	0	0	0	0	0	<i>na</i>	7	10	2	2	3	
			Chrysogonum virginianum							Eupatorium hyssopifolium					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0	
Freehand	1.75G	2.65	0	0	0	10	10	8	0	0	7	7	10	13	
Freehand	1.75G	5.3	0	0	0	23	15	15	0	0	13	13	20	23	
Freehand	1.75G	10.6	0	5	5	23	23	27	0	0	13	23	30	33	
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	0	0	10	10	8	<i>na</i>	<i>na</i>	7	7	10	13	
			Helianthus microcephalus							Solidago sphacelata 'Golden					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0	
Freehand	1.75G	2.65	0	2	2	2	3	2	0	0	0	3	2	2	
Freehand	1.75G	5.3	0	5	7	10	10	7	0	0	0	10	5	3	
Freehand	1.75G	10.6	0	10	10	10	18	10	0	0	0	23	8	8	
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	2	2	2	3	2	<i>na</i>	<i>na</i>	<i>na</i>	3	2	2	
			Leucanthemum x superbum 'Becky'							Gazania splendens 'Kiss Lemon Shades'					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0	
Freehand	1.75G	2.65	0	10	3	10	7	0	0	0	0	0	0	0	
Freehand	1.75G	5.3	0	10	7	10	12	3	0	0	0	10	5	2	
Freehand	1.75G	10.6	0	10	10	23	17	10	0	2	2	20	10	8	
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	10	3	10	7	0	<i>na</i>	0	0	7	0	0	
			Lobelia cardinalis												
Untreated	~	~	0	0	0	0	0	0							
Freehand	1.75G	2.65	0	0	2	2	5	10							
Freehand	1.75G	5.3	0	0	8	17	27	40							
Freehand	1.75G	10.6	0	0	17	27	43	63							
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	<i>na</i>	2	2	5	10							

continued

Percent Injury														
			5/27	6/3	6/17	7/8	7/15	7/29	5/27	6/3	6/17	7/8	7/15	7/29
Treatment	Form	Rate	Gaura lindheimeri						Helianthus microcephalus					
		lb/a a.i.	'Siskiyou Pink'						'Lemon Queen'					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
F6875	0.3G	0.375	0	0	3	3	5	5	0	0	0	0	0	0
F6875	0.3G	0.75	0	2	7	7	10	7	0	5	0	0	5	5
F6875	0.3G	1.5	0	10	20	30	33	20	3	8	7	10	10	8
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	<i>0</i>	<i>3</i>	<i>3</i>	<i>5</i>	<i>5</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>

Percent Injury														
			5/27	6/3	6/17	7/8	7/15	7/29	5/27	6/3	6/17	7/8	7/15	7/29
Treatment	Form	Rate	Vernonia noveboracensis						Veronica spicata 'Red Fox'					
		lb/a a.i.												
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
Snapshot	2.5G	2.5	0	5	7	0	2	3	0	0	8	0	10	13
Snapshot	2.5G	5.0	0	10	10	0	3	5	0	0	33	0	40	60
Snapshot	2.5G	10.0	0	10	27	0	10	10	0	0	43	0	73	87
<i>Fisher's LSD @ 0.05</i>			<i>0</i>	<i>5</i>	<i>7</i>	<i>0</i>	<i>2</i>	<i>3</i>	<i>0</i>	<i>0</i>	<i>8</i>	<i>0</i>	<i>10</i>	<i>13</i>

Percent Injury														
			8/3	8/6	8/24	9/14	9/21	10/5	6/17	6/24	7/8	8/3	8/6	8/24
Treatment	Form	Rate	Potentilla fruticosa						Ophiopogon japonicus					
		lb/a a.i.	'Goldfinger'						'Nana'					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
Freehand	1.75G	2.65	0	0	0	0	0	0	0	0	0	0	0	0
Freehand	1.75G	5.3	0	0	0	0	0	0	0	0	0	0	0	0
Freehand	1.75G	10.6	0	0	0	0	0	0	0	0	0	0	0	0
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>
			Pieris japonica 'Shojo'						Oenothera speciosa					
Untreated	~	~	0	0	0	0	0	0	0	0	0	0	0	0
Freehand	1.75G	2.65	0	0	0	0	0	0	0	7	0	0	0	0
Freehand	1.75G	5.3	0	0	0	0	0	0	0	8	0	0	0	0
Freehand	1.75G	10.6	0	0	0	0	0	0	0	10	0	0	0	0
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>6</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>

Percent Injury								
			6/17	6/24	7/8	8/3	8/6	8/24
Treatment	Form	Rate	Ligustrum x vicaryi					
		lb/a a.i.						
Untreated	~	~	0	0	0	0	0	0
Tower	63.9EC	2.65	0	0	0	0	3	0
Tower	63.9EC	5.3	0	0	0	0	7	2
Tower	63.9EC	10.6	0	0	0	0	13	7
<i>Fisher's LSD @ 0.05</i>			<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>5</i>	<i>3</i>

Halosulfuron Tolerance of Field Grown Ornamentals: IR-4

Herbicide tolerance of several field grown herbaceous and woody ornamentals was tested at the Long Island Horticultural Research and Extension Center through the IR-4 Program. Sedgehammer 75WG plus a non-ionic surfactant (at 0.25% V/V) were applied three months after transplant and again four weeks later at the IR-4 1, 2, and 4X rates. The ornamental species, *Acer rubrum*, *Acer saccharinum*, *Aronia arbutifolia* 'Brilliantissima', *Aster ericoides* 'Snow Flurry', *Buddleia davidii* 'Black Knight', *Buxus microphylla* 'Green Mountain', and *Hydrangea arborescens* 'Hayes Starburst' were transplanted into Riverhead sandy loam on May 17, fertilized with 10-10-10, 50 lb. N/ac on 5/20/09, and mulched with 2" of hardwood chips on June 17. Visual phytotoxicity was evaluated at two and four weeks after the first treatment and one, two, and four weeks after the second treatment. One additional visual observation will be made during the spring of 2010. Most species were injured and much of it was severe and significant during at least part of the season. Few species saw complete recovery by season end. Injury may have been, at least in part, a result of the non-ionic surfactant which was applied along with each treatment. In the future, an additional treatment of non-ionic surfactant alone should be added to trials such as this.

		Percent Injury									
Chemical	Rate lb/a a.i.	8/24	9/2	9/14	9/23	10/5	8/24	9/2	9/14	9/23	10/5
		<i>Acer rubrum</i>					<i>Acer saccharinum</i>				
Untreated	~	0	0	0	0	0	0	0	0	0	0
SedgeHammer	0.031	28	33	38	38	40	40	40	43	40	40
SedgeHammer	0.063	30	38	40	38	40	43	45	50	45	45
SedgeHammer	0.125	38	40	43	38	40	45	45	48	48	50
Fisher's LSD @ 0.05		12	8	13	16	19	9	8	13	9	8
		<i>Buddleia davidii</i> 'Black Knight'					<i>Aster ericoides</i> 'Snow Flurry'				
Untreated	~	0	0	0	0	0	0	0	0	0	0
SedgeHammer	0.031	65	65	80	83	90	5	5	5	10	0
SedgeHammer	0.063	63	75	83	83	85	10	10	10	10	0
SedgeHammer	0.125	70	85	88	88	90	13	10	10	10	10
Fisher's LSD @ 0.05		19	20	14	11	14	7	5	5	0	na
		<i>Aronia arbutifolia</i> 'Brilliantissima'					<i>Buxus microphylla</i> 'Green Mountain'				
Untreated	~	0	0	0	0	0	0	0	0	0	0
SedgeHammer	0.031	15	8	13	13	13	5	5	5	10	10
SedgeHammer	0.063	16	18	18	18	18	5	5	8	10	10
SedgeHammer	0.125	23	28	25	23	23	8	10	10	15	10
Fisher's LSD @ 0.05		13	8	7	5	5	8	7	5	5	0
		<i>Hydrangea arborescens</i> 'Hayes Starburst'									
Untreated	~	0	0	0	0	0					
SedgeHammer	0.031	20	23	18	18	15					
SedgeHammer	0.063	38	33	30	30	23					
SedgeHammer	0.125	53	45	40	40	30					
Fisher's LSD @ 0.05		24	20	11	11	5					

Efficacy of Early Post-emergence Applications to Broadleaf Weeds: IR-4

Several herbicides were applied to weed seedlings at three stages. All applications were made on July 10, 2009 which was 22 days after the first seeding (when plants were at the 2 to 4 leaf stage), 15 days after the second seeding (when plants were at the cotyledon to 1 leaf stage), and on the day of treatment (seeded onto treated substrate). An untreated control was also seeded at each timing. Weed species included *Cardamine hirsuta* (hairy bittercress), *Oxalis stricta* (yellow woodsorrel), and *Chamaesyce humistrata* (prostrate spurge). Visual percent control data was collected at one, two, and four weeks after treatment. Many treatments were effective, yielding fifty to one hundred percent control by the fourth week after treatment.

Percent Control												
Treatment	Form	Rate lb/a a.i.	Timing	Bittercress			Yellow Woodsorrel			Spruge		
				1 WAT	2 WAT	4 WAT	1 WAT	2 WAT	4 WAT	1 WAT	2 WAT	4 WAT
Untreated	~	~	at seed	0	0	0	0	0	0	0	0	0
Broadstar	0.25G	0.19	at seed	1	3	0	14	30	3	28	53	83
Broadstar	0.25G	0.375	at seed	6	3	0	20	33	8	13	28	58
Certainty	75WDG	0.035	at seed	6	68	73	5	55	70	0	23	63
Certainty	75WDG	0.094	at seed	10	70	78	10	50	70	0	23	58
Casoron	4G	1.0	at seed	4	10	0	1	15	0	0	0	0
Casoron	4G	2.0	at seed	8	10	10	8	20	8	0	0	10
Casoron	1.4CS	1.0	at seed	5	20	18	10	45	38	0	3	25
HGH-63	2G	2.0	at seed	6	48	33	8	58	20	18	25	55
Tower	6EC	0.97	at seed	6	10	0	40	45	10	5	18	53
Tower	6EC	1.94	at seed	10	20	15	63	68	43	70	73	88
V-10142	0.5G	0.38	at seed	3	63	63	0	53	63	0	40	63
V-10142	0.5G	0.75	at seed	6	65	78	0	43	63	43	58	73
Untreated	~	~	cotyl to 1-lf	0	0	0	0	0	0	0	0	0
Broadstar	0.25G	0.19	cotyl to 1-lf	5	20	13	13	50	38	5	15	48
Broadstar	0.25G	0.375	cotyl to 1-lf	10	73	78	25	53	53	33	43	80
Certainty	75WDG	0.035	cotyl to 1-lf	1	65	88	5	50	70	13	33	78
Certainty	75WDG	0.094	cotyl to 1-lf	3	75	93	13	58	73	8	18	68
Casoron	4G	1.0	cotyl to 1-lf	0	20	0	3	20	3	0	0	3
Casoron	4G	2.0	cotyl to 1-lf	0	15	5	15	43	20	0	15	5
HGH-63	2G	2.0	cotyl to 1-lf	10	75	78	20	70	83	18	15	65
Tower	6EC	0.97	cotyl to 1-lf	0	45	33	20	48	35	13	13	60
Tower	6EC	1.94	cotyl to 1-lf	10	45	65	33	58	50	38	40	93
V-10142	0.5G	0.38	cotyl to 1-lf	1	58	90	8	48	58	13	28	48
V-10142	0.5G	0.75	cotyl to 1-lf	8	80	100	18	65	80	38	40	73
Untreated	~	~	2 to 4-lf	0	0	0	0	0	0	~	~	0
Broadstar	0.25G	0.19	2 to 4-lf	50	65	43	78	53	8	~	~	50
Broadstar	0.25G	0.375	2 to 4-lf	71	65	48	85	85	60	~	~	65
Certainty	75WDG	0.035	2 to 4-lf	30	35	53	93	78	68	~	~	68
Certainty	75WDG	0.094	2 to 4-lf	60	50	60	93	78	80	~	~	83
Casoron	4G	1.0	2 to 4-lf	73	43	15	88	38	18	~	~	48
Casoron	4G	2.0	2 to 4-lf	78	35	20	93	63	50	~	~	43
Casoron	1.4CS	1.0	2 to 4-lf	100	60	55	100	85	78	~	~	70
HGH-63	2G	2.0	2 to 4-lf	15	33	20	35	45	48	~	~	83
Tower	6EC	0.97	2 to 4-lf	23	38	53	75	38	48	~	~	85
Tower	6EC	1.94	2 to 4-lf	79	43	53	93	45	63	~	~	95
V-10142	0.5G	0.38	2 to 4-lf	28	45	55	78	70	70	~	~	70
V-10142	0.5G	0.75	2 to 4-lf	48	48	60	78	80	78	~	~	80
<i>Fisher's LSD @ 0.05</i>				13	18	20	19	17	21	26	26	29

Weed Control Longevity in Container Nursery Weed Management

A container study was conducted at the Long Island Horticultural Research and Extension Center in 2009 to evaluate the longevity of control of several granular herbicides. The herbicides were applied to flats filled with commercial nursery growing media on 5/8/09. The treated flats were either over seeded at treatment, at 30 days after treatment, or at 60 days after treatment. Weed species seeded at each timing were spotted spurge, (*Chamaesyce maculata*), common groundsel, (*Senecio vulgaris*), yellow woodsorrel, (*Oxalis stricta*), hairy bittercress, (*Cardamine hirsuta*), smooth crabgrass, (*Digitaria ischaemum*), annual bluegrass, (*Poa annua*) and northern willowherb (*Epilobium ciliatum*).

Based on visual observations, the longest lasting control of spurge was observed with Barricade and Barricade +Gallery; Freehand and Showcase also performed well. All treatments showed some early season activity on yellow woodsorrel. Gallery and Dimension were the least long lasting in control of this weed. Smooth crabgrass was controlled by all treatments except Gallery. Snapshot treatments wore off sooner than others. All Freehand rates controlled annual bluegrass very well while most other treatments were somewhat effective except Gallery, which was ineffective on this weed. All Freehand rates performed very well on willowherb. Other treatments were less long lasting and less effective initially. Bittercress was initially well controlled by all treatments except Barricade. Control level decreased rapidly for most treatments within 30 days after treatment and Freehand control was longest lasting. Common groundsel was well controlled by most treatments initially, but good control was lost rapidly after 30 days for all treatments.

In addition to the efficacy study, a companion ornamental tolerance study was conducted using the same treatments on newly planted *Thuja occidentalis* 'Nigra' and *Physocarpus opulifolius* 'Coppertina'. The results of visual evaluations indicate that *Thuja* tolerated all treatments without injury. *Physocarpus* showed slight initial injury from one treatment, but in general tolerated the treatments well.

continued

Percent Control 30 Days After Seeding

TREATMENT			Seeding Timing (days after treatment)										
			0	30	60	0	30	60	0	30	60		
Trade Name	Form	Rate lb/a a.i.	Spotted spurge			Yellow woodsorrel			Hairy bittercress				
Untreated	~	~	0	0	0	0	0	0	0	0	0		
Showcase	2.5G	5.0	80	83	0	95	98	100	95	95	0		
Snapshot	2.5G	2.5	70	40	13	95	55	50	95	58	0		
Snapshot	2.5G	3.8	90	30	33	95	88	75	95	48	0		
Snapshot	2.5G	5.0	90	95	0	100	93	75	100	65	0		
Freehand	1.75G	1.8	100	75	58	98	88	75	85	25	0		
Freehand	1.75G	2.6	100	75	8	100	98	68	90	53	0		
Freehand	1.75G	3.5	100	95	25	98	100	100	98	68	0		
Dimension	2EW	0.5	93	88	8	98	93	50	90	95	33		
Dimension+Gallery	2EW+75DF	0.5+1.0	100	95	25	100	95	50	100	98	25		
Gallery	75DF	1.0	100	85	0	100	78	25	100	70	0		
Barricade	65WDG	0.8	88	93	60	85	90	100	63	65	35		
Barricade+Gallery	65WDG+75DF	0.845+1.0	100	93	58	96	93	100	96	93	35		
Dimension	40WSP	0.5	93	95	48	95	95	100	93	95	80		
<i>Fisher's LSD @ 0.05</i>			22	38	45	8	21	54	9	33	36		
			Smooth crabgrass			Annual bluegrass			Common groundsel				
Untreated	~	~	0	0	0	0	0	0	0	0	0		
Showcase	2.5G	5.0	98	98	13	83	68	13	95	58	0		
Snapshot	2.5G	2.5	88	78	13	73	50	25	88	8	0		
Snapshot	2.5G	3.8	95	83	25	75	43	25	63	38	0		
Snapshot	2.5G	5.0	100	70	40	85	88	25	93	35	0		
Freehand	1.75G	1.8	100	70	75	95	70	50	93	8	0		
Freehand	1.75G	2.6	100	100	100	100	100	83	85	43	0		
Freehand	1.75G	3.5	100	100	100	100	100	100	95	25	0		
Dimension	2EW	0.5	100	98	60	100	78	40	80	13	0		
Dimension+Gallery	2EW+75DF	0.5+1.0	100	100	48	100	55	43	100	15	8		
Gallery	75DF	1.0	60	0	0	43	0	0	100	40	18		
Barricade	65WDG	0.8	95	93	83	75	83	58	23	13	25		
Barricade+Gallery	65WDG+75DF	0.845+1.0	98	93	85	84	95	68	100	23	0		
Dimension	40WSP	0.5	100	80	93	98	53	0	68	48	20		
<i>Fisher's LSD @ 0.05</i>			11	28	38	18	27	46	22	44	28		
			No. Willowherb										
Untreated	~	~	0	0									
Showcase	2.5G	5.0	83	0									
Snapshot	2.5G	2.5	55	0									
Snapshot	2.5G	3.8	48	0									
Snapshot	2.5G	5.0	80	0									
Freehand	1.75G	1.8	68	25									
Freehand	1.75G	2.6	100	75									
Freehand	1.75G	3.5	100	100									
Dimension	2EW	0.5	100	75									
Dimension+Gallery	2EW+75DF	0.5+1.0	75	73									
Gallery	75DF	1.0	40	0									
Barricade	65WDG	0.8	43	25									
Barricade+Gallery	65WDG+75DF	0.845+1.0	68	0									
Dimension	40WSP	0.5	95	48									
<i>Fisher's LSD @ 0.05</i>			34	45									

Preemergent Granular Application in Bedding Plants

Ten common bedding plant species were grown in 2" cell packs then transplanted on June 11, 2009 into Riverhead sandy loam which had been covered with two inches of hardwood mulch. Treatments were applied on June 12. The results of visual observations over several weeks and roots evaluations (0 to 5 scale) indicate that the bedding plant species tolerated these treatments with little or no injury. The bedding plants evaluated were *Ageratum houstonianum* 'Marie White', *Coleus x hybridus* 'Wizard Coral Sunrise', *Dahlia pinnata* 'Patty Red', *Dianthus chinensis* 'Super Parfait Raspberry', *Gomphrena globosa* 'Buddy Purple', *Portulaca grandiflora* 'Margarita Fuschia', *Salvia splendens* 'Vista Salmon', *Senecio cineraria* 'Silverdust', *Tagetes erecta* 'Marvel Orange' (AF), and *Zinnia marylandica* 'Zahara Coral Rose'.

Percent Injury and Root Evaluation													
Treatment	Rate lb/a a.i.	Injury (weeks after treatment)					Root Eval.	Injury (weeks after treatment)					Root Eval.
		1	2	4	6	8		1	2	4	6	8	
<i>Ageratum</i>													
Untreated	~	0	0	0	0	0	5	0	0	0	0	0	5
Freehand	1.75	0	0	5	5	5	4	1	3	4	6	8	4
Freehand	3.5	0	0	5	6	4	4	3	3	9	9	8	4
Freehand	7.0	0	0	10	8	8	3	5	4	9	9	8	3
Preen	4.0	0	0	9	9	5	4	3	1	9	9	6	4
<i>Fisher's LSD at 0.05</i>		<i>na</i>	<i>na</i>	5	5	4	0.1	5	3	3	2	4	0.3
<i>Coleus</i>													
<i>Gomphrena</i>													
Untreated	~	0	0	0	0	0	5	0	0	0	0	0	5
Freehand	1.75	0	0	1	1	3	4	0	4	0	0	0	5
Freehand	3.5	0	0	4	4	4	4	0	3	0	0	1	4
Freehand	7.0	0	0	5	10	5	4	0	5	9	3	1	4
Preen	4.0	0	0	8	3	1	4	0	3	8	6	5	5
<i>Fisher's LSD at 0.05</i>		<i>na</i>	<i>na</i>	4	4	4	1	<i>na</i>	4	2	2	3	0.3
<i>Marigold</i>													
<i>Dahlia</i>													
Untreated	~	0	0	0	0	0	4	0	0	0	0	0	4
Freehand	1.75	0	0	6	1	1	4	0	1	3	3	4	4
Freehand	3.5	3	0	6	1	1	4	4	1	8	5	3	4
Freehand	7.0	4	1	8	6	3	3	5	6	13	10	5	4
Preen	4.0	0	0	4	3	4	4	0	1	9	6	4	4
<i>Fisher's LSD at 0.05</i>		2	2	5	4	4	1	2	4	5	4	3	0.4
<i>Dianthus</i>													
<i>Portulaca</i>													
Untreated	~	0	0	0	0	0	5	0	0	0	0	0	5
Freehand	1.75	0	3	0	1	1	4	0	0	4	5	9	4
Freehand	3.5	0	0	0	1	1	4	0	0	6	4	4	4
Freehand	7.0	0	1	4	4	3	4	0	1	11	11	10	4
Preen	4.0	0	4	6	3	0	4	0	0	6	6	3	4
<i>Fisher's LSD at 0.05</i>		<i>na</i>	4	3	4	3	0.1	<i>na</i>	2	5	6	8	0.1
<i>Salvia</i>													
<i>Dusty Miller</i>													
Untreated	~	0	0	0	0	0	5	0	0	0	0	0	4
Freehand	1.75	0	0	5	4	4	4	0	0	0	3	3	5
Freehand	3.5	0	0	5	1	3	4	0	0	3	5	6	4
Freehand	7.0	0	0	8	8	6	4	0	0	8	11	8	4
Preen	4.0	0	0	8	6	6	4	0	0	6	8	3	4
<i>Fisher's LSD at 0.05</i>		<i>na</i>	<i>na</i>	7	5	5	0.4	<i>na</i>	<i>na</i>	6	5	6	0.2
<i>Zinnia</i>													

Granular Application of Preemergence Herbicide in Container-Grown Perennials

A container study was conducted to evaluate the response of several perennial species to three rates of Freehand. Treatments were applied on May 22, 2009 to fresh transplants of *Aster ericoides* 'Snow Flurry', *Astilbe chinensis* 'Pumila', *Coreopsis* x 'Jethro Tull', *Polystichum polyblepharum*, *Phlox paniculata*, *Physostegia virginiana*, and *Rudbeckia fulgida* 'Goldsturm'. While *Rudbeckia* was injured at all rates, the other species were tolerant of the lowest rate. *Astilbe*, *phlox*, and *physostegia* were injured at the highest rate. No injury was observed in *aster* and *coreopsis*. Evaluations indicated that the upper layer of roots and rhizomes within the container were inhibited at the higher Freehand rates.

Percent Injury													
Treatment	Rate lb/a a.i.	2	4	6	8	10	14	2	4	6	8	10	14
		WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT	WAT
		Astilbe chinensis 'Pumila'						Phlox paniculata					
Untreated	~	0	0	0	0	0	0	0	0	0	0	0	0
Freehand	1.75	0	0	5	7	3	0	0	0	0	0	7	0
Freehand	3.50	0	0	7	8	7	0	0	0	0	0	8	0
Freehand	7.00	0	0	12	13	10	0	0	0	0	10	10	0
Snapshot	3.75	0	0	7	5	7	0	0	0	0	3	8	0
<i>Fisher's LSD @ 0.05</i>		<i>na</i>	<i>na</i>	7	2	3	<i>na</i>	<i>na</i>	<i>na</i>	<i>na</i>	3	7	<i>na</i>
		Physostegia virginiana						Polystichum polyblepharum					
Untreated	~	0	0	0	0	0	0	0	0	0	0	0	0
Freehand	1.75	0	0	2	7	3	0	0	0	0	3	3	0
Freehand	3.50	0	0	5	10	5	3	0	0	0	8	7	0
Freehand	7.00	3	3	10	20	8	8	0	0	0	10	13	0
Snapshot	3.75	3	3	8	20	10	10	0	0	0	7	7	0
<i>Fisher's LSD @ 0.05</i>		3	3	2	7	3	3	<i>na</i>	<i>na</i>	<i>na</i>	3	3	<i>na</i>
		Rudbeckia fulgida 'Goldsturm'											
Untreated	~	0	0	0	0	0	0						
Freehand	1.75	0	0	0	13	3	0						
Freehand	3.50	0	0	0	20	5	0						
Freehand	7.00	0	0	0	27	7	0						
Snapshot	3.75	0	0	0	20	5	0						
<i>Fisher's LSD @ 0.05</i>		<i>na</i>	<i>na</i>	<i>na</i>	13	3	<i>na</i>						

Evaluation of Granular Combinations for Container-Grown Ornamentals

A container study was conducted at the Long Island Horticultural Research and Extension Center in 2009 to evaluate the response of several newly transplanted herbaceous perennials to three rates of the granular herbicide Freehand (dimethenamid-p & pendimethalin). *Armeria maritima* 'Splendens', *Calendula officinalis* 'Pacific Beauty Mix', *Dendranthema weyrichii* 'White Bomb', *Gaura lindheimeri* 'Siskiyou Pink', *Hibiscus moscheuto*, *Leucanthemum x superbum* 'Becky', *Nepeta cataria*, and *Nepeta x faassenii* 'Walker's Low' were treated on July 2 and retreated on August 11, 2009.

Visual evaluations of injury were recorded two, four, and six weeks after first treatment and two, four, six, eight, and ten weeks after second treatment. End of season root evaluations were conducted on October 19 based on 0 to 5 scale, where 5=best in test and 0=dead. When injury occurred, aboveground growth appeared necrotic and of low vigor. Root injury was manifested in lack of formation of roots in the upper portion of the container. The results indicate that *Nepeta cataria*, *calendula*, and *dendranthema* were injured by the higher application rates. Often, root injury was greater than corresponding aboveground injury. This may be because the plants were irrigated regularly and were not drought stressed during the trial.

		Percent Injury and Root Evaluation																		
Herbicide	Rate lb/a a.i.	Injury								Root	Injury								Root	
		7/15	7/30	8/6	8/24	9/2	9/21	10/6	10/19	Eval.	7/15	7/30	8/6	8/24	9/2	9/21	10/6	10/19	Eval.	
		<i>Armeria maritima</i> 'Splendens'									<i>Leucanthemum x superbum</i> 'Becky'									
Untreated	~	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5
Freehand	2.63	0	1	4	0	0	0	0	0	4	0	0	0	0	3	0	0	0	0	4
Freehand	5.25	1	1	10	0	0	0	0	0	4	1	0	0	0	8	5	0	0	0	4
Freehand	7.88	3	5	15	0	0	0	0	0	4	3	0	0	0	13	5	3	0	0	4
<i>Fisher's LSD @ 0.05</i>		4	4	2	0	0	0	0	0	1	3	na	na	na	2	na	2	na	1	
		<i>Calendula officinalis</i> 'Pacific Beauty Mix'									<i>Nepeta cataria</i>									
Untreated	~	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5
Freehand	2.63	3	3	9	3	3	1	0	0	4	9	10	11	30	20	20	20	15	3	
Freehand	5.25	5	6	15	8	8	5	5	1	4	6	10	15	50	45	38	38	40	2	
Freehand	7.88	6	9	19	11	13	8	5	3	3	8	15	23	55	60	45	45	60	2	
<i>Fisher's LSD @ 0.05</i>		3	4	3	3	2	3	na	3	1	3	3	7	13	17	13	13	15	1	
		<i>Dendranthema weyrichii</i> 'White Bomb'									<i>Nepeta x faassenii</i> 'Walker's Low'									
Untreated	~	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5
Freehand	2.63	0	5	4	3	3	3	3	3	4	0	0	0	0	0	0	0	0	0	5
Freehand	5.25	1	8	8	6	6	6	6	6	3	0	0	0	0	0	0	0	0	0	5
Freehand	7.88	6	11	18	10	9	9	9	9	2	0	0	0	0	0	0	0	0	0	4
<i>Fisher's LSD @ 0.05</i>		4	4	4	3	3	3	3	3	1	na	na	na	na	na	na	na	na	1	
		<i>Hibiscus moscheuto</i>									<i>Gaura lindheimeri</i> 'Siskiyou Pink'									
Untreated	~	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	5
Freehand	2.63	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	0	0	0	4
Freehand	5.25	0	0	0	0	0	0	0	0	4	0	3	3	5	5	5	0	0	4	
Freehand	7.88	0	0	0	0	0	0	0	0	4	0	5	5	10	8	8	2	0	4	
<i>Fisher's LSD @ 0.05</i>		na	na	na	na	na	na	na	na	0	na	4	3	0	3	3	3	na	0	

Efficacy of Postemergence Asulox on Liverwort

An exploratory greenhouse study was conducted to evaluate the efficacy of asulam (Asulox 3.34EC) at two rates (the label rate and half the label rate) with and without surfactant (X-77 at 0.25%) for the post and pre-emergence control of liverwort (*Marchantia polymorpha*). The post treatments were applied to well established thalli of liverwort. The pre (residual control) treatments were applied to bare soil-less media and inoculated with gammae (small clonal bodies) immediately after treatment. The standard treatment was flumioxazin (SureGuard at 0.25 lb a.i./a). The plots were evaluated for 97 days after treatment (DAT).

The results indicate that Asulox was able to control liverwort to a certain extent. The control peaked at 34 DAT and ranged from 49 to 63 percent. Flumioxazin control was better and more complete than any Asulox treatment. From these studies, it would appear that use rates of Asulox were not sufficient to provide acceptable control as a 'stand alone' product, however, combinations with other partially effective products may provide more complete control.

Percent Control							
TREATMENT	Rate lb/a a.i.	POSTemergence					PREemergence
		3 DAT	6 DAT	11 DAT	34 DAT	97 DAT	97 DAT
Untreated	~	10	10	3	0	0	0
ASULOX	1.67	10	11	15	49	16	27
ASULOX	3.34	16	16	15	54	24	40
ASULOX+X-77	1.67	15	15	20	59	14	28
ASULOX+X-77	3.34	21	21	25	63	24	45
X-77	0.25%	13	13	15	9	0	15
SUREGUARD	0.25	24	25	45	79	98	100
<i>Fisher's Protected LSD @ 0.05</i>		4	4	5	6	7	12

Percent Cover				
TREATMENT	Rate lb/a a.i.	POSTemergence	PREemergence	
		97 DAT	34 DAT	97 DAT
Untreated	~	100	8	77
ASULOX	1.67	89	0	52
ASULOX	3.34	83	1	40
ASULOX+X-77	1.67	91	1	53
ASULOX+X-77	3.34	80	0	38
X-77	0.25%	100	5	78
SUREGUARD	0.25	3	0	0
<i>Fisher's Protected LSD @ 0.05</i>		7	4	18

Pre and Post-emergence Liverwort Control with Dimethenamid-p and Asulam

A greenhouse study was conducted to evaluate the ability of herbicide treatments to control liverwort post and pre-emergently. Liverwort survives in containers with radially expanding thallus bodies. These thalli produce small lens-shaped clonal bodies called gemmae which form in gemma cups and are the means for the liverwort to spread short distances (by splashing water dislodging the gemmae and carrying them to new areas). The study was designed to evaluate herbicide performance on the thalli as well as determine how well they worked in preventing new populations from establishing from gemmae.

Treatments were applied on March 31, 2009 to flats with silver-dollar sized thalli as well as bare flats filled with soil-less media. After treatment, a solution of suspended gemmae was poured over the treated area and evaluated for several weeks. The results indicate that the sprayable formulation of dimethenamid-p (Tower 6EC) provided good post-emergence control of thalli and prevented new populations from forming. On the other hand, the granular formulation dimethenamid-p + pendimethalin (Freehand 1.75G) also prevented new populations from forming, but provided relatively poor control of the thalli.

Asulox (asulam 3.34EC) had a moderate effect on the thalli and had some, but not excellent, control of the gemmae. Interestingly, carfentrazone (Quicksilver 1.9EC), which control mosses very well, did not provide significant post or pre control of liverwort. This study helps to explain some of the previously puzzling results by illustrating that control of liverwort can be either post or pre-emergent.

Treatment	Rate lb/a a.i.	Non-ionic Surfactant @ 0.25%	Percent Control			Percent Cover	
			Thalli			Gemma Clonal Bodies	
			10 DAT	34 DAT	58 DAT	34 DAT	58 DAT
Untreated (thalli planted and gemmae poured)			0	0	0	20	48
Untreated (no gemmae added)			0	0	0	25	59
Tower	1.0		16	86	60	0	3
Tower	1.5		24	98	89	0	3
Freehand	1.75		4	10	21	1	8
Freehand	3.25		5	11	26	3	8
SureGuard	0.25	✓	34	100	99	0	0
Asulox	1.67	✓	6	18	30	3	18
Asulox	3.34	✓	10	41	60	4	16
Quicksilver	0.0148	✓	11	3	15	4	10
Weed Pharm	20% undilute	✓	96	100	96	5	5
Asulox+Quicksilver	1.67+.0148	✓	16	15	28	3	3
Asulox+WeedPharm	1.67+20%	✓	99	100	99	0	5
<i>Fisher's Protected LSD 0.05</i>			6	7	11	9	17

TURFGRASS

LIHREC TURF 03 09

Efficacy of Imprelis in Turf for Narrowleaf Plantain Control

A weed efficacy study was conducted at the Long Island Horticultural Research and Extension Center in 2009 to evaluate the efficacy of several sprayable and granular herbicide formulations for post-emergence control in narrowleaf plantain (*Plantago lanceolata*) in low maintenance perennial ryegrass (PRG). Treatments were applied on May 11, 2009 to sparse PRG heavily infested with narrowleaf plantain. Rain occurred (0.37") 84 hours after treatment. Percent control and percent cover were evaluated for 90 days after treatment. The treatment array consisted of three rates of Imprelis (DPX-MAT28) compared to a standard rate of Trimec Classic. The granular formulations DPX-MAT28-070 and DPX-MAT28-071 were also evaluated at three rates in comparison to Momentum Force at standard rate.

The results of the Imprelis evaluations indicate that the lower two rates controlled plantain at very good to excellent levels. This was on a par with the standard Trimec Classic. The highest rate of Imprelis (6 fl oz) was superior to the other rates and Trimec. At this rate, plantain control was maintained at near 90 percent three months after application. The lowest rates of both DPX-MAT28-070 and 071 provided comparable control to the granular standard, Momentum Force. The peak level of control was reached by 14 DAT for '070' and by 30 DAT for '071'. The greatest level of control by granular herbicides was provided by the highest rate of DPX-MAT28-070.

Treatment			Percent Control						Percent Ground Cover				
			Narrow Leaf Plantain (<i>Plantago lanceolata</i>)						7	14	30	42	60
Product	Form	Formulated Product/ac	7 DAT	14 DAT	30 DAT	42 DAT	60 DAT	90 DAT	7 DAT	14 DAT	30 DAT	42 DAT	60 DAT
Untreated	-	-	0	0	0	0	0	0	49	38	63	58	55
Imprelis™ (DPX-MAT28)	2SL	3.0 fl.oz.	61	73	83	83	84	49	43	43	28	16	11
Imprelis™ (DPX-MAT28)	2SL	4.5 fl.oz.	74	86	91	91	93	69	43	43	24	14	6
Imprelis™ (DPX-MAT28)	2SL	6.0 fl.oz.	73	89	91	91	97	88	41	41	35	11	2
Trimec Classic	2.72 EC	4 Pints	64	85	89	90	90	63	51	51	29	15	6
DPX-MAT28-070	0.05GF-S	150 lb	31	56	59	60	61	43	39	39	36	28	24
DPX-MAT28-070	0.05GF-S	175 lb	36	58	61	63	65	51	43	43	38	29	25
DPX-MAT28-070	0.05GF-S	200 lb	46	70	84	85	86	84	49	50	29	15	10
DPX-MAT28-071	0.05GF-E	150 lb	39	70	76	66	64	33	40	43	33	26	23
DPX-MAT28-071	0.05GF-E	175 lb	39	63	84	81	79	53	35	35	21	18	14
DPX-MAT28-071	0.05GF-E	200 lb	45	68	80	76	73	54	46	46	33	25	20
Momentum Force	1.76%G	156.8 lb	28	61	59	55	54	20	41	41	40	35	35
<i>Fisher's LSD @ 0.05</i>			13	15	16	15	16	23	14	17	14	9	14

Treatment			Percent Injury					
			Perennial Ryegrass					
Product	Form	Formulated Product/ac	7 DAT	14 DAT	30 DAT	42 DAT	60 DAT	90 DAT
Untreated	-	-	0	0	0	0	0	0
Imprelis™ (DPX-MAT28)	2SL	3.0 fl.oz.	0	0	0	0	0	0
Imprelis™ (DPX-MAT28)	2SL	4.5 fl.oz.	0	0	0	0	0	0
Imprelis™ (DPX-MAT28)	2SL	6.0 fl.oz.	0	0	0	0	0	0
Trimec Classic	2.72 EC	4 Pints	0	0	0	0	0	0
DPX-MAT28-070	0.05GF-S	150 lb	0	0	0	0	0	0
DPX-MAT28-070	0.05GF-S	175 lb	0	0	0	0	0	0
DPX-MAT28-070	0.05GF-S	200 lb	0	0	0	0	0	0
DPX-MAT28-071	0.05GF-E	150 lb	0	0	0	0	0	0
DPX-MAT28-071	0.05GF-E	175 lb	0	0	0	0	0	0
DPX-MAT28-071	0.05GF-E	200 lb	0	0	0	0	0	0
Momentum Force	1.76%G	156.8 lb	0	0	0	0	0	0
<i>Fisher's LSD @ 0.05</i>			ns	ns	ns	ns	ns	ns

SMALL FRUIT

LIHREC FRT 01 09

Herbicide Tolerance of Second Year Grape Vines

A field study was continued into a second growing season that evaluated the effects of flazasulfuron alone and with s-metolachlor or pendimethalin. In this study, flazasulfuron was applied at 0.0223, 0.0334, 0.0445 lbs. a.i./a as a pre bud break application to second year Chardonnay Clone 95 on 3309 root stock on April 24, 2009. These treatments were re-applied to the same plots that received these rates in 2008. In addition other plots were newly treated with flazasulfuron alone (at the highest rate) or with pendimethalin or s-metolachlor. Other treatments were applied May 31 (Spring) and July 7 (Summer).

The results of early season visual ratings indicate second year vines can tolerate flazasulfuron when applied alone or in combination. The results of treatments that were re-applied in the second year indicate early season injury, which may have been a residual from the previous year's application. By mid-season, however, all vines appeared near or at recovery. Unfortunately, a devastating early onset of downy mildew in the planting necessitated a premature secession of the study. The results indicate a fairly high degree of tolerance of flazasulfuron in two year old vines.

TREATMENT Chemical Name	Rate lb/a a.i.	Timing	PERCENT INJURY			Vine Ht (in)	Vine Wt (g)
			6/10	6/25	7/15	7/16	8/13
Weedy Check	~	~	0	0	0	31	20
Handweeded Check	~	~	0	0	0	34	22
Handweeded + Mulched	~	~	10	10	0	32	28
Pendimethalin 3.8CS	2.85	pre budbreak	3	3	0	38	27
Oryzalin 4AS	2	pre budbreak	7	3	0	48	46
Oryzalin+glyphosate (Credit, 23.66 ml)	2	summer					
Flumioxazin 51WDG	0.125	pre budbreak	10	10	17	41	34
Flumioxazin (no NIS)	0.125	spring					
Flumioxazin + MSO (4.73 ml)	0.125	summer					
Fomesafen 2L	0.25	pre budbreak	0	0	10	40	27
Fomesafen	0.25	summer					
Paraquat 2EC +NIS	1	spring	5	0	0	42	35
Paraquat +NIS	1	summer					
Glyphosate 4EC	1 5	pre budbreak	0	0	10	57	72
Glyphosate	1 5	summer					
Tembotrione c 3 5EC+MSO @ 1%	0.128	pre budbreak	3	7	0	36	18
Tembotrione c (no NIS)	0.128	spring					
Flazasulfuron 25WDG (first app on 2nd year vine)	0.0445	pre budbreak	10	10	0	27	36
Flazasulfuron (first app on 2nd year vine)+s-metolachlor7.64EC	0.0445 +1.91	pre budbreak	7	0	10	30	29
Fomesafen	0 5	pre budbreak	7	7	7	37	45
Oryzalin	2	pre budbreak					
Topramezone c 2 8EC + MSO 0 25% (4.73 ml)	0.064	summer					
Flumioxazin	0.125	pre budbreak	5	15	10	24	20
Pendimethalin	2.85	pre budbreak					
Flumioxazin	0.125	summer					
Topramezone c + MSO 0 25%	0.064	summer					
Flazasulfuron (re-apply 2nd year)	0.0223	pre budbreak	13	23	10	35	22
Flazasulfuron (re-apply 2nd year)	0.0334	pre budbreak	13	18	8	32	16
Flazasulfuron (re-apply 2nd year)	0.0445	pre budbreak	10	15	0	31	28
Flazasulfuron (first app on 2nd year vine)+pendimethalin	0.0445 +2.85	pre budbreak	8	5	8	34	26
		<i>Fisher's LSD @ 0.05</i>	12	15	13	na	na

Vineyard Weed Management with Flazasulfuron

An efficacy study was conducted under controlled conditions in the greenhouse at the Long Island Horticultural Research and Extension Center, which evaluated nine weed species, horseweed (*Conyza canadensis*), groundsel, (*Senecio vulgaris*), smooth crabgrass (*Digitaria ischemum*), white clover (*Trifolium repens*), fall panicum (*Panicum dichotomiflorum*), chickweed (*Stellaria media*), dovefoot geranium (*Geranium molle*), Carolina geranium, (*Geranium carolinium*) and dandelion (*Taraxacum officinale*). Treatments were applied both pre-emergence and at early post-emergence. Pre-emergence treatments were applied then overseeded immediately. Post-emergence treatments were applied to weeds that had been seeded and grown until most were in the 2-4 true leaf stage. The results of the pre-treatments indicate that flazasulfuron applied alone provided very good to excellent control of these weed species. The addition of either s-metolachlor or pendimethalin provided increased control of fall panicum and crabgrass. The results of the post-treatments also indicate a very high level of control when flazasulfuron was applied at the 2-4 leaf stage. Crabgrass control was very good, but was improved with the addition of s-metolachlor or pendimethalin. These results indicate that flazasulfuron can provide excellent early season control of small seeded summer and winter annual broadleaf and grassy weeds.

		Percent Control							
		PRE			POST				
Chemical Name	Rate lb/a a.i.	15	22	30	7	15	22	30	37
		DAT	DAT	DAT	DAT	DAT	DAT	DAT	DAT
<i>Common Chickweed (Stellaria media)</i>									
Untreated	~	0	0	0	0	0	0	0	0
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	95	94	100	70	96	100	100	100
flazasulfuron +pendimethalin +NIS	0.0445+2.85	92	93	100	73	100	100	100	100
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	95	95	100	85	100	100	100	100
pendimethalin 3.8ACS	2.85	63	85	80	50	83	100	100	100
s-metolachlor 7.62EC	1.91	92	94	83	53	48	50	100	38
dichlobenil 4G	4.0	100	100	100	57	65	88	100	82
dichlobenil 1.4CS	1.0	100	100	100	60	63	72	100	58
dichlobenil 1.4CS	2.0	100	100	100	75	95	100	100	100
<i>Fisher's LSD @ 0.05</i>		3	2	2	6	14	8	4	13
<i>Horseweed (Conyza canadensis)</i>									
Untreated	~	0	0	0	0	0	0	0	0
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	100	98	100	90	100	100	100	100
flazasulfuron +pendimethalin +NIS	0.0445+2.85	100	100	100	90	100	100	100	100
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	100	100	100	95	100	100	100	100
pendimethalin 3.8ACS	2.85	45	75	50	45	0	0	0	0
s-metolachlor 7.62EC	1.91	100	100	100	70	75	70	80	50
dichlobenil 4G	4.0	100	100	100	90	87	68	63	57
dichlobenil 1.4CS	1.0	100	100	100	85	95	100	100	97
dichlobenil 1.4CS	2.0	100	100	100	90	99	100	100	100
<i>Fisher's LSD @ 0.05</i>		5	2	3	3	4	10	7	8

continued

		Percent Control							
		PRE			POST				
		15	22	30	7	15	22	30	37
		DAT	DAT	DAT	DAT	DAT	DAT	DAT	DAT
Chemical Name	Rate lb/a a.i.	Common Groundsel (<i>Senecio vulgaris</i>)							
Untreated	~	0	0	0	0	0	0	0	0
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	100	100	100	100	100	100	100	100
flazasulfuron +pendimethalin +NIS	0.0445+2.85	100	100	100	100	100	100	100	100
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	100	100	100	100	100	100	100	100
pendimethalin 3.8ACS	2.85	7	50	50	13	0	0	0	0
s-metolachlor 7.62EC	1.91	100	100	100	75	50	62	100	100
dichlobenil 4G	4.0	100	100	100	100	100	100	100	100
dichlobenil 1.4CS	1.0	100	100	100	100	100	100	100	100
dichlobenil 1.4CS	2.0	100	100	100	100	100	100	100	100
<i>Fisher's LSD @ 0.05</i>		3	0	3	2	0	2	4	
		White Clover (<i>Trifolium repens</i>)							
Untreated	~	0	0	0	0	0	0	0	0
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	100	100	100	77	100	100	100	100
flazasulfuron +pendimethalin +NIS	0.0445+2.85	100	100	100	83	95	100	100	100
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	99	100	100	87	100	100	100	100
pendimethalin 3.8ACS	2.85	15	100	100	52	62	75	100	100
s-metolachlor 7.62EC	1.91	95	100	100	72	80	88	90	100
dichlobenil 4G	4.0	100	100	100	75	90	100	100	100
dichlobenil 1.4CS	1.0	100	100	100	67	90	100	100	100
dichlobenil 1.4CS	2.0	100	100	100	75	95	100	100	100
<i>Fisher's LSD @ 0.05</i>		0	0	na	6	3	2	na	4
		Common Dandelion (<i>Taraxacum officinale</i>)							
Untreated	~	0	0	0					
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	99	100	100					
flazasulfuron +pendimethalin +NIS	0.0445+2.85	100	100	100					
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	100	100	100					
pendimethalin 3.8ACS	2.85	92	67	80					
s-metolachlor 7.62EC	1.91	95	83	73					
dichlobenil 4G	4.0	100	100	100					
dichlobenil 1.4CS	1.0	100	100	100					
dichlobenil 1.4CS	2.0	100	100	100					
<i>Fisher's LSD @ 0.05</i>		2	25	17					
		Carolina Geranium (<i>Geranium carolinianum</i>)							
Untreated	~	0	0		0	0			
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	90	100		100	90			
flazasulfuron +pendimethalin +NIS	0.0445+2.85	98	100		100	98			
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	70	100		100	70			
pendimethalin 3.8ACS	2.85	13	25		53	42			
s-metolachlor 7.62EC	1.91	100	75		90	72			
dichlobenil 4G	4.0	100	100		100	100			
dichlobenil 1.4CS	1.0	100	100		100	100			
dichlobenil 1.4CS	2.0	100	100		100	100			
<i>Fisher's LSD @ 0.05</i>		30	25		2	53			

continued

		Percent Control							
		PRE			POST				
		15	22	30	7	15	22	30	37
		DAT	DAT	DAT	DAT	DAT	DAT	DAT	DAT
Chemical Name	Rate lb/a a.i.	Dovefoot Geranium (<i>Geranium molle</i>)							
Untreated	~	0	0	0	0	0	0	0	0
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	95	90	100	88	92	100	100	100
flazasulfuron +pendimethalin +NIS	0.0445+2.85	95	98	100	83	97	100	100	100
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	96	97	100	82	99	100	100	100
pendimethalin 3.8ACS	2.85	62	73	73	70	82	88	90	93
s-metolachlor 7.62EC	1.91	90	100	100	60	67	78	90	100
dichlobenil 4G	4.0	97	100	100	60	78	80	73	67
dichlobenil 1.4CS	1.0	89	100	100	52	70	65	60	50
dichlobenil 1.4CS	2.0	97	94	100	87	95	100	100	100
<i>Fisher's LSD @ 0.05</i>		2	3	2	8	16	16	15	17
		Fall Panicum (<i>Panicum dichotomiflorum</i>)							
Untreated	~	0	0	0	0	0	0	0	0
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	93	93	90	60	75	98	100	100
flazasulfuron +pendimethalin +NIS	0.0445+2.85	100	100	98	70	92	100	100	100
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	100	100	100	90	92	100	100	100
pendimethalin 3.8ACS	2.85	100	100	100	57	50	90	90	90
s-metolachlor 7.62EC	1.91	100	100	100	82	82	90	90	100
dichlobenil 4G	4.0	99	100	90	62	90	97	100	100
dichlobenil 1.4CS	1.0	99	95	90	50	88	93	95	90
dichlobenil 1.4CS	2.0	100	100	97	63	95	100	100	100
<i>Fisher's LSD @ 0.05</i>		2	2	1	6	5	2	2	4
		Smooth Crabgrass (<i>Digitaria ischimum</i>)							
Untreated	~	0	0	0	0	0	0	0	0
flazasulfuron 25WDG +NIS @ 0.25%	0.0445	90	95	90	82	75	96	83	90
flazasulfuron +pendimethalin +NIS	0.0445+2.85	100	100	98	95	92	100	100	100
flazasulfuron + s-metolachlor +NIS	0.0445+1.91	100	100	100	95	92	100	100	100
pendimethalin 3.8ACS	2.85	100	100	100	50	50	77	50	90
s-metolachlor 7.62EC	1.91	97	98	100	82	75	77	85	100
dichlobenil 4G	4.0	96	99	97	85	83	80	77	63
dichlobenil 1.4CS	1.0	99	100	98	90	77	77	57	50
dichlobenil 1.4CS	2.0	100	100	95	95	82	95	100	100
<i>Fisher's LSD @ 0.05</i>		1	0	2	2	6	7	9	13

VEGETABLE

LIHREC GH (VEG) 01 09

Managing Eastern Black Nightshade

Eastern black nightshade (EBN), *Solanum ptychanthum*, is a troublesome summer annual weed of the Solanaceae family. EBN is the most common weed of this genus (which includes potatoes and tomatoes) infesting Long Island fields. Other, similar species such as black nightshade (*S. nigrum*) and hairy nightshade (*S. physalifolium*) also occur but less commonly. EBN can be a prolific seed producer if left to grow in fields. The seeds are fairly large and are borne in juicy black berries that are spread from field to field by wildlife as well as by cultivation equipment. Managing EBN in vegetables and fruit crops is possible with judicious use of selective herbicides combined with rotations that allow their use.

Recently, a greenhouse study was conducted at the Cornell Research and Extension Center to determine which commonly available herbicides are effective on this weed. The study was conducted to examine control by both pre-emergence and post-emergence applications. Eastern black nightshade was grown from seeds collected from five local farms. Pre treatments were applied on March 22 to seeded flats with dry media. Post treatments were applied April 10 to EBN at 2-4 true leaf stage and tomatoes 3-5" tall. Non-ionic surfactant (0.25%) was added to all post treatments.

The results indicate that several herbicides labeled for use in corn can be very effective on this weed. Aatrex, Basagran, Callisto, Aim, Impact, Option, and Sandea all showed very good to excellent levels of control in this trial. The Matrix label, registered for potatoes and tomatoes, states specifically that EBN is not controlled while black and hairy nightshade are. These results confirm that no pre-emergence control can be expected from Matrix. While a certain level of post-emergence suppression was observed, it does not reach commercially acceptable levels.

Also these results showed that several herbicides have some activity on this weed, yet several are not specifically labeled for control of EBN. This includes Goal, Strategy, Sandea, Reflex, Basagran, and Karmex. Chateau is the only one of the group specifically labeled for control of EBN. Using these herbicides on registered vegetable/fruit crops for other weed species will probably help suppress EBN and keep it from becoming a dominant pest. However, vegetables that have Devrinol (napropamide) or Sencor (metribuzin) as a sole or major component in the weed control program are vulnerable to infestation of this weed. Neither of these herbicides can be expected to provide any significant control of this weed. So the key to reducing EBN problems in these crops is to reduce the soil weed seed bank by rotating to crops that have effective herbicides that can be legally used. When possible, cultivation is an important tool to keep young weeds from producing seed.

			Tomatoes			E. B. Nightshade		
Chemical	Form	Rate lb/a a.i.	Percent Injury		Wt (g)	Percent Injury		Wt (g)
			4/12	4/20	4/20	4/12	4/20	4/20
PRE TREATMENTS								
Untreated	~	~	0	0	4.73	0	0	1.78
Aatrex	4L	0.50	81	85	0.30	83	90	0.03
Chateau	51WDG	0.0625	100	100	0.01	100	100	0.00
Matrix	25WDG	0.024	6	0	4.65	3	0	1.26
Pyrazosulfuron	70WDG	0.0446	0	0	4.44	0	0	1.05
Reflex	2L	0.25	8	0	5.02	11	0	0.84
Sandea	75WDG	0.0625	4	0	4.78	0	0	2.12
Devrinol	50DF	2.00	0	0	4.34	0	0	1.34
Goal	2EC	0.25	95	95	0.28	100	100	0.03
Karmex	80WDG	1.00	95	100	0.03	94	98	0.02
Strategy	2.1EC	0.79	89	93	0.32	90	94	0.04
<i>Fisher's LSD @ 0.05</i>			10	8	1.19	9	3	0.57
POST TREATMENTS								
Untreated	~	~	0	0	11.10	0	0	1.19
Aatrex	4L	0.50	8	100	0.15	8	100	0.05
Chateau	51WDG	0.0625	90	100	0.00	90	100	0.00
Matrix	25WDG	0.024	11	41	5.20	11	60	0.88
Pyrazosulfuron	70WDG	0.0446	15	48	3.18	16	39	1.39
Reflex	2L	0.25	90	100	0.00	90	100	0.00
Sandea	75WDG	0.0625	13	79	1.43	14	79	0.38
Aim	1.9EW	0.00742	90	100	0.08	90	100	0.10
Aim	1.9EW	0.014	90	100	0.05	89	100	0.00
Basagran	4L	0.750	13	100	0.05	13	100	0.03
Callisto	4SC	0.09375	8	86	1.08	8	91	0.12
Flazisulfuron	25WDG	0.0445	16	63	1.95	16	45	1.13
Impact	2.8EC	0.0164	5	79	1.48	5	88	0.14
Option	35WDG	0.033	14	93	0.70	15	94	0.11
<i>Fisher's LSD @ 0.05</i>			5	9	1.70	5	13	0.45



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Weed Science Program

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Program Objectives

The Weed Science Program assists the agricultural and horticultural industry by developing educational programs and conducting applied research in weed biology and management in several horticultural enterprises including vegetables, grapes, turf, woody and herbaceous perennial production in the field and containers, field-grown cutflowers, container-grown chrysanthemums, and landscape use of woody and herbaceous plant materials.



Program Summary

The Weed Science program focuses on two major areas:

Applied Research: Several weed management problems are being addressed through research. The program investigates both traditional weed control approaches and alternative and cultural methods that can be integrated and used successfully.

Educational Extension Efforts: Some major areas of focus are the Cornell Pesticide Management Guide for Commercial Production of Trees and Shrubs and the Cornell Pesticide Management Guide for the Production and Maintenance of Herbaceous Perennials as well as other means of disseminating information about the results of recent research such as weed identification display gardens, articles in trade journals, illustrated lectures, fact sheets, and website contributions.

A recent additional role has been involvement with a consortium of representatives from several other state and regional governmental and non-governmental organizations in developing a Weed Management Plan for Long Island to control and prevent new infestations of invasive weeds.



Recent establishment of demonstration planting of some of the best perennials that were tested for roadside planting.

Program Justification

Growers and end-users of horticultural products are constantly confronted with potential loss of quality and economic loss due to weed competition in both the production cycle and in the end-use.

Additionally, great concern about the potential contamination of the single source aquifer from which Long Island draws its drinking water has resulted in fewer registrations of herbicides here and loss of several older materials that were heavily relied upon.

The weed science program is continually evaluating new and alternative methods and measures that will help solve some of these issues.

Impact to Industry

Several recent research projects have had either direct or indirect impact on the industry:

Vegetable growers and nurseries on Long Island have recently lost the use of a valuable tool for weed management, the pre-emergence metolachlor. Research has been focused on alternatives to this material.

A five-year project evaluated nearly 100 herbaceous perennial groundcover species for their ability to establish rapidly thereby suppress weed growth. The use of such plants along roadsides by Departments of Transportation and by homeowners has the potential to reduce herbicide use and labor and to significantly increase demand for these plants. Demonstration plantings were established on Long Island and Upstate New York along roadsides and in retail nurseries to further evaluate the best performing plants and educate the public about these plants.

New selective postemergence herbicides are being evaluated in both field and container production of perennials. If a broadly applicable postemergence approach can be established, many troublesome weed problems can be reduced or eliminated.

Unique environmental and cultural conditions exist for weed management in grape production on Long island. Issues involving off target herbicide drift and alternative under-trellis weed management are being addressed.

Both conventional and alternative approaches to weed management in field grown cash crops have been evaluated. Because of the multi-species and small acreage approach of many growers, weed management is a very difficult aspect of crop production. Several new 'spins' on some old approaches have shown promise.

Program Team

Andrew Senesac, Program Leader
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Collaborators:
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Betsy Lamb, NYS IPM Program
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Temperature and Rainfall Record 2009

Long Island Horticultural Research and Extension Center, Riverhead, NY

Day	February			March			April			May			June			July			August			September			October		
	Temp.		Rain (in)	Temp.		Rain (in)	Temp.		Rain (in)	Temp.		Rain (in)	Temp.		Rain (in)	Temp.		Rain (in)	Temp.		Rain (in)	Temp.		Rain (in)	Temp.		Rain (in)
	High (°F)	Low (°F)		High (°F)	Low (°F)		High (°F)	Low (°F)		High (°F)	Low (°F)		High (°F)	Low (°F)		High (°F)	Low (°F)		High (°F)	Low (°F)		High (°F)	Low (°F)		High (°F)	Low (°F)	
1	48	22	0.00	37	29	0.13	56	33	0.00	64	51	0.03	69	47	0.00	78	67	0.10	83	67	0.45	74	61	0.00	57	43	0.00
2	54	30	0.00	32	21	0.85	57	42	0.17	62	52	0.20	77	55	0.00	80	64	0.05	80	66	0.07	76	54	0.00	63	39	0.00
3	42	28	0.18	24	14	0.00	59	48	0.77	61	48	0.11	77	57	0.06	78	64	0.09	83	65	0.00	78	53	0.00	69	58	0.73
4	28	19	0.05	31	18	0.00	56	48	0.01	58	49	0.32	66	52	0.66	79	63	0.00	83	67	0.00	82	57	0.00	71	63	0.05
5	25	11	0.00	42	10	0.00	60	41	0.00	54	49	0.20	64	55	0.56	78	63	0.00	86	74	0.00	83	64	0.00	70	56	0.00
6	27	12	0.00	46	30	0.00	60	42	0.72	65	47	0.44	74	55	0.53	82	61	0.00	82	67	0.00	81	63	0.01	65	54	0.00
7	46	14	0.00	66	39	0.00	46	42	0.05	68	49	0.50	78	58	0.00	79	65	0.07	78	65	0.00	71	58	0.00	72	54	0.33
8	60	42	0.00	60	46	0.00	46	35	0.00	70	51	0.46	76	60	0.00	75	58	0.45	78	65	0.00	75	59	0.00	65	54	0.00
9	43	32	0.00	55	35	0.37	59	34	0.00	69	55	0.45	72	58	1.13	75	60	0.00	77	65	0.00	76	62	0.05	67	51	0.00
10	46	29	0.00	44	32	0.00	61	39	0.00	70	56	0.00	65	57	0.00	76	54	0.00	90	70	0.04	74	60	0.00	66	60	0.03
11	62	39	0.00	50	38	0.01	53	41	1.00	63	47	0.00	64	57	0.00	76	52	0.00	90	73	0.00	66	59	0.66	62	41	0.00
12	53	43	0.16	47	31	0.00	45	36	0.00	67	47	0.00	78	59	0.70	80	64	0.18	86	71	0.00	70	65	0.17	60	46	0.00
13	43	36	0.00	37	25	0.00	54	35	0.00	67	44	0.00	75	62	0.00	80	57	0.00	75	67	0.09	77	65	0.14	62	42	0.00
14	39	27	0.00	47	26	0.00	53	41	0.00	65	52	0.00	71	57	0.12	78	62	0.00	85	61	0.00	76	64	0.00	59	44	0.00
15	39	28	0.00	50	37	0.00	55	42	0.23	75	56	0.47	72	55	0.00	79	55	0.00	85	66	0.00	76	57	0.00	50	42	0.40
16	37	27	0.00	49	30	0.00	60	41	0.00	75	53	0.00	68	56	0.00	78	65	0.00	88	68	0.00	76	61	0.17	46	41	0.49
17	37	25	0.00	52	33	0.00	67	31	0.00	62	48	0.53	69	48	0.00	85	64	0.00	91	72	0.00	66	56	0.00	52	45	0.00
18	40	24	0.22	54	30	0.00	75	42	0.00	57	47	0.00	66	58	0.79	81	71	0.00	91	70	0.00	74	48	0.00	50	40	0.78
19	51	37	0.36	51	39	0.13	68	48	0.00	64	44	0.00	79	62	0.63	83	59	0.00	88	72	0.00	73	54	0.00	55	40	0.07
20	46	23	0.00	43	35	0.00	55	41	0.17	78	47	0.00	78	62	0.03	80	62	0.00	88	72	0.00	73	46	0.00	62	34	0.00
21	38	27	0.00	43	29	0.00	54	43	1.82	78	53	0.00	69	61	0.50	80	65	1.17	88	77	0.00	74	49	0.00	65	43	0.00
22	43	30	0.30	52	29	0.00	53	44	0.36	79	55	0.00	70	63	0.00	80	66	0.05	86	73	0.18	75	59	0.00	70	49	0.00
23	37	27	0.00	46	28	0.00	55	42	0.08	75	61	0.00	72	63	0.03	80	66	0.11	83	73	0.00	77	64	0.00	65	48	0.00
24	35	22	0.00	47	26	0.00	64	40	0.00	77	54	0.00	72	63	0.03	79	62	2.17	84	70	0.00	80	69	0.06	71	48	0.10
25	39	23	0.00	53	33	0.00	80	49	0.00	77	61	0.12	76	61	0.00	82	62	0.09	83	67	0.00	76	60	0.00	66	54	1.40
26	50	27	0.00	51	32	0.00	86	58	0.00	77	53	0.00	80	64	0.35	84	70	0.24	85	67	0.00	66	51	0.00	61	48	0.00
27	58	39	0.00	61	39	0.31	79	51	0.00	62	50	0.00	80	60	0.31	82	71	0.00	82	66	0.10	67	54	0.97	57	44	0.00
28	52	34	0.25	58	43	0.01	82	60	0.00	61	54	0.00	80	61	0.00	85	68	0.00	75	64	0.08	72	56	0.00	57	52	1.30
29				56	42	0.54	77	50	0.07	68	53	0.92	81	64	0.00	82	72	0.00	71	65	0.96	69	50	0.16	57	47	0.10
30				57	42	0.08	63	40	0.00	75	58	0.00	82	61	0.00	85	72	0.00	80	64	0.04	65	54	0.00	58	42	0.00
31				59	38	0.00				75	53	0.00				85	70	0.05	75	64	0.00				70	47	0.00
Avg/St	44	28	1.52	48	32	2.43	61	43	5.45	68	52	4.75	73	58	6.43	80	64	4.82	83	68	2.01	74	58	2.39	62	47	5.78