



# Ornamental Horticulture Program Research Project Sheet

<http://ir4.rutgers.edu/Ornamental/ornamentalProjectInformationSheets.cfm>

**Project Name:** Pre Emergent Herbicide Crop Safety – Sulfentrazone

<b>New</b>	<b>Ongoing</b>	X	<b>Completed</b>	<b>Duration if ongoing or completed:</b>	1996 - 2015
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**Project Description:**

The Pre-Emergent Herbicide Crop Safety Project began in 2004 and has continued through 2015. While specific crops and herbicides have changed, the intent of this research has been to screen over-the-top applications of pre-emergent herbicides as plants are breaking dormancy, or beginning new growth, and then 4 to 6 weeks later once foliage is more mature. This research project sheet covers four formulations containing sulfentrazone: F6875 0.3G, F6875 4SC, Sulfentrazone G, Sulfentrazone 4F.

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

**Abstract from 2009 Sulfentrazone Crop Safety Summary**

Since 1996 IR-4 has completed 247 trials with products containing sulfentrazone (Sulfentrazone 0.2G and Sulfentrazone 4F) on 111 crops. The data contained in this report was generated to register uses of sulfentrazone on and around ornamental horticulture plants with over-the-top applications. The sulfentrazone rates in the testing programs were 0.125, 0.25 and 0.5 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Sulfentrazone 0.2G had been applied to 54 plant genera or species. Of these, 12 exhibited no or minimal transient injury after application at all three rates. One crop exhibited no phytotoxicity at 0.125 and 0.25 lb ai per acre, but did have some injury at 0.5 lb ai per acre. Only 3 crops (*Canna sp.*, *Echinacea purpurea*, and *Hosta sp.*) exhibited phytotoxicity at even the lowest rate. Sulfentrazone 4F has been applied to 57 crops since 1996. Of these only 6 (*Buxus sp.*, *Ilex vomitoria 'nana'*, *Juniperus horizontalis*, *Rosa sp.*, *Taxus sp.*, and *Thuja sp.*) exhibited no damage with over the top applications at all tested rates. Seven crops had minimal, transitory damage at the lower rates but some phytotoxicity at the 4X rate and 15 crops exhibited damage at all tested rates.

**Abstract from 2014 Sulfentrazone + Prodiamine Crop Safety Summary**

Since 2007 IR-4 has completed 342 trials with products containing sulfentrazone + prodiamine (F6875 0.3G and F6875 4SC) on 88 crops. The data contained in this report was generated to register uses of sulfentrazone + prodiamine formulation on and around ornamental horticulture plants with over-the-top applications. The rates tested were 0.375, 0.75 and 1.5 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. The F6875 0.3G formulation was applied to 75 plant genera or species. Of these crops, 22 exhibited no or minimal transient injury after application at all three rates. Nine crops (*Buddleia davidii*, *Echinacea sp.*, *Hemerocallis sp.*, *Hosta sp.*, *Iris sp.*, *Lobularia maritima*, *Ophiopogon sp.*, *Phlox paniculata*, *Phlox subulata*) exhibited phytotoxicity at even the lowest rate. F6875 4SC was tested on 55 genera or species of which 11 species exhibited little to no injury at all three rates. Eleven species (*Buddleia davidii*, *Chasmanthium latifolium*, *Dryopteris sp.*, *Echinacea purpurea*, *Hemerocallis*, *Heuchera sanguinea*, *Hibiscus sp.*, *Hosta sp.*, *Hydrangea sp.*, *Phlox paniculata*, and *Rudbeckia sp.*) demonstrated significant injury even at the lowest rate.

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

Crop Safety

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

See "IR-4 Crop Safety to Date" below

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

F6875 0.3G	Sulfentrazone 0.2G
F6875 SC	Sulfentrazone 4F

Product Registration and Research Status	
	<b>Registration Status</b>
Labeled & Commercialized Wide range of ornamental horticulture crops listed	
Labeled & Commercialized Opportunity to add additional ornamental horticulture crops	
Labeled But NOT Commercialized	
Not yet registered or labeled	F6875 0.3G F6875 4SC Sulfentrazone 0.2G
No longer available for development	<b>Sulfentrazone 4F*</b>
* IR-4 Data contributed to registration decision – either adding pest to label or not pursuing further research	
1 At least one crop species screened fully	
2 Product not available for production ornamentals	

<b>Other:</b>
Sulfentrazone for the ornamental horticulture market is not being marketed as a standalone product. This registration is a precursor for F6875 registration.

Project Pros	Project Cons
1 Additional research could yield data favorable for further label expansion 2	1

<b>IR-4 Crop Safety Trials to Date</b>
Average rating on a scale of 1 – 5 with 1 = 0 to about no injury and 5 = severe injury and mortality; minimum to maximum rating; number of trials. A rating of 3 or higher is considered commercially unacceptable ( <i>red text</i> ). A rating of 1 or 2 is considered commercially acceptable and those with more than 3 trials are complete ( <i>green text</i> ). ‘Labeled’ indicates that IR-4 generated data in at least one trial and that this crop is listed on the label. For crop/product combinations that are blank, IR-4 has not screened this combination.

Plant Group	Crop	F6875 0.3G (Sulfentrazone + Prodiamine)	F6875 4SC (Sulfentrazone + Prodiamine)	Sulfentrazone 0.2G (Sulfentrazone)	Sulfentrazone 4F (Sulfentrazone)
Broadleaf Evergreen Tree/Shrub	Aucuba (Aucuba sp.)		1.5 (0 - 3) n4		
	Boxwood (Buxus sp.)	1.3 (1 - 2) n3	Labeled	1.5 (1 - 2) n4	Labeled
	Jasmine, Cape, Common Gardenia (Gardenia sp.)		Labeled		
	Holly (Ilex sp.)	1.0 (1 - 1) n5	Labeled	MFG Hold	Labeled
	Holly, Dwarf Yaupon (Ilex vomitoria 'nana')			1.0 (1 - 1) n2	Labeled
	Anise Tree (Illicium sp.)			1.0 (1 - 1) n1	Labeled
	Loropetalum (Loropetalum sp.)	1.0 (1 - 1) n4			
	Magnolia, Southern (Magnolia grandiflora)			1.0 (1 - 1) n1	Labeled
	Pentas (Pentas sp.)			1.0 (1 - 1) n1	
	Azalea (Rhododendron sp.)	1.0 (1 - 1) n5	Labeled		
	Azalea, & Rhododendron (Rhododendron sp.)			2.0 (2 - 2) n1	Labeled
Broadleaf Evergreen/	Abelia (Abelia sp.)			1.0 (1 - 1) n2	Labeled
	Barberry (Berberis sp.)		1.5 (0 - 3) n4		
	Cotoneaster (Cotoneaster sp.)	1.3 (1 - 2) n3		1.0 (1 - 1) n2	Labeled

Plant Group	Crop	F6875 0.3G (Sulfentrazone + Prodiamine)	F6875 4SC (Sulfentrazone + Prodiamine)	Sulfentrazone 0.2G (Sulfentrazone)	Sulfentrazone 4F (Sulfentrazone)
Deciduous Tree/ Shrub	Mexican Heather, False Heather, Elfin Herb (Cuphea hyssopifolia)			2.0 (1 - 3) n2	Labeled
	Privet (Ligustrum sp.)				Labeled
	Magnolia (Magnolia sp.)	1.0 (1 - 1) n5	Labeled		
Bulbs & Corms	Canna (Canna sp.)	1.3 (1 - 2) n3		3.0 (3 - 3) n1	
	Daylily (Hemerocallis sp.)	3.0 (1 - 4) n4	3.3 (2 - 4) n4		
	Flag (Iris sp.)	3.0 (2 - 4) n5			
	Lily, Easter (Lilium longiflorum)			3.0 (3 - 3) n1	
Cactus & Succulents	Agave (Agave sp.)		3.0 (3 - 3) n1		
	Barbados Aloe (Aloe sp.)		2.3 (1 - 4) n3		
	Stonecrop (Crassula sp.)		2.5 (2 - 3) n2		
	Echeveria sp. (Echeveria sp.)		3.0 (3 - 3) n1		
	Echinocactus grusonii (Echinocactus grusonii)		1.7 (1 - 2) n3		
	Stonecrop (Sedum sp.)		2.8 (1 - 4) n5		
Deciduous Tree/Shrub/Vine	Maple, Red (Acer rubrum)	1.5 (1 - 2) n2		2.0 (2 - 2) n1	Labeled
	Butterfly Bush (Buddleia davidii)	2.8 (1 - 4) n4	3.6 (1 - 5) n5		Labeled
	Ceanothus sp. (Ceanothus sp.)	1.0 (1 - 1) n1			
	Red Bud, Eastern (Cercis canadensis)		3.0 (3 - 3) n1		
	Fernbush (Chamaebatiaria sp.)			1.0 (1 - 1) n3	
	Yellowwood (Cladrastis sp.)	1.5 (1 - 2) n2			
	Euonymus (Euonymus sp.)		1.0 (1 - 1) n3	1.8 (1 - 2) n4	Labeled
	Golden Bells (Forsythia sp.)		4.0 (4 - 4) n1		
	Witch Alder (Fothergilla gardenii)	3.0 (3 - 3) n1			
	Ash (Fraxinus sp.)	1.0 (1 - 1) n2			
	Cape Jasmine (Gardenia augusta)	1.7 (1 - 3) n3		1.0 (1 - 1) n3	Labeled
	Honey Locust (Gleditsia sp.)	1.0 (1 - 1) n1			
	Baby's Breath (Gypsophila elegans)			2.0 (2 - 2) n1	Labeled
	Hydrangea (Hydrangea sp.)	1.9 (1 - 3) n8	3.6 (1 - 5) n5		MFG Hold
	Virginia Sweetspire (Itea virginica)	2.0 (1 - 3) n2			
	Japanese Kerria, Japanese Rose (Kerria japonica)		2.0 (2 - 2) n1		
	Crape Myrtle (Lagerstroemia indica)	1.2 (1 - 2) n5	Labeled	1.0 (1 - 1) n1	MFG Hold
	Larch (Larix sp.)	2.0 (2 - 2) n1			
	Apple & Crabapple (Non-Bearing) (Malus sp.)		3.0 (3 - 3) n1		
	Mock Orange (Philadelphus sp.)		2.0 (0 - 4) n2		
	Cherry, Black (Non-Bearing) (Prunus serotina)		4.0 (4 - 4) n1		
	Cherry (Non-Bearing) (Prunus sp.)			2.0 (2 - 2) n1	Labeled
	Oak, Northern Red (Quercus rubra)			1.5 (1 - 2) n2	Labeled
	Rose (Rosa sp.)	1.0 (1 - 1) n4	Labeled	1.3 (1 - 3) n6	Labeled
	Bridal-Wreath (Spiraea sp.)	2.0 (2 - 2) n2		1.7 (1 - 3) n7	Labeled
	Lilac (Syringa sp.)		3.0 (3 - 3) n2		
	Viburnum, arrowwood (Viburnum dentatum)			1.0 (1 - 1) n2	Labeled
	Arrowwood (Viburnum sp.)	1.2 (1 - 2) n5	2.0 (1 - 3) n3	1.0 (1 - 1) n2	Labeled
Fern	Fern, Shaggy Shield (Dryopteris sp.)		3.8 (3 - 4) n4		
Hardy Ground Cover Foliage	Delosperma sp. (Delosperma sp.)		1.7 (1 - 3) n6	1.0 (1 - 1) n3	
	English Ivy (Hedera helix L. ssp. Helix)			2.0 (2 - 2) n2	Labeled
	Shrub Verbena (Lantana sp.)	2.8 (2 - 4) n4		1.0 (1 - 1) n1	Labeled
	Lilyturf, Big Blue;Giant (Liriope muscari)				Labeled
	Lilyturf, Creeping (Liriope sp.)	3.0 (3 - 3) n1	2.0 (1 - 3) n3	1.7 (1 - 2) n3	Labeled
	Periwinkle (Vinca sp.)	2.2 (1 - 4) n5	4.0 (4 - 4) n1		Labeled

Plant Group	Crop	F6875 0.3G (Sulfentrazone + Prodiamine)	F6875 4SC (Sulfentrazone + Prodiamine)	Sulfentrazone 0.2G (Sulfentrazone)	Sulfentrazone 4F (Sulfentrazone)
Herbaceous Flowering Plant	Blanket Flower (Gaillardia sp.)				MFG Hold
	Mallow, Rose Mallow (Hibiscus sp.)	1.0 (1 - 1) n2	3.5 (3 - 4) n2		
	Sweet Alyssum (Lobularia maritima)	2.5 (2 - 3) n2	2.0 (2 - 2) n1		
	Mexican Petunia (Ruellia carolinensis)				Labeled
	Pasture Sage (Salvia nemorosa)		1.8 (1 - 3) n4		
Herbaceous Flowering Plant - Annual	Sage, Ramona (Salvia sylvestris)	1.3 (1 - 2) n4		1.3 (1 - 2) n3	
	Sunflower (Helianthus sp.)	2.0 (2 - 2) n1	4.0 (4 - 4) n1		
Herbaceous Flowering Plant - Perennial	Petunia (Petunia sp.)	2.0 (1 - 4) n3	1.3 (1 - 2) n3		
	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.)		2.0 (2 - 2) n1		
	Hardy Mum (Chrysanthemum/Dendranthema x morifolium)	1.3 (1 - 2) n3			
	Lance Coreopsis (Coreopsis lanceolata)				MFG Hold
	Tickseed (Coreopsis sp.)	1.5 (1 - 3) n6			
	Pinks (Dianthus sp.)	2.0 (1 - 3) n3			
	Purple Coneflower (Echinacea sp.)	3.8 (3 - 4) n4	3.4 (1 - 4) n5	3.7 (2 - 5) n3	Labeled
	Gaura (Gaura lindheimeri)	2.7 (1 - 4) n3			
	Hellebore, Christmas rose, Lenten Rose (Helleborus niger)			1.0 (1 - 1) n4	
	Coral Bells, Alumroot (Heuchera sanguinea)		3.3 (3 - 4) n3		
	Hosta (Hosta sp.)	2.8 (1 - 4) n5	3.5 (3 - 4) n4	3.5 (3 - 4) n2	Labeled
	Shasta Daisy (Leucanthemum maximum)		3.3 (3 - 4) n3		
	Blazing-Star, Gayfeather (Liatris sp.)	2.0 (1 - 3) n4			
	Beard-Tongue (Penstemon sp.)		2.7 (2 - 3) n3		
	Phlox, Perennial (Phlox paniculata)	4.0 (4 - 4) n1	3.3 (2 - 4) n4		
	Phlox (Phlox sp.)				Labeled
	Creeping Phlox, Moss Pink (Phlox subulata)	3.0 (2 - 4) n3			Labeled
	Coneflower, Orange (Rudbeckia fulgida speciosa)			2.0 (1 - 3) n2	Labeled
	Coneflower, Hairy (Rudbeckia hirta)				MFG Hold
	Coneflower (Rudbeckia sp.)		3.5 (3 - 4) n4		
Pincushion Flower (Scabiosa sp.)	1.6 (1 - 4) n5				
Vervain (Verbena sp.)				Labeled	
Narrowleaf Evergreen Tree/Shrub	Fir, Fraser (Abies fraseri)	1.0 (1 - 1) n4		1.0 (1 - 1) n3	Labeled
	Juniper (Juniperus sp.)	1.0 (1 - 1) n6		1.0 (1 - 1) n2	Labeled
	Spruce, Norway (Picea abies)			1.0 (1 - 1) n1	Labeled
	Spruce (Picea sp.)	4.0 (4 - 4) n2			
	Pine (Pinus sp.)		1.0 (1 - 1) n1		
	Fir, Douglas (Pseudotsuga menziesii)	1.0 (1 - 1) n3		1.0 (1 - 1) n5	Labeled
	Bald Cypress (Taxodium distichum)		Labeled	1.0 (1 - 1) n1	Labeled
	Yew (Taxus sp.)	1.0 (1 - 1) n3			
	Cedar, Western Red (Thuja plicata)	1.0 (1 - 1) n4			
	Arborvitae (Thuja sp.)	1.0 (1 - 1) n6	Labeled	1.0 (1 - 1) n3	MFG Hold
	Hemlock, Western (Tsuga heterophylla)	3.5 (3 - 4) n2			
Ornamental Grass	Feather Reed Grass (Calamagrostis acutiflora)	1.8 (1 - 3) n4	1.8 (1 - 3) n4		Labeled
	Northern Sea Oats, Wild Oats (Chasmanthium latifolium)		3.0 (1 - 4) n4		Labeled
	Blue Fescue (Festuca glauca)	1.8 (1 - 2) n4			
	Silver Grass (Miscanthus sp.)	1.3 (1 - 2) n4			

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	Muhly, hairyawn (Muhlenbergia capillaris)	2.0 (2 - 2) n1			Labeled
	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.)	4.0 (4 - 4) n2	1.7 (1 - 3) n3	1.0 (1 - 1) n1	
	Switch-Grass (Panicum virgatum)				Labeled
	Fountain Grass (Pennisetum setaceum)				Labeled
	Feathergrass (Pennisetum sp.)		2.7 (2 - 4) n3		
	Ribbon-Grass, Gardeners-Garters (Phalaris arundinacea)				Labeled
	Little Blue Stem (Schizachyrium scoparium)				Labeled
Palm	Palm, Windmill (Trachycarpus fortunei)			1.0 (1 - 1) n1	Labeled
Tropical Foliage Plant	Jasmine, Asian (Trachelospermum asiaticum)			1.0 (1 - 1) n2	
	Jasmine, Star;Confederate (Trachelospermum jasminoides)				Labeled