



Ornamental Horticulture Program Research Project Sheet

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

Project Name: Pre Emergent Herbicide Crop Safety – Trifluralin + Isoxaben

New	Ongoing	Completed	X	Duration if ongoing or completed:	1992 2001 - 2012
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Project Description:

The Pre-Emergent Herbicide Crop Safety Project began in 2004 and has continued through 2013. 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 Snapshot 2.5TG (Trifluralin + Isoxaben).

Research Project Abstract (if available):

Abstract from 2013 Trifluralin + Isoxaben Crop Safety Summary

In an effort to provide weed management tools to growers of a wide variety of nursery ornamental crops this research was undertaken to expand the three pre-emergent herbicide labels: Pendulum 2G (pendimethalin), Pennant Magnum (s-metolachlor), and Snapshot 2.5TG (trifluralin + isoxaben). This report covers only Snapshot 2.5TG. The rates chosen for this research were 2.5, 5, and 10 pounds active ingredient per acre (lb ai per acre) as a 1/2X, 1X and 2X rates. From 2004 to 2013, IR-4 completed 418 trials on Snapshot 2.5TG. One hundred forty one crops were examined. Of these, 62 species exhibited no or minimal transient injury after application at all three rates. Eight crops exhibited no phytotoxicity at 2.5 or 5.0 lb ai per acre, but did have some injury at the higher rate of 10 lb ai per acre. Twenty-two species exhibited phytotoxicity at the 5 lb ai per acre rate. For the remaining 59 crops, IR-4 would recommend generating additional data because either fewer than 3 trials were conducted or different locations exhibited different responses.

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)

Snapshot 2.5TG

Product Registration and Research Status

	Registration Status
Labeled & Commercialized	Snapshot 2.5TG
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	
No longer available for development	
* IR-4 Data contributed to registration decision – either adding pest to label or not pursuing further research	

Other:

Project Pros	Project Cons
1 Additional research could yield data favorable for further label expansion	1 No label updates have been made incorporating data generated in this project.

IR-4 Crop Safety Trials to Date

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 (**red text**). A rating of 1 or 2 is considered commercially acceptable and those with more than 3 trials are complete (**green text**). ‘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	Showcase (Trifluralin + Isoxaben + Oxyfluorfen)	Snapshot 2.5TG (Trifluralin + Isoxaben)
Broadleaf Evergreen Tree/Shrub	Holly (Ilex sp.)	1.0 (1 - 1) n1	
	Loropetalum (Loropetalum sp.)	1.5 (1 - 3) n4	
	Pentas (Pentas sp.)		MFG Hold
Broadleaf Evergreen/ Deciduous Tree/Shrub	Mexican Heather, False Heather, Elfin Herb (Cuphea hyssopifolia)		Labeled
	Hydrangea, Climbing (Hydrangea petiolaris)		1.0 (1 - 1) n2
Bulbs & Corms	Canadian Ginger (Asarum canadense)		1.0 (1 - 1) n3
	Canna (Canna sp.)		1.0 (1 - 1) n4
	Virginia bluebells (Mertensia virginica)		4.0 (4 - 4) n1
Cactus & Succulents	Agave (Agave sp.)		2.0 (2 - 2) n1
	Barbados Aloe (Aloe sp.)		2.0 (2 - 2) n1
	Devil's-tongue prickly pear (Opuntia humifusa)		1.0 (1 - 1) n2
	Stonecrop (Sedum sp.)		Labeled
	Hen and chicks (Sempervivum arachnoideum)		1.0 (1 - 1) n3
	Hen and chicks (Sempervivum tectorum)		1.3 (1 - 2) n3
Deciduous Tree/Shrub/Vine	Western sage (Artemisia ludoviciana)		1.0 (1 - 1) n4
	Artemisia (Artemisia pontica)		1.0 (1 - 1) n2
	Beach wormwood, Dusty Miller (Artemisia stelleriana)		1.0 (1 - 1) n5
	Seafoam (Artemisia versicolor)		1.0 (1 - 1) n3
	Ceanothus, maritime (Ceanothus maritimus)		Labeled
	Ceanothus sp. (Ceanothus sp.)		Labeled
	Ceanothus (Ceanothus x pallida)		Labeled
	Clematis (Clematis sp.)		1.3 (1 - 2) n3
	Hydrangea, French (Hydrangea macrophylla)	2.0 (2 - 2) n1	
	Candytuft (Iberis sp.)		MFG Hold
	Lavender, English (Lavandula angustifolia)		Labeled
	Mock Orange (Philadelphus sp.)		1.0 (1 - 1) n2
	Rose (Rosa sp.)	1.0 (1 - 1) n4	1.0 (1 - 1) n3
	Fern	Fern, Lady (Athyrium nipponicum)	
Fern, Autumn (Dryopteris erythrosora)			2.8 (2 - 4) n4
Fern, Southern Shield (Dryopteris ludoviciana)			2.0 (2 - 2) n2
Fern, Royal (Osmunda regalis)			2.0 (2 - 2) n1
Hardy Ground Cover Foliage	Broom Sedge (Andropogon virginicus)		1.0 (1 - 1) n1
	Mugwort, Wormwood (Artemisia sp.)		1.0 (1 - 1) n6
	Hardy Ice Plant, Yellow Ice Plant (Delosperma nubigenum)		1.7 (1 - 3) n3
	Cogongrass; Japanese Bloodgrass (Imperata cylindrica)		1.3 (1 - 2) n3
	Shrub Verbena (Lantana sp.)	2.0 (1 - 3) n3	Labeled
	Lilyturf, Big Blue;Giant (Liriope muscari)		Labeled
	Catmint (Nepeta x faasseni)		1.7 (1 - 4) n6
Herbaceous Flowering Plant	Hyssop, Sunset;Giant (Agastache rupestris)		1.5 (1 - 3) n4
	Lady's-Mantle (Alchemilla sp.)		1.2 (1 - 2) n5
	Allamanda (Allamanda sp.)		1.0 (1 - 1) n2
	Shell Ginger, Variegated Ginger (Alpinia zerumbet)		1.0 (1 - 1) n1
	Leadplant (Amorpha canescens)		1.0 (1 - 1) n1
	Pussy-Toes, Stoloniferous (Antennaria dioica)		5.0 (5 - 5) n1
	Pussy-Toes, Small-leaf (Antennaria parvifolia)		2.0 (1 - 4) n3

Plant Group	Crop	Showcase (Trifluralin + Isoxaben + Oxyfluorfen)	Snapshot 2.5TG (Trifluralin + Isoxaben)
	Flamingo-lily (<i>Anthurium andraeanum</i>)		1.0 (1 - 1) n1
	Sandwort (<i>Arenaria</i> sp.)		Labeled
	Thrift, Sea Pink (<i>Armeria maritima</i>)		1.0 (1 - 1) n3
	Rock Cress (<i>Aubrieta</i> sp.)		MFG Hold
	Barrenwort (<i>Epimedium</i> sp.)		2.5 (2 - 3) n2
	Treasure Flower (<i>Gazania</i> sp.)		MFG Hold
	Common sneezeweed (<i>Helenium autumnale</i>)		1.2 (1 - 2) n5
	Helen's Flower, Sneezeweed (<i>Helenium</i> sp.)		MFG Hold
	Sun Rose, Rock Rose (<i>Helianthemum</i> sp.)		1.2 (1 - 2) n5
	False Sunflower, Smooth Oxeye (<i>Heliopsis helianthoides</i>)		MFG Hold
	Mallow, Rose Mallow (<i>Hibiscus</i> sp.)		1.4 (1 - 2) n5
	Yellow Archangel (<i>Lamium galeobdolon</i>)		1.7 (1 - 3) n3
	Golden Rockets (<i>Ligularia stenocephala</i>)		1.0 (1 - 1) n3
	Moneywort (<i>Lysimachia nummularia</i>)		2.0 (2 - 2) n1
	Mazus (<i>Mazus reptans</i>)		1.0 (1 - 1) n1
	Hopflower Oregano (<i>Origanum libanoticum</i>)		3.0 (2 - 4) n3
	Mexican Petunia (<i>Ruellia carolinensis</i>)		2.0 (2 - 2) n1
	Ruscus (<i>Ruscus hypophyllum</i>)		1.0 (1 - 1) n1
	Lavender cotton (<i>Santolina chamaecyparissus</i>)		1.8 (1 - 4) n5
	Spiderwort (<i>Tradescantia ohiensis</i>)		2.0 (2 - 2) n1
	Ironweed, New York (<i>Vernonia noveboracensis</i>)		1.3 (1 - 2) n3
	Turkish veronica (<i>Veronica liwanensis</i>)		4.0 (4 - 4) n2
Speedwell, Brooklime (<i>Veronica</i> sp.)		1.4 (1 - 3) n5	
Herbaceous Flowering Plant - Annual	Transvaal Daisy (<i>Gerbera</i> sp.)		1.8 (1 - 4) n5
	Sunflower (<i>Helianthus</i> sp.)		1.0 (1 - 1) n1
	Primrose, Fairy (<i>Primula malacoides</i>)		2.0 (0 - 4) n2
Herbaceous Flowering Plant - Perennial	Yarrow (<i>Achillea millefolium</i>)		1.0 (1 - 1) n1
	Yarrow, Woolly (<i>Achillea tomentosa</i>)		3.0 (3 - 3) n1
	Hyssop species (<i>Agastache</i> sp.)		1.5 (1 - 2) n4
	Bluestar (<i>Amsonia</i> sp.)		2.0 (1 - 4) n3
	Butterfly Flower (<i>Asclepias</i> sp.)		1.6 (0 - 3) n5
	Butterfly Weed (<i>Asclepias tuberosa</i>)		1.5 (1 - 2) n6
	Aster (<i>Aster ericoides</i>)		1.0 (1 - 1) n3
	False Spirea (<i>Astilbe</i> sp.)		Labeled
	Blue False Indigo (<i>Baptisia australis</i>)		1.5 (1 - 2) n4
	Heart-leaved Bergenia (<i>Bergenia cordifolia</i>)		MFG Hold
	Jupiter's Beard (<i>Centranthus ruber</i>)		1.0 (1 - 1) n3
	Turtlehead, Snakehead (<i>Chelone</i> sp.)		2.7 (1 - 4) n3
	Hardy Mum (<i>Chrysanthemum/Dendranthema x morifolium</i>)	1.0 (1 - 1) n1	
	Golden Star (<i>Chrysogonum</i> sp.)		2.0 (1 - 3) n3
	Bugbane & Cohosh, Black (<i>Cimicifuga racemosa</i>)		2.0 (1 - 4) n3
	Tickseed (<i>Coreopsis</i> sp.)		1.0 (1 - 1) n1
	Larkspur (<i>Delphinium</i> sp.)		1.3 (0 - 4) n7
	Maiden Pink (<i>Dianthus deltoides</i>)		1.0 (1 - 1) n6
	Pinks (<i>Dianthus</i> sp.)		1.7 (1 - 2) n3
	Foxglove (<i>Digitalis</i> sp.)		MFG Hold
	Purple Coneflower (<i>Echinacea</i> sp.)		MFG Hold
	Joepy weed, Spotted (<i>Eupatorium maculatum</i>)		1.0 (1 - 1) n2
	Boneset (<i>Eupatorium perfoliatum</i>)		1.0 (1 - 1) n2
	Joepy weed, Sweetscented (<i>Eupatorium purpureum</i>)		3.0 (1 - 5) n2
	Thoroughwort (<i>Eupatorium</i> sp.)		1.2 (1 - 2) n5
	Strawberry (Non-Bearing) (<i>Fragaria</i> sp.)		1.0 (1 - 1) n2
	Gaura (<i>Gaura lindheimeri</i>)		MFG Hold
	Geranium (<i>Geranium magniflorum</i>)		1.0 (1 - 1) n3

Plant Group	Crop	Showcase (Trifluralin + Isoxaben + Oxyfluorfen)	Snapshot 2.5TG (Trifluralin + Isoxaben)
	Geranium (Geranium sp.)		1.3 (1 - 3) n7
	Globe Amaranth (Gomphrena sp.)		1.2 (1 - 2) n5
	Sunflower, Maximilian (Helianthus maximiliani)		1.8 (1 - 4) n4
	Sunflower, Willowleaf (Helianthus salicifolius)		1.0 (1 - 1) n2
	Hellebore, Christmas rose, Lenten Rose (Helleborus niger)		1.5 (1 - 2) n2
	Coral Bells, Alumroot (Heuchera sanguinea)		2.7 (1 - 4) n3
	Poker Plant, Red-Hot-Poker (Kniphofia sp.)		MFG Hold
	Shasta Daisy (Leucanthemum maximum)		Labeled
	Blue flax (Linum perenne L. ssp. Perenne)		1.0 (1 - 1) n3
	Evening Primrose, Sundrops (Oenothera sp.)		Labeled
	Peony (Paeonia sp.)		1.0 (1 - 1) n2
	Beard-Tongue (Penstemon sp.)		2.0 (1 - 4) n5
	Phlox (Phlox sp.)		1.8 (1 - 3) n6
	Creeping Phlox, Moss Pink (Phlox subulata)		2.0 (1 - 3) n5
	Jacob's Ladder (Polemonium sp.)		2.2 (0 - 4) n6
	Pincushion Flower (Scabiosa sp.)		MFG Hold
	Goldenrod, Wrinkleleaf (Solidago rugosa)		1.0 (1 - 1) n5
	Goldenrod, Seaside (Solidago sempervirens)		1.0 (1 - 1) n3
	Goldenrod (Solidago sp.)		1.0 (1 - 1) n3
	Goldenrod, Showy (Solidago speciosa)		1.0 (1 - 1) n1
	Goldenrod, Autumn (Solidago sphacelata)		1.0 (1 - 1) n2
	Thyme, Creeping (Thymus praecox)		1.8 (1 - 3) n4
	Foamflower, Heartleaf (Tiarella cordifolia)		2.5 (2 - 3) n2
Vervain (Verbena sp.)		3.0 (3 - 3) n1	
Speedwell, Spiked (Veronica spicata)		3.3 (2 - 4) n4	
Ornamental Grass	Big Blue Stem (Andropogon gerardii)		1.7 (1 - 4) n6
	Feather Reed Grass (Calamagrostis acutiflora)		1.0 (1 - 1) n3
	Sedge (Carex sp.)		Labeled
	Northern Sea Oats, Wild Oats (Chasmanthium latifolium)		1.2 (1 - 2) n5
	Deertongue (Dichanthelium clandestinum)		1.5 (1 - 2) n2
	Indian Grass (Hierochloa odorata)		1.3 (1 - 2) n4
	Blue Lyme Grass (Leymus arenarius)		1.0 (1 - 1) n2
	Muhly, hairyawn (Muhlenbergia capillaris)		2.0 (1 - 4) n3
	Switch-Grass (Panicum virgatum)		MFG Hold
	New Zealand Flax (Phormium sp.)		1.3 (1 - 2) n3
	Little Blue Stem (Schizachyrium scoparium)		2.0 (1 - 4) n3
	Indian Grass, Wood Grass (Sorghastrum sp.)		1.0 (1 - 1) n6
	Feather Grass, Mexican (Stipa sp.)		2.0 (1 - 4) n3
Cattails (Typha minima)		1.0 (1 - 1) n1	
Palm	Palmetto Palm (Sabal minor)		1.0 (1 - 1) n1
	Palm, Windmill (Trachycarpus fortunei)		1.0 (1 - 1) n2
Tropical Foliage Plant	Spiderwort (Tradescantia sp.)		1.0 (1 - 1) n1
	Spiderwort (Tradescantia x andersoniana)		1.0 (1 - 1) n3