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IR-4 Ornamental Horticulture Program
Trifluralin + Isoxaben Crop Safety

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Abstract

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.

Introduction

Modern production of herbaceous perennials involves a great diversity in crops. Many of these plant species are not listed on herbicide product labels which can make weed control in nurseries a challenge. Three pre-emergent herbicides, Pendulum 2G, Pennant Magnum, and Snapshot 2.5TG, were chosen for 2004 through 2006 research activities into level of crop safety. Research continued on Snapshot 2.5TG from 2008 through 2013. This report covers the results for Snapshot 2.5TG through 2013 on 139 crops.

Materials and Methods

Two applications of Snapshot 2.5TG (trifluralin + isoxaben) were made approximately 4 or 6 weeks apart. The application rates were 2.5, 5.0, and 10.0 lb ai per acre plus a water treated control. A minimum of four plants (replicate treatments) were required with many researchers exceeding this minimum. Phytotoxicity was recorded on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill) at 1, 2, 4, 8, and 12 weeks after initial application. Some researchers also included readings 3 to 4 days after the initial and second applications. Please visit http://ir4.rutgers.edu/ornamental/OrnamentalDrafts.cfm to view and download these protocols.

Snapshot 2.5 TG was supplied to researchers (See list of researchers in Appendix 2) by Dow Agro Sciences.

Results and Summary

Efficacy

Several researchers also examined efficacy in addition to crop safety. Derr (2004) reported good control of large crabgrass at 2.5 lb ai per acre with excellent control at higher rates and excellent control of spotted spurge at all rates. Derr (2005) reported no control of dove weed, suppression of tassel flower at 5 and 10 lb per acre rates, good to excellent control of crabgrass, and excellent control of common chick weed and spotted spurge. In 2011 Derr reported good control of groundsel. Klett reported significant control of seeded broadleaf weeds (not specified). Gilliam reported significantly reduced natural occurring indigenous weed population (prostrate spurge, gripeweed, and oxalis). Boydston reported significantly reduced kochia, barnyard grass, chickweed and green foxtail. Uber (2010) found Snapshot to provide good control of hairy bittercress and spotted spurge. Beste/Frank (2010 reported excellent control of yellow woodsorrel, spotted spurge and large crabgrass.

Phytotoxicity

Based on the type and nature of injury seen with Snapshot 2.5TG applications in the research conducted from 2004 to 2011, tested plant species were placed into four categories: 1) no significant phytotoxicity or growth differences from the untreated check or any injury was transitory 2) no or minimal transitory injury seen at the 1X rate, but the 2X and/or 4X rates did cause significant phytotoxicity, 3) Significant injury sufficient to recommend growers not utilize this product, 4) more data is needed to make informed recommendations

In general, Snapshot 2.5TG exhibited no or minimal negative impact on a range of plant species (Table 1). Sixty two plant genera or species fell into this category. Some minimal injury may be acceptable for growers if applications are made several weeks to months in advance of crop sale particularly for woody ornamental crops.

Eight crop species, exhibited no or little injury at the 2.5 lb ai per acre rate, but significant phytotoxicity occurred at the 5.0 or 10.0 lb ai per acre rate (Table 2). It may be prudent to either conduct additional trials or place language on the label indicating applications of Snapshot are considered safe at the 2.5 lb ai per acre rate but any higher rate may cause unacceptable injury.

There were ee crops in the testing that exhibited damage sufficient to recommend growers not to utilize Snapshot 2.5TG as an over-the-top treatment for pre-emergent weed control (Table 3).

There are 59 crops where it is recommended additional trials be conducted to clarify their response under various environmental conditions because more information is needed either because only 1 or 2 trials were conducted or because consistent results were not achieved among the research sites (Table 4).

Please see Table 5 for a list of research on Snapshot 2.5 TG from 2004 to 2013 and the summary of the results received so far.

Table 1. List of Snapshot 2.5TG treated crops with no or minimal transitory injury.

Agastache aurantiaca
Agastache rupestris
Amsonia hubrichtii
Andropogon gerardii
Antennaria parvifolia
Armeria maritime
Artemisia ludoviciana[1]
Artemisia stelleria
Artemisia versicolor
Asarum canadense
Ascelpias sp.
Baptisia australis
Bergenia cordifolia
Calamagrostis acutiflora
Canna sp.
Ceanothus sp.
Centranthus ruber
Chasmanthium latifolium
Clematis sp.[1] *(See Stamps)*
Delosperma nubigenum[1]
Delphinium sp. (See Senesac 2010)
Dianthus deltoides[1]
Dianthus chinensis[1]
Echinacea sp.
Eupatorium maculatum
Eupatorium purpureum
Geranium cantabrigiense (see Lieth 2010)
Gerbera jamesonii
Gomphrena sp.
Helenium autumnale
Helianthus salicifolius (See Lieth 2012)
Helleborus niger
Helianthemum sp.
Helianthus maximiliani
Heliopsis sp.
Hibiscus rosa-sinensis[1]
Hibiscus syriacus[1]
Hierochloe odorata
Iberis sp. (See Boydston report)
Imperata cylindrica
Kniphofia sp.
Lamiastrum galeobdolon
Lantana hybrida[1]
Lantana montevidensis[1]
Lavandula angustifolia[1]
Ligularia stenocephala
Linum perenne
Muhlenbergia capillaries
Nepeta x faasseni
Panicum virgatum
Phormium sp.
Rosa sp.[1]
Santolina chamaecyparissus (see Lieth 2012)
Sedum sp.[1] *(See Neal)*
Sempervivum arachnoideum
Solidago rugosa
Solidago sempervirens
Solidago sphacelata
Sorghastrum nutans
Stipa sp. (see Lieth 2010)
Thymus praecox (see Lieth 2012)
Tradescantia x andersoniana

[1] Genera or closely related species already registered.

Table 2. List of Snapshot 2.5TG treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity

Alchemilla mollis	*Chrysogonum virginianum*	*Dryopteris ludoviciana*
Aubrieta sp.	*Digitalis sp.*	*Phlox sp.*
Chelone lyonii	*Dryopteris erythrosora*	

Table 3. List of Snapshot 2.5TG treated crops exhibiting significant injury at 1X.

Agastache rugosa X foeniculum	*Mertensia virginica*
Amsonia tabernaemontana	*Nepeta nervosa 'Blue Carpet'*
Antennaria dioica	*Origanum libanoticum*
Antennaria neglecta	*Polemonium sp.*
Arachniodes simplicor	*Polystichium polyblepharum*
Athyrium nipponicum	*Primula malacoides*
Cimicifuga racemosa	*Sempervivum tectorum*
Cyrtomium falcatum	*Tiarella cordifolia*
Digitalis thaspi	*Tradescantia ohiensis*
Epimedium sp.	*Verbena canadensis*[1]
Heuchera sanguine[1]	*Veronica spicata*

Table 4. List of Snapshot 2.5TG treated crops where more research is needed to clarify response

Achillea millefolium[1]
Achillea tomentosa[1]
Agave sp.
Allamanda cathartica
Aloe sp.
Alpinia zerumbet
Amorpha canescens
Andropogon gerardii
Anthurium adraeanum
Aquilegia sp.
Arenaria montana
Artemisia arborescens
Artemisia frigida
Artemisia pontica
Artemisia schmidtiana[1]
Artemisia stelleriana
Asarum chinensis
Asparagus virgatus[1]
Aster dumosus
Aster ericoides
Astilbe sp.
Canna x generalis
Carex buchannii[1]
Coreopsis sp.1
Cuphea hyssopifolia[1]
Delphinium sp.
Dichanthelium clandestinum
Eupatorium sp.
Fragaria sp.
Gazania sp.[1]
Gaura lindheimeri[1]
Hibiscus moschata
Hibiscus mosheutos
Hierochloe odorata
Hydrangea anomala petiolaris
Leucanthemum maximum
Leymus arenarius
Liriope muscari[1]
Lysimachia nummularia
Mazus reptans
Oenothera berlandieri[1]
Opuntia humifusa
Osmanda regalis
Paeonia sp
Penstemon sp.[1]
Pentas sp.[1]
Philadelphus viginalis
Ruscus hypophyllum
Ruellia carolinensis[1]
Sabal minor
Santolina chamaecyparissus
Scabiosa sp.
Schizachyrium scoparium (see Neal 2010)
Solidago cabadensis
Solidago speciosa
Stachys byzantina
Trachycarpus fortunei
Typha minima
Vernonia noveboracensis

[1] Genera or closely related species already registered.

Table 5. Detailed Summary of Crop Safety Testing with Snapshot 2.5TG

Notes: Table entries are sorted by crop Latin name. All researchable studies for Snapshot are included in this table. Only those that were received by 12/13/2013 have summaries.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
29108	Yarrow (Achillea millefolium) 'Moonshine'	Field Container	Williams	IL	2009	Broadcast	No injury at 2.5, 5 and 10 lb ai per acre.	N	20110208e.pdf
20805	Yarrow, Woolly (Achillea tomentosa) 'King Edward'	Field Container	Senesac	NY	2001	Over the top	Minor to moderate injury increasing with rate after single application of 2.5, 5, and 10 ai per acre on actively growing plants.	N	20080616a.pdf
24769	Hyssop, Sunset;Giant (Agastache rupestris)	Field Container	Derr	VA	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20091202a.pdf
24769	Hyssop, Sunset;Giant (Agastache rupestris)	Field Container	Senesac	NY	2010	Over the top	Little to no injury with 2.5 lb ai per acre. Moderate injury with 5 and 10 lb ai with partial recovery by season end.	N	20101129c.pdf
24769	Hyssop, Sunset;Giant (Agastache rupestris) 'Apache Sunset'	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre	N	20090924d.pdf
24769	Hyssop, Sunset;Giant (Agastache rupestris) 'Blue Fortune'	Field Container	Boydston	WA	2010	Over the top	No significant injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20101130h.pdf
24768	Hyssop species (Agastache sp.) A. aurantiaca 'Coronado'	Field Container	Klett	CO	2005	Broadcast	No significant injury at 2.5, 5.0 and 10 lb ai per acre.	N	20060215c1.pdf
24768	Hyssop species (Agastache sp.) A. auranticaca	Field Container	Williams	IL	2006	Broadcast	No commercial phytoxicity to Hyssop at 2.5, 5.0 or 10 lb ai per acre. Stem at soil line was swollen and particularly noticeable at 10 lb rate.	N	20110208a.pdf
24768	Hyssop species (Agastache sp.) A. rugosa X foeniculum 'Blue Fortune'	Field Container	Boydston	WA	2005	Broadcast	No visible injury, but all rates caused brittle stems susceptible to wind damage.	N	20060217u3.pdf
24768	Hyssop species (Agastache sp.) A. rugosa X foeniculum 'Blue Fortune'	Field Container	Mathers	OH	2005	Over the top	No injury at 2.5 and 5 lb ai per acre; moderate (brittle stems) at 10 lb ai per acre.	N	20060124c.pdf
31331	Century Plant (Agave sp.) 'Blue Flame'	Field Container	Villavicencio	CA	2012	Over the top	Slight discoloration and spotting with 200, 400 and 600 lb per acre applied twice, slight necrosis at 2X and 4X; no growth reduction.	N	20120917a.pdf
20806	Lady's-Mantle (Alchemilla sp.) A. mollis 'Auslese'	Field Container	Derr	VA	2004	Over the top	Slight injury at all rates; good control of large crabgrass at 2.5 lb ai per acre; excellent control at higher rates; and excellent control of spotted spurge at all rates.	N	20040103z.pdf
20806	Lady's-Mantle (Alchemilla sp.) A. mollis 'Auslese'	Field Container	Lieth	CA	2004	Broadcast	No injury at 2.5 lb ai per acre; little injury at 5 and 10 lb ai per acre.	N	20040104a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
20806	Lady's-Mantle (Alchemilla sp.) A. mollis 'Select'	Field Container	Neal	NC	2001	Over the top	No significant injury with single application of 2.5, 5.0, 10.0 lb ai per acre on actively growing plants.	N	20080616o.pdf
20806	Lady's-Mantle (Alchemilla sp.) A. mollis 'Thriller'	Field Container	Ahrens/Mervosh	CT	2005	Ground, broadcast over top	All rates (2.5, 5.0, 10.0 lb ai per acre) caused slight injury.	N	20060123H.pdf
20806	Lady's-Mantle (Alchemilla sp.) A. mollis 'Thriller'	Field Container	Senesac	NY	2004	Over the top	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20040103y.pdf
24770	Golden Trumpet (Allamanda sp.) A. cathartica 'Hendersonii'	Field Container	Stamps	FL	2009	Over the top	No significant injury at 2.5 and 5, slight at 10 lb ai per acre; no significant growth reduction.	N	20100301a.pdf
24770	Golden Trumpet (Allamanda sp.) A. x hendersonii 'Brown Bud'	Field Container	Senesac	NY	2011	Broadcast	No crop injury with two applications at 2.5, 5.0, and 10.0 lb aia.	N	20111107f.pdf
31330	Aloe (Aloe sp.) 'Blue Elf'	Field Container	Villavicencio	CA	2012	Over the top	Slight necrosis with 200, 400 and 600 lb per acre applied twice; no growth reduction.	N	20120917a.pdf
24771	Shellplant (Alpinia zerumbet)	Field Container	Senesac	NY	2011	Broadcast	No crop injury with two applications at 2.5, 5.0, 10.0 lb aia.	N	20111107f.pdf
24772	Leadplant (Amorpha canescens) A. canascens Pursh.	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury with one or two applications at 2.5, 5.0, 10.0 lb ai per acre. 50-70% weed control noted compared to untreated.	N	20110113e.pdf
23783	Bluestar (Amsonia sp.) A. hubrichtii	Field Container	Neal	NC	2004	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20040104c.pdf
23783	Bluestar (Amsonia sp.) A. hubrichtii	Field Container	Senesac	NY	2004	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20040104b.pdf
23783	Bluestar (Amsonia sp.) A. tabernaemontana	Field Container	Gilliam	AL	2004	Broadcast	No injury at 2.5 lb ai per acre but significant leaf burn at 5 and 10 lb ai per acre. All rates significantly reduced naturally-occurring indigenous weed population (prostrate spurge, gripeweed, oxalis).	N	20040104d.pdf
23741	Big Blue Stem (Andropogon gerardii)	Field Container	Neal	NC	2010	Broadcast	No crop injury with one application of 2.5, 5, 10 lb ai per acre during first 6 weeks but second application at the high rate resulted in significant stunting. Root quality reduced at all rates.	N	20110308e.pdf
23741	Big Blue Stem (Andropogon gerardii)	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
23741	Big Blue Stem (Andropogon gerardii)	Field Container	Williams	IL	2009	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20110208f.pdf
23741	Big Blue Stem (Andropogon gerardii) 'Pawnee'	Field Container	Klett	CO	2010	Broadcast	Trial 2: no crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height, width, dry mass or weed control compared to the weeded control.	N	20110128a.pdf
23741	Big Blue Stem (Andropogon gerardii) 'Pawnee'	Field Container	Klett	CO	2010	Over the top	Trial 1: no crop injury with 2.5, 5.0, 10 lb ai per acre.	N	20110128a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23741	Big Blue Stem (Andropogon gerardii) 'Roundtree'	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5, 5, 10 lb ai per acre. Root rating affected.	N	20101129c.pdf
23520	Broom Sedge (Andropogon virginicus)	Field Container	Neal	NC	2010	Broadcast	No crop injury observed with one or two applications at 2.5, 5, 10 lb ai per acre.	N	20110308e.pdf
23784	Pussy-Toes, Stoloniferous (Antennaria dioica) Rose Pussytoes	Field Container	Roys	WA	2005	Broadcast	All rates (2.5, 5.0, 10.0 lb ai per acre) caused severe stunting and plant death.	N	20060217w1.pdf
23785	Pussy-Toes, Small-leaf (Antennaria parvifolia)	Field Container	Neal	NC	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060217y1.pdf
23785	Pussy-Toes, Small-leaf (Antennaria parvifolia)	Field Container	Senesac	NY	2004	Over the top	No significant injury at 2.5, 5.0 and 10 lb ai per acre.	N	20040103l.pdf
23785	Pussy-Toes, Small-leaf (Antennaria parvifolia) A. neglecta 'Gaspensis'	Field Container	Beste/Frank (ARS)	MD	2005	Broadcast	No injury at 2.5 and 5 lb per acre rates, but significant damage occurred with 10 lb per acre rate and all plants were smaller than untreated which would affect market value.	N	20060120a1.pdf
24773	Flamingo-lily (Anthurium andraeanum)	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No differences in phytotoxicity for 2.5, 5, 10 lb ai per acre compared to control but ratings were confounded with severe sunscald. Repeat trial.	N	20110525c.pdf
20808	Sandwort (Arenaria sp.) A. montana	Field Container	Senesac	NY	2001	Over the top	Minor transient injury after single application of 2.5, 5, and 10 lb ai per acre on actively growing plants.	Y	20080616b.pdf
24774	Thrift, Sea Pink (Armeria maritima) 'Dusseldorf'	Field Container	Lieth	CA	2005	Broadcast	No injury but plants treated with 10 lb ai per acre were smaller.	N	20060123b1.pdf
24774	Thrift, Sea Pink (Armeria maritima) 'Splendens'	Field Container	Boydston	WA	2005	Over the top	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20080718o.pdf
24774	Thrift, Sea Pink (Armeria maritima) 'Splendens'	Field Container	Gilliam	AL	2005	Broadcast	No injury but plants treated with 10 lb ai per acre were smaller.	N	20060217t1.pdf
24776	Western sage (Artemisia ludoviciana)	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060217w9.pdf
24776	Western sage (Artemisia ludoviciana) A. 'Silver King'	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre)	N	20070113n.pdf
24776	Western sage (Artemisia ludoviciana) 'Valerie Finnis'	Field Container	Boydston	WA	2006	Broadcast	No injury or growth reduction at all rates	N	20061109m.pdf
24776	Western sage (Artemisia ludoviciana) 'Valerie Finnis'	Field Container	Linderman	OR	2006	Over the top	No injury at 2.5, 5 and 10 lb ai per acre	N	20070111I.pdf
24778	Artemisia (Artemisia pontica)	Field Container	Uber	CA	2010	Over the top	No crop injury with two applications of 2.5, 5.0, 10 lb ai per acre. Good efficacy observed on hairy bittercress and spotted spurge.	N	20101223b.pdf
24778	Artemisia (Artemisia pontica) A. 'Powis Castle'	Field Container	Boydston	WA	2011	Broadcast	Two sequential applications at 2.5, 5.0 and 10.0 lb ai per acre did not injure or affect growth.	N	20111201k.pdf
29902	Mugwort, Wormwood (Artemisia sp.) A. arborescens x absinthium 'Powis Castle'	Field Container	Lieth	CA	2010	Broadcast	No crop injury or growth suppression with one or two applications at 2.5, 5.0, and 10 lb ai per acre.	N	20110624b.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
29902	Mugwort, Wormwood (Artemisia sp.) A. frigida	Field Container	Klett	CO	2011	Broadcast	Trial 1:No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
29902	Mugwort, Wormwood (Artemisia sp.) A. frigida	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
29902	Mugwort, Wormwood (Artemisia sp.) A. 'Silver Brocade'	Field Container	Boydston	WA	2011	Broadcast	Two sequential applications of Snapshot 2.5TG applied 6 weeks apart at 2.5, 5.0, and 10.0 lb ai per acre did not injure or affect growth of artemisia plants.	N	20111201n.pdf
29902	Mugwort, Wormwood (Artemisia sp.) 'Powis Castle'	Field Container	Uber	CA	2010	Over the top	No crop injury with two applications of 2.5, 5.0 10.0 lb aia. Good efficacy observed on hairy bittercress and spotted spurge.	N	20101223b.pdf
29902	Mugwort, Wormwood (Artemisia sp.) schmidtiana 'Silver Mound'	Field Container	Lieth	CA	2010	Broadcast	No crop injury or growth suppression with one or two applications at 2.5, 5.0, and 10 lb ai per acre.	N	20110624b.pdf
24777	Beach wormwood, Dusty Miller (Artemisia stelleriana) A. 'Silver Moon'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in marketability with 2.5, 5.0, 10 lb ai per acre.	N	20110323c.pdf
24777	Beach wormwood, Dusty Miller (Artemisia stelleriana) A. stellariana 'Silver Mound'	Field Container	Boydston	WA	2011	Broadcast	Two sequential applications at 2.5, 5.0, and 10.0 lb ai per acre did not injure or affect growth.	N	20111201j.pdf
24777	Beach wormwood, Dusty Miller (Artemisia stelleriana) A. stelleriana 'Silver Brocade'	Field Container	Lieth	CA	2010	Broadcast	No crop injury or growth suppression with one or two applications at 2.5, 5.0, and 10 lb ai per acre.	N	20110624b.pdf
24777	Beach wormwood, Dusty Miller (Artemisia stelleriana) 'Silver Brocade'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20091201r.pdf
24777	Beach wormwood, Dusty Miller (Artemisia stelleriana) 'Silver Brocade'	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20101130i.pdf
24779	Seafoam (Artemisia versicolor) S. schmidtiana 'Silver Mound'	Field Container	Boydston	WA	2010	Over the top	No injury at 2.5, 5 and 10 lb ai per acre; slight plant width reduction at 1X; all treated plants saleable.	N	20101130j.pdf
24779	Seafoam (Artemisia versicolor) 'Sea Foam'	Field Container	Klett	CO	2010	Broadcast	Trial 1: No crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height, dry mass or efficacy with 1x, 2,x, or 4x compared to the weeded control.	N	20110128a.pdf
24779	Seafoam (Artemisia versicolor) 'Sea Foam'	Field Container	Klett	CO	2010	Over the top	Trial 2: No crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height, width, dry mass compared to control No efficacy differences with 2x, or 4x compared to the weeded control.	N	20110128a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23786	Canadian Ginger (Asarum canadense)	Field Container	Reding	OH	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070410a.pdf
23786	Canadian Ginger (Asarum canadense)	Field Container	Senesac	NY	2005	Over the top	No significant injury at 2.5, 5.0 and 10 lb ai per acre.	N	20060202j.pdf
23786	Canadian Ginger (Asarum canadense) A. chinensis	Field Container	Neal	NC	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060217y2.pdf
24923	Butterfly Flower (Asclepias sp.)	Field Container	Derr	VA	2009	Over the top	No significant injury at 2.5, 5 and 10 lb ai per acre.	N	20091202a.pdf
24923	Butterfly Flower (Asclepias sp.)	Field Container	Senesac	NY	2010	Over the top	Little to no injury with 2.5 lb ai per acre. Moderate injury with 5 and 10 lb ai with partial recovery by season end.	N	20101129c.pdf
24923	Butterfly Flower (Asclepias sp.) A. currisavica	Field Container	Lieth	CA	2009	Over the top	No significant suppression of height or width with 2.5, 5.0, 10.0 lb aia. Slight crop injury (< or = 20%) but significantly different than untreated at 4WAT and occurring again with second application 7WATbut no significant differences among treatments by	N	20100430g.pdf
24923	Butterfly Flower (Asclepias sp.) A. incarnata	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in growth with one or two applications at 2.5, 5.0 and 10.0 lb ai per acre. Excellent control of yellow woodsorrel, spotted spurge and lg. crabgrass.	N	20110426d.pdf
24923	Butterfly Flower (Asclepias sp.) A. speciosa	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	Heat stress caused injury on all treatments including untreated; mortality occurred on smaller plants. Additional studies should be conducted with larger plants.	N	20120503a.pdf
24780	Butterfly Weed (Asclepias tuberosa)	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in growth with one or two applications at 2.5, 5.0 and 10.0 lb ai per acre but significant reduction in flower number with 2x and 4x.	N	20110426e.pdf
24780	Butterfly Weed (Asclepias tuberosa)	Field Container	Lieth	CA	2012	Over the top	No significant injury or growth reduction with 2.5 and 5.0, unacceptable with 10.0 lb ai per acre applied twice.	N	20130226d.pdf
24780	Butterfly Weed (Asclepias tuberosa)	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060217w10.pdf
24780	Butterfly Weed (Asclepias tuberosa)	Field Container	Trader	MS	2009	Over the top	No significant injury at 2.5, very slight at 5 and 10 lb ai per acre; no growth reduction.	N	20090924d.pdf
24780	Butterfly Weed (Asclepias tuberosa)	Field Container	Williams	IL	2009	Broadcast	No crop injury at 2.5, 5 and 10 lb ai per acre.	N	20110208g.pdf
24780	Butterfly Weed (Asclepias tuberosa) A. speciosa	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No significant or very minor injury with 2.5, 5 and 10 lb ai per acre applied twice; no reduction of growth and flower number; all plants marketable.	N	20120409f.pdf
11286	Fern, Tree (Asparagus virgatus)	Field In-Ground	Stamps	FL	1992	Broadcast	No injury at 2.5 and 5 lb ai per acre.	Y	19990101j.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
24782	Aster (Aster ericoides)	Field Container	Williams	IL	2006	Broadcast	No crop injury with 2.5, 5.0, 10 lbs ai/A.	N	20110208b.pdf
24782	Aster (Aster ericoides) A. dumosus 'Wood's Light Blue'	Field Container	Boydston	WA	2006	Broadcast	No injury or growth reduction at all rates (2.5, 5.0, 10 lb ai per acre).	N	20061109n.pdf
24782	Aster (Aster ericoides) 'Snow Flurry'	Field Container	Chandran	WV	2005	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20070110s.pdf
21430	False Spirea (Astilbe sp.)	Field Container	Williams	IL	2006	Broadcast	No crop injury with 2.5, 5.0, 10 lbs ai/A.	Y	20110208c.pdf
21430	False Spirea (Astilbe sp.) 'Purple Candles'	Field Container	Senesac	NY	2001	Over the top	No injury with single application of 2.5, 5.0 10.0 lb ai over dormant plants.	Y	20080616c.pdf
24783	Fern, Lady (Athyrium nipponicum)	Field Container	Derr	VA	2005	Broadcast	Little to no injury at 2.5 lb ai per acre; moderate and severe injury at 5 and 10 lb ai per acre.	Y	20060217x1.pdf
31345	Fern, Lady (Athyrium nipponicum) A. 'Japanese Painted Fern'	Field Container	Derr	VA	2011	Broadcast	Unacceptable crop injury and significant reduction in fresh shoot weight with 2.5, 5.0, 10 lb ai per acre. Good groundsel control.	N	20120321b.pdf
24783	Fern, Lady (Athyrium nipponicum) 'Pretum'	Field Container	Mathers	OH	2005	Over the top	All rates (2.5, 5.0, 10 lb ai per acre) caused moderate to severe injury (frond scorching).	Y	20060124c.pdf
23787	Rock Cress (Aubrieta sp.)	Field Container	Reding	OH	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060213c3.pdf
23787	Rock Cress (Aubrieta sp.) A. deltoidea 'Whitewell Gem'	Field Container	Neal	NC	2004	Over the top	No injury at 2.5 and 5 lb ai per acre; severe at 10 lb ai per acre.	N	
26019	Rock Cress (Aubrieta sp.) 'Large Flo'	Greenhouse	Freiberger	NJ	2006	Over the top	Virtually no injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070417a.pdf
23787	Rock Cress (Aubrieta sp.) 'Whitewell Gem'	Field Container	Lieth	CA	2004	Over the top	Slight injury at 2.5 and 5 lb ai per acre; moderate injury at 10 lb ai per acre.	N	20040103m.pdf
26019	Rock Cress (Aubrieta sp.) 'Whitwell Gem'	Greenhouse	Mickelbart	IN	2006	Over the top	Significant injury only at 10 lb ai per acre; no growth reduction (2.5, 5 and 10 lb ai).	N	20070411b.pdf
23788	Blue False Indigo (Baptisia australis)	Field Container	Derr	VA	2004	Over the top	All rates caused slight injury. Good control of large crabgrass at 2.5 lb ai per acre; excellent control at higher rates. Excellent control of spotted spurge at all rates.	N	20040103z.pdf
23788	Blue False Indigo (Baptisia australis)	Field Container	Gilliam	AL	2004	Over the top	No injury at 2.5 and 5 lb ai per acre; slight injury at 10 lb ai per acre. All rates significantly reduced naturally-occurring indigenous weed population (prostrate spurge, gripeweed, oxalis).	N	20040103n.pdf
23788	Blue False Indigo (Baptisia australis)	Field Container	Neal	NC	2004	Over the top	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20040103o.pdf
23788	Blue False Indigo (Baptisia australis)	Field Container	Senesac	NY	2005	Over the top	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060202j.pdf
24784	Heart-leaved Bergenia (Bergenia cordifolia) New Hybrid bergenia	Field Container	Neal	NC	2005	Broadcast	No injury at 2.5 and 5 lb ai per acre; moderate injury at 10 lb ai per acre.	N	20060217y8.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
24784	Heart-leaved Bergenia (Bergenia cordifolia) New Hybrids	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070113o.pdf
24784	Heart-leaved Bergenia (Bergenia cordifolia) 'Red Bloom'	Field Container	Boydston	WA	2006	Broadcast	No injury or growth reduction at all rates.	N	20061109o.pdf
24784	Heart-leaved Bergenia (Bergenia cordifolia) 'Rotblum'	Field Container	Lieth	CA	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060123b2.pdf
26022	Heart-leaved Bergenia (Bergenia cordifolia) 'Winter Glow'	Greenhouse	Mickelbart	IN	2006	Over the top	No significant injury or growth reduction (2.5, 5 and 10 lb ai per acre).	N	20070411b.pdf
23521	Feather Reed Grass (Calamagrostis acutiflora) 'Karl Foerster'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20100120f.pdf
23521	Feather Reed Grass (Calamagrostis acutiflora) 'Overdam'	Field Container	Boydston	WA	2004	Over the top	No injury at 2.5, 5.0, and 10.0 lb ai per acre. Significantly reduced kochia, barnyardgrass, chickweed and green foxtail	N	20040105e.pdf
23521	Feather Reed Grass (Calamagrostis acutiflora) 'Overdam'	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
29649	Canna (Canna sp.) C. 'Blushing Bride'	Field Container	Gilliam	AL	2011	Broadcast	No crop injury or reduction in growth with 2.5, 5.0 or 10.0, lb ai per acre.	N	20111206c.pdf
29649	Canna (Canna sp.) C. spp.	Field Container	Gilliam	AL	2011	Broadcast	No crop injury or reduction in growth with 2.5, 5.0 or 10.0, lb ai per acre.	N	20111206c.pdf
29649	Canna (Canna sp.) C. x generalis 'Ermine'	Field Container	Stamps	FL	2009	Over the top	No significant injury at 2.5, 5 and 10 lb ai per acre; no significant growth reduction.	N	20100301a.pdf
29649	Canna (Canna sp.) 'Freckle Face'	Field Container	Derr	VA	2011	Broadcast	No crop injury with two applications at 2.5, 5.0, 10 lb ai per acre.	N	20120307a.pdf
20809	Sedge (Carex sp.) C. buchananii	Field Container	Boydston	WA	2004	Over the top	No injury at 2.5, 5.0, 10 lb ai per acre; all plants saleable.	Y	20040105f.pdf
28752	Ceanothus, maritime (Ceanothus maritimus)	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 2.5, 5.0 and 10 lb ai per acre; all treated plants saleable.	Y	20110113c.pdf
28752	Ceanothus, maritime (Ceanothus maritimus)	Field Container	Lieth	CA	2011	Over the top	No injury or significant growth reduction with 100, 200 and 400 lb per acre applied twice.	Y	20130130d.pdf
28752	Ceanothus, maritime (Ceanothus maritimus) C. maritimus 'Dark Star'	Field Container	Wilen	CA	2010	Over the top	No crop injury with 2.5, 5.0, 10 lb ai per acre with one application but a second application resulted in unacceptable injury and reduction in growth with the 400 lb per acre rate.	Y	20110205c.pdf
28751	Ceanothus sp. (Ceanothus sp.) C. x pallida 'Marie Simon'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 2.5, 5.0 and 10 lb ai per acre; all treated plants saleable.	Y	20110113c.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
28753	Ceanothus (Ceanothus x pallida)	Field Container	Lieth	CA	2010	Over the top	No injury with 0.375 and 0.75, slight with 1.5 lb ai per acre, applied twice; high growth reduction at 4X.	Y	20130130d.pdf
28753	Ceanothus (Ceanothus x pallida) 'Marie Simon'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 2.5, 5.0 and 10 lb ai per acre; all treated plants saleable.	Y	20110113c.pdf
24785	Jupiter's Beard (Centranthus ruber)	Field Container	Reding	OH	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060213c1.pdf
24785	Jupiter's Beard (Centranthus ruber)	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060217w11.pdf
24785	Jupiter's Beard (Centranthus ruber) 'Coccineus'	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070113p.pdf
23523	Northern Sea Oats, Wild Oats (Chasmanthium latifolium)	Field Container	Boydston	WA	2004	Over the top	No injury at 2.5, 5.0, and 10.0 lb ai per acre. Significantly reduced kochia, barnyardgrass, chickweed and green foxtail.	N	20040105g.pdf
23523	Northern Sea Oats, Wild Oats (Chasmanthium latifolium)	Field Container	Neal	NC	2011	Broadcast	No crop injury was observed at 2.5, 5.0 or 10 lb ai per acre following initial application. Reduced growth was observed following the second applications at 2X and 4X doses. .	N	20120312a.pdf
23523	Northern Sea Oats, Wild Oats (Chasmanthium latifolium)	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
23523	Northern Sea Oats, Wild Oats (Chasmanthium latifolium)	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5, 5, 10 lb ai per acre throughout evaluation period.	N	20101129c.pdf
23523	Northern Sea Oats, Wild Oats (Chasmanthium latifolium)	Field Container	Williams	IL	2009	Broadcast	No crop injury with 2.5, 5, 10 lb ai per acre.	N	20110208j.pdf
23789	Turtlehead, Snakehead (Chelone sp.) C. lyonii 'Hot Lips'	Field Container	Derr	VA	2004	Over the top	Slight injury at 2.5 and 5 lb ai per acre; moderate injury at 10 lb ai per acre. Good control of large crabgrass at 2.5 lb ai per acre; excellent control at higher rates. Excellent control of spotted spurge at all rates.	N	20040103z.pdf
23789	Turtlehead, Snakehead (Chelone sp.) C. lyonii 'Hot Lips'	Field Container	Neal	NC	2004	Over the top	No injury at 2.5 lb ai per acre rate; slight and severe injury at 5 and 10 lb ai per acre rates.	N	20040104e.pdf
23789	Turtlehead, Snakehead (Chelone sp.) C. lyonii 'Hot Lips'	Field Container	Senesac	NY	2004	Over the top	No statistically significant injury.	N	20040104f.pdf
20810	Golden Star (Chrysogonum sp.) C. virginianum	Field Container	Senesac	NY	2005	Over the top	Slight injury at 2.5 and 5 lb ai per acre; moderate injury at 10 lb ai per acre.	N	20060202j.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
20810	Golden Star (Chrysogonum sp.) C. virginianum 'Alan Bush'	Field Container	Derr	VA	2004	Over the top	Slight injury at 2.5 lb ai per acre; moderate injury at 5 and 10 lb ai per acre rates. Good control of large crabgrass at 2.5 lb ai per acre; excellent control at higher rates. Excellent control of spotted spurge at all rates.	N	20040103z.pdf
20810	Golden Star (Chrysogonum sp.) C. virginianum 'Pierre'	Field Container	Neal	NC	2004	Over the top	All rates caused stunting but plants recovered.	N	20040103p.pdf
23791	Bugbane & Cohosh, Black (Cimicifuga racemosa)	Field Container	DeFrancesco	OR	2011	Over the top	No injury with 100, 200 and 400 lb per acre applied twice; no growth reduction.	N	20121002a.pdf
23791	Bugbane & Cohosh, Black (Cimicifuga racemosa)	Field Container	Neal	NC	2005	Broadcast	Moderate injury at 2.5 and 5 lb ai per acre; severe injury at 10 lb ai per acre.	N	20060217y3.pdf
23791	Bugbane & Cohosh, Black (Cimicifuga racemosa)	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5, 5, 10 lb ai per acre. Root rating affected.	N	20101129c.pdf
24895	Clematis (Clematis sp.)	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all plants saleable.	N	20091103a.pdf
24895	Clematis (Clematis sp.) 'Midnight Showers'	Field Container	Mathers	OH	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	N	20060124c.pdf
24895	Clematis (Clematis sp.) 'Ramona'	Field Container	Stamps	FL	2009	Over the top	No significant injury at 2.5, moderate at 5 and 10 lb ai per acre; no significant growth reduction.	N	20100301a.pdf
29107	Tickseed (Coreopsis sp.) lanceolata	Field Container	Williams	IL	2009	Broadcast	No crop injury at 2.5, 5 and 10 lb ai per acre.	N	20110208k.pdf
25294	Mexican Heather, False Heather, Elfin Herb (Cuphea hyssopifolia)	Field In-Ground	Chen	LA	2005	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre.	Y	20060202q.pdf
24839	Hardy Ice Plant, Yellow Ice Plant (Delosperma nubigenum)	Field Container	Boydston	WA	2005	Broadcast	No injury at 2.5, 5.0, 10 lb ai per acre..	N	20060217u8.pdf
24839	Hardy Ice Plant, Yellow Ice Plant (Delosperma nubigenum)	Field Container	Boydston	WA	2006	Broadcast	Significant injury; no growth reduction.	N	20061109q.pdf
24839	Hardy Ice Plant, Yellow Ice Plant (Delosperma nubigenum)	Field Container	Linderman	OR	2006	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20070111k.pdf
24840	Larkspur (Delphinium sp.) 'Blue Mirror'	Field Container	Senesac	NY	2010	Over the top	Moderate to severe injury with 2.5, 5 and 10 lb ai per acre.	N	20101129c.pdf
24840	Larkspur (Delphinium sp.) 'Butterfly Compactum'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20091201s.pdf
24840	Larkspur (Delphinium sp.) D. 'Connecticut Yankee'	Field Container	Mathers	OH	2010	Over the top	Both the untreated and treated (2.5 lb ai per acre) had unacceptable levels of injury. Further study needed.	N	20101005a.pdf
24840	Larkspur (Delphinium sp.) D. elatum 'Aurora White'	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20101130m.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
24840	Larkspur (Delphinium sp.) D. sp. 'Bluebird'	Field Container	Reding	OH	2010	Broadcast	No crop injury or difference in growth from one or two applications at 2.5, 5.0, 10.0 lb ai per acre.	N	20110131b.pdf
24840	Larkspur (Delphinium sp.) 'Guardian Early Blue'	Field Container	Klett	CO	2010	Over the top	Trial 1: no crop injury with2.5, 5.0, 10 lb ai per acre. No differences in height or width between 1x,2x, 4x and control. 1x rate had lower weed control compared to the weeded check.	N	20110128a.pdf
24840	Larkspur (Delphinium sp.) 'Guardian Early Blue'	Field Container	Klett	CO	2010	Over the top	Trial 2: no crop injury with 2.5, 5.0, 10 lb ai per acre. Control had greater width than 4x treated pots. 1x rate had lower weed control compared to the weeded check and 4x treatments.	N	20110128a.pdf
24838	Maiden Pink (Dianthus deltoides)	Field Container	Williams	IL	2006	Over the top	No crop injury with 2.5, 5.0, 10 lb ai per acre.	N	20110208d.pdf
24838	Maiden Pink (Dianthus deltoides) 'Brilliant'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20091201v.pdf
24838	Maiden Pink (Dianthus deltoides) 'Firewitch'	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20101130l.pdf
24838	Maiden Pink (Dianthus deltoides) 'Zing Rose'	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No significant injury or reduction of growth and flower number with 2.5, 5.0 and 10.0 lb ai per acre; all plants marketable.	N	20120503d.pdf
24838	Maiden Pink (Dianthus deltoides) 'Zing Rose'	Field Container	Klett	CO	2010	Broadcast	Trial 1: no crop injury with 2.5, 5, 10 lb per acre. No differences in height, width, dry mass or efficacy between treated and weeded control.	N	20110128a.pdf
24838	Maiden Pink (Dianthus deltoides) 'Zing Rose'	Field Container	Klett	CO	2010	Broadcast	Trial 2: no crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height or width between treated and control. 1x and 2x had less weed control compared to weeded check.	N	20110128a.pdf
29099	Pinks (Dianthus sp.)	Field Container	Lieth	CA	2012	Over the top	No significant injury with 2.5, 5.0 and 10.0 lb ai per acre applied twice; unacceptable growth reduction with 4X.	N	20130226d.pdf
29099	Pinks (Dianthus sp.) D. chinensis	Field Container	Williams	IL	2009	Broadcast	No crop injury at 2.5, 5.0 and 10 lbs ai per acre.	N	20110208d.pdf
29099	Pinks (Dianthus sp.) 'Firewitch'	Field Container	Wilen	CA	2012	Over the top	Acceptable injury and growth reduction increasing with rates (100, 200 and 400 lb per acre)applied twice.	N	20121108b.pdf
23742	Deertongue (Dichanthelium clandestinum)	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
23742	Deertongue (Dichanthelium clandestinum)	Field Container	Senesac	NY	2010	Over the top	Slight to moderate crop injury with 2.5, 5, 10 lb ai per acre.	N	20101129c.pdf
24786	Foxglove (Digitalis sp.) 'Ambigua'	Field Container	Treat	WA	2006	Broadcast	No injury at 1X rate (2.5 lb ai per acre); higher rates unacceptable.	N	20070113q.pdf
24786	Foxglove (Digitalis sp.) D. purpurea	Field Container	Linderman	OR	2006	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20070111j.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
24786	Foxglove (Digitalis sp.) D. thaspi 'Spanish Peaks'	Field Container	Klett	CO	2005	Over the top	Unacceptable stunting at all rates (2.5, 5.0, and 10.0 lb ai per acre).	N	20060215c3.pdf
26025	Foxglove (Digitalis sp.) 'Excelsior Mix'	Greenhouse	Freiberger	NJ	2006	Over the top	No injury at 2.5 and 5 lb ai per acre, moderate at 10 lb ai.	N	20070417a.pdf
24786	Foxglove (Digitalis sp.) 'Foxy'	Field Container	Boydston	WA	2006	Broadcast	No injury at 2.5 lb ai per acre; significant at 5 and 10 lb ai per acre.	N	20061109p.pdf
26025	Foxglove (Digitalis sp.) 'Palm's Choice'	Greenhouse	Mickelbart	IN	2006	Over the top	Significant injury only at 10 lb ai per acre; no growth reduction at all rates (2.5, 5 and 10 lb ai per acre).	N	20070411b.pdf
25585	Fern, Autumn (Dryopteris erythrosora)	Field Container	Gilliam	AL	2010	Broadcast	No crop injury but significant stunting with all rates (2.5, 5, 10.0 lb ai per acre).	N	20110623c.pdf
25585	Fern, Autumn (Dryopteris erythrosora)	Field Container	Senesac	NY	2010	Over the top	Slight to moderate crop injury with 2.5, 5 and 10 lb ai per acre.	N	20101129c.pdf
25585	Fern, Autumn (Dryopteris erythrosora) 'Brilliance'	Field Container	Stamps	FL	2009	Over the top	No significant injury at 2.5, 5 and 10 lb ai per acre; significant growth reduction at 4X.	N	20100301a.pdf
25585	Fern, Autumn (Dryopteris erythrosora) D 'Autumn Brilliance'	Field Container	Derr	VA	2011	Broadcast	Minor to unacceptable (31%) crop injury and significant reduction in fresh shoot weight with 2.5, 5.0, 10 lb ai per acre. Good control of groundsel but not tassleflower.	N	20120321b.pdf
25595	Fern, Southern Shield (Dryopteris ludoviciana) D. carthusianna	Field Container	Gilliam	AL	2010	Broadcast	No crop injury with 2.5, 5, 10 lb ai per acre but stunting with 2x and 4x rate.	N	20110623c.pdf
25595	Fern, Southern Shield (Dryopteris ludoviciana) D. 'S. Shield fern'	Field Container	Derr	VA	2011	Broadcast	Minor (up to 18%) crop injury with 2.5, 5.0, 10 lb ai per acre and significant reduction in fresh shoot weigh at 4x. Good control of groundsel but not tassleflower.	N	20120321b.pdf
24787	Purple Coneflower (Echinacea sp.) E. paradoxa	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	Y	20060217w12.pdf
24787	Purple Coneflower (Echinacea sp.) E. purpurea 'Magnus'	Field Container	Derr	VA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	Y	20060217x2.pdf
26028	Purple Coneflower (Echinacea sp.) 'Magnus'	Greenhouse	Freiberger	NJ	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070417a.pdf
24787	Purple Coneflower (Echinacea sp.) 'Magnus'	Field Container	Gilliam	AL	2005	Broadcast	No injury but plants treated with 10 lb ai per acre were smaller.	Y	20060217t2.pdf
26028	Purple Coneflower (Echinacea sp.) 'White Swan'	Greenhouse	Mickelbart	IN	2006	Over the top	No significant injury or growth reduction (2.5, 5 and 10 lb ai per acre).	N	20070411b.pdf
23792	Barrenwort (Epimedium sp.) E. x rubrum	Field Container	Ahrens/Mervosh	CT	2005	Ground, broadcast over top	All rates reduced plant vigor.	N	20060123h.pdf
23792	Barrenwort (Epimedium sp.) E. x rubrum	Field Container	Senesac	NY	2005	Over the top	Moderate injury at all rates.	N	20060202j.pdf
23793	Joepye weed, Spotted (Eupatorium maculatum)	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060217w2.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23793	Joepye weed, Spotted (Eupatorium maculatum) 'Gateway'	Field Container	Ahrens/Mervosh	CT	2005	Ground, broadcast over top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060123h.pdf
23794	Boneset (Eupatorium perfoliatum)	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5, 5, 10 lb ai per acre.	N	20101129c.pdf
23794	Boneset (Eupatorium perfoliatum) 'Chocolate'	Field Container	Boydston	WA	2010	Over the top	No significant injury or growth reduction at 2.5, 5 and 10 lb ai per acre; treated plants saleable.	N	20101130f.pdf
23795	Joepye weed, Sweetscented (Eupatorium purpureum)	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5 lb ai per acre; unacceptable injury at 5 and 10 lb ai per acre.	N	20060217w3.pdf
23795	Joepye weed, Sweetscented (Eupatorium purpureum)	Field Container	Senesac	NY	2004	Broadcast	No statistically significant injury.	N	20040104h.pdf
24788	Thoroughwort (Eupatorium sp.) 'Colelestinum'	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070113r.pdf
24788	Thoroughwort (Eupatorium sp.) E. aromaticum	Field Container	Reding	OH	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070410a.pdf
24788	Thoroughwort (Eupatorium sp.) E. purpureum 'Gateway'	Field Container	Neal	NC	2005	Broadcast	No injury at 2.5 and 5 lb ai per acre, slight injury at 10 lb ai per acre.	N	20060217y4.pdf
24788	Thoroughwort (Eupatorium sp.) E. rugosum 'Chocolate'	Field Container	Boydston	WA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060217u4.pdf
24788	Thoroughwort (Eupatorium sp.) E. rugosum 'Chocolate'	Field Container	Boydston	WA	2006	Broadcast	No injury at 2.5, 5.0, and 10.0 lb ai per acre and no growth reduction.	N	20061109l.pdf
20841	Strawberry (Non-Bearing) (Fragaria sp.) F. chiloensis 'Pink Panda'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20100120e.pdf
20841	Strawberry (Non-Bearing) (Fragaria sp.) 'Pink Panda'	Field Container	Senesac	NY	2001	Over the top	No injury with single application of 2.5, 5,0, or 10.0 lb ai per acre on actively growing plants.	N	20080616d.pdf
29532	Gaura (Gaura lindheimeri) 'Pink Fountain'	Field Container	Williams	IL	2009	Broadcast	Crop injury at 10 lb ai per acre.	N	20110208i.pdf
25092	Treasure Flower (Gazania sp.) 'Daybreak MIx'	Greenhouse	Freiberger	NJ	2006	Over the top	No injury at 2.5 and 5 lb ai per acre, light injury with complete recovery at 10 lb ai.	N	20070417a.pdf
24790	Geranium (Geranium magniflorum)	Field Container	Gilliam	AL	2010	Broadcast	No crop injury with 2.5, 5, 10 lb ai per acre. No growth indices taken due to weather.	N	20110623c.pdf
24790	Geranium (Geranium magniflorum)	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5, 5, 10 lb ai per acre. Root rating affected	N	20101129c.pdf
24790	Geranium (Geranium magniflorum) G. cantabrigiense 'Biokovo'	Field Container	Boydston	WA	2011	Broadcast	Two sequential applications at 2.5, 5.0 and 10.0 lb ai per acre did not injure or affect growth.	N	20111201l.pdf
29903	Geranium (Geranium sp.) G x cantabrigiense 'Karmina'	Field Container	Boydston	WA	2010	Broadcast	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20101130k.pdf
29903	Geranium (Geranium sp.) G x cantabrigiense 'Karmina'	Field Container	Klett	CO	2010	Broadcast	Trial 1: No crop injury with 2.5, 5.0 10 lb ai per acre. No differences in height, width, or dry mass compared to control. 1x had less weed control compared to the weeded check.	N	20110128a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
29903	Geranium (Geranium sp.) G x cantabrigiense 'Karmina'	Field Container	Klett	CO	2010	Broadcast	Trial 2: No crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height, width, or dry mass compared to control. 1x had less weed control compared to the weeded check.	N	20110128a.pdf
29903	Geranium (Geranium sp.) G. cantabrigiense 'Karmina'	Field Container	Boydston	WA	2011	Broadcast	Two sequential applications of Snapshot 2.5TG applied 6 weeks apart at 2.5, 5.0 and 10.0 lb ai per acre did not injure or affect growth or flowering of Geranium plants.	N	20111201o.pdf
29903	Geranium (Geranium sp.) G. macrorrhizum	Field Container	Klett	CO	2011	Broadcast	Trial 1: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
29903	Geranium (Geranium sp.) G. macrorrhizum	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
29903	Geranium (Geranium sp.) x cantabrigiense 'Biokovo'	Field Container	Lieth	CA	2010	Broadcast	Moderate crop injury with 2.5, 5.0 and 10 lb, marginal marketabiltiy.	N	20110624b.pdf
24791	Transvaal Daisy (Gerbera sp.)	Field Container	Reding	OH	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070410a.pdf
24791	Transvaal Daisy (Gerbera sp.) G. festival 'Dark Eye Orange'	Field Container	Treat	WA	2006	Broadcast	No injury at 2.5 and 5 lb ai per acre; 10 lb ai per acre rate unacceptable.	N	20070113s.pdf
24791	Transvaal Daisy (Gerbera sp.) G. jamesonii	Field Container	Chandran	WV	2005	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20070110s.pdf
24791	Transvaal Daisy (Gerbera sp.) G. jamesonii	Field Container	Fraelich	GA	2006	Broadcast	Very slight injury and stunting; no reduction in marketability.	N	20061110h.pdf
24791	Transvaal Daisy (Gerbera sp.) G. jamesonii 'Lambada'	Field Container	Lieth	CA	2005	Broadcast	No phytotoxicity but plant growth significantly reduced.	N	20060201a.pdf
24792	Globe Amaranth (Gomphrena sp.)	Field Container	Chandran	WV	2005	Over the top	No to minor injury increasing with rate (2.5, 5, and 10 lb ai per acre).	N	20070110s.pdf
24792	Globe Amaranth (Gomphrena sp.)	Field Container	Reding	OH	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070410a.pdf
24792	Globe Amaranth (Gomphrena sp.) G. globosa 'Buddy Series Purple'	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070113t.pdf
24792	Globe Amaranth (Gomphrena sp.) G. haageana	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060217w13.pdf
24792	Globe Amaranth (Gomphrena sp.) Globe Amaranth	Field Container	Gilliam	AL	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060217t3.pdf
23796	Common sneezeweed (Helenium autumnale)	Field Container	Lieth	CA	2004	Over the top	Low levels of chlorosis and stunting of new leaves increasing with rate.	N	20040103q.pdf
23796	Common sneezeweed (Helenium autumnale)	Field Container	Reding	OH	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060213c5.pdf

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23796	Common sneezeweed (Helenium autumnale)	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060217w4.pdf
23796	Common sneezeweed (Helenium autumnale)	Field Container	Senesac	NY	2005	Over the top	No significant injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060202j.pdf
23796	Common sneezeweed (Helenium autumnale) 'Summer Sun'	Field Container	Neal	NC	2004	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20040104i.pdf
26848	Helen's Flower, Sneezeweed (Helenium sp.) 'Hoopes II Yellow'	Greenhouse	Freiberger	NJ	2006	Over the top	No injury at 2 lb ai per acre, slight injury with complete recovery at end of trial at 5 and 10 lb ai.	N	20070417a.pdf
24793	Sun Rose, Rock Rose (Helianthemum sp.) 'Belgravia Rose'	Field Container	Lieth	CA	2005	Broadcast	No significant injury; 5 and 10 lb ai per acre reduced plant height.	N	20060123b3.pdf
24793	Sun Rose, Rock Rose (Helianthemum sp.) H. nummularium 'Hartswood Ruby'	Field Container	Klett	CO	2011	Broadcast	Trial 1: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
24793	Sun Rose, Rock Rose (Helianthemum sp.) H. nummularium 'Hartswood Ruby'	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
24793	Sun Rose, Rock Rose (Helianthemum sp.) species Red	Field Container	Klett	CO	2010	Broadcast	Trial 1: No crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height, width, dry mass or efficacy between treated and weeded control.	N	20110128a.pdf
24793	Sun Rose, Rock Rose (Helianthemum sp.) species Red	Field Container	Klett	CO	2010	Broadcast	Trial 2: No crop injury with 2.5, 5.0 10 lb ai per acre. No differences in height, width or dry mass between treated and untreated. 1x and 2x had lower weed control compared to weeded check.	N	20110128a.pdf
23798	Sunflower, Maximilian (Helianthus maximiliani)	Field Container	Klett	CO	2010	Broadcast	Trial 1: no crop injury with 2.5, 5.0, 10 lb ai per acre. The 1x rate had less weed control than the weeded check. No differences in width or dry mass between treated and control.	N	20110128a.pdf
23798	Sunflower, Maximilian (Helianthus maximiliani)	Field Container	Klett	CO	2010	Broadcast	Trial 2: no crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height, dry mass or efficacy between treated and weeded check.	N	20110128a.pdf
23798	Sunflower, Maximilian (Helianthus maximiliani)	Field Container	Lieth	CA	2012	Over the top	Moderate to severe injury and growth reduction with 2.5, 5.0 and 10.0 lb ai per acre applied twice.	N	20130226d.pdf
23798	Sunflower, Maximilian (Helianthus maximiliani)	Field Container	Roys	WA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060217w5.pdf
23797	Sunflower, Willowleaf (Helianthus salicifolius) 'First Light'	Field Container	Mathers	OH	2005	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060124c.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23797	Sunflower, Willowleaf (Helianthus salicifolius) 'First Light'	Field Container	Senesac	NY	2005	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060202j.pdf
24794	Sunflower (Helianthus sp.) H. salicifoius 'First Light'	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070113u.pdf
23799	False Sunflower, Smooth Oxeye (Heliopsis helianthoides)	Field Container	Boydston	WA	2005	Broadcast	No injury or reduction of growth at 2.5, 5.0, or 10.0 lb ai per acre.	N	20060217u1.pdf
23799	False Sunflower, Smooth Oxeye (Heliopsis helianthoides)	Field Container	Senesac	NY	2010	Over the top	Slight to moderate crop injury with 2.5, 5 and 10 lb ai per acre decreasing with time.	N	20101129c.pdf
23799	False Sunflower, Smooth Oxeye (Heliopsis helianthoides) H 'Summer Sun'	Field Container	Senesac	NY	2011	Broadcast	No crop injury with two applications at 2.5, 5.0, and 10.0 lb aia.	N	20111107f.pdf
26031	False Sunflower, Smooth Oxeye (Heliopsis helianthoides) 'Summer Nights'	Greenhouse	Mickelbart	IN	2006	Over the top	No significant injury or growth reduction (2.5, 5 and 10 lb ai per acre).	N	20070411b.pdf
23799	False Sunflower, Smooth Oxeye (Heliopsis helianthoides) 'Summer Sun'	Field Container	Klett	CO	2010	Broadcast	Trial 1: no crop injury with 2.5, 5.0, 10 lb ai per acre. No differences in height, width, or dry mass between treated and control. 1x and 2x had less weed control compared to weeded check.	N	20110128a.pdf
23799	False Sunflower, Smooth Oxeye (Heliopsis helianthoides) 'Summer Sun'	Field Container	Klett	CO	2010	Broadcast	Trial 2: no crop injury with 2.5. 5.0, 10 lb ai per acre. No differences in height, width or dry mass compared to control. 1x rate had less weed control compared to weeded check.	N	20110128a.pdf
23800	Hellebore, Christmas rose, Lenten Rose (Helleborus niger) H. orientalis	Field Container	Czarnota	GA	2004	Over the top	No injury at 3.75 lb ai per acre through 4 weeks after treatment, but minor injury appeared 8 and 12 weeks after treatment.	N	20050510a.pdf
23800	Hellebore, Christmas rose, Lenten Rose (Helleborus niger) 'Shmiemann Strain white Spot	Field Container	Senesac	NY	2005	Over the top	No significant injury.	N	20060202j.pdf
24795	Coral Bells, Alumroot (Heuchera sanguinea)	Field Container	Klett	CO	2005	Broadcast	Slight injury at 2.5 lb ai per acre rate; moderate to severe injury at 5 and 10 lb ai per acre.	N	20060215c2.pdf
24795	Coral Bells, Alumroot (Heuchera sanguinea) 'Crimson Curls'	Field Container	Boydston	WA	2005	Over the top	Single application caused reddening and necrosis; second application caused additional damage.	N	20080718c.pdf
24795	Coral Bells, Alumroot (Heuchera sanguinea) 'Firefly'	Field Container	Lieth	CA	2005	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20060125a.pdf
25789	Mallow, Rose Mallow (Hibiscus sp.) 'Boule de Feu'	Field Container	Senesac	NY	2010	Over the top	Very slight crop injury with 2.5, 5, 10 lb ai per acre.	N	20101129c.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
25789	Mallow, Rose Mallow (Hibiscus sp.) H. moschata 'Pink Swirl'	Field Container	Boydston	WA	2011	Broadcast	Two sequential applications at 2.5, 5.0 and 10.0 lb ai per acre did not injure or affect growth.	N	20111201m.pdf
25789	Mallow, Rose Mallow (Hibiscus sp.) H. mosheutos 'Splash Pinot Noir'	Field Container	Senesac	NY	2005	Over the top	No significant injury.	N	20060202j.pdf
25789	Mallow, Rose Mallow (Hibiscus sp.) H. rosa-sinensis 'Fire-N-Ice'	Field Container	Stamps	FL	2009	Over the top	No significant injury at 2.5, 5 and 10 lb ai per acre; no significant growth reduction.	N	20100301a.pdf
25789	Mallow, Rose Mallow (Hibiscus sp.) H. syriacus 'Minerva'	Field Container	Lieth	CA	2009	Over the top	No significant suppression of height or width with 2.5, 5.0, 10.0 lb aia. Slight crop injury (< or = 20%) with 5.0 and 10 lb aia but significantly different than untreated 4WAT and occurring again with second application 7WAT but no significant difference	N	20100430g.pdf
23525	Indian Grass (Hierochloe odorata)	Field Container	Klett	CO	2011	Broadcast	Trial 1: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
23525	Indian Grass (Hierochloe odorata)	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
23525	Indian Grass (Hierochloe odorata)	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
23525	Indian Grass (Hierochloe odorata)	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5 and 5.0 lb ai per acre but slight crop injury with 10 lb ai per acre.	N	20101129c.pdf
20813	Hydrangea, Climbing (Hydrangea anomala petiolaris)	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 2.5, 5.0 and 10 lb ai per acre; all treated plants saleable.	N	20110113c.pdf
20813	Hydrangea, Climbing (Hydrangea anomala petiolaris) 'Nikko Blue'	Field Container	Derr	VA	2004	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20040105c.pdf
26841	Candytuft (Iberis sp.)	Greenhouse	Freiberger	NJ	2006	Over the top	Very slight injury after second application increasing with rate (2.5, 5, and 10 lb ai per acre).	N	20070417a.pdf
24841	Candytuft (Iberis sp.)	Field Container	Reding	OH	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	Y	20070410a.pdf
24841	Candytuft (Iberis sp.) 'Alexander's White'	Field Container	Boydston	WA	2006	Broadcast	Minor to significant injuryt increasing with rate; no stunting at 2.5 and 5.0 lb ai per acre, but significant stunting at 10.0 lb ai per acre.	Y	20061109r.pdf
24841	Candytuft (Iberis sp.) I. sempervirens 'Purite'	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre).	Y	20070113x.pdf
24841	Candytuft (Iberis sp.) 'Snowflake'	Field Container	Lieth	CA	2005	Broadcast	No significant injury, but significant plant growth suppression.	Y	20060303b1.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
28018	Cogongrass; Japanese Bloodgrass (Imperata cylindrica) 'Red Baron'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20100120r.pdf
28018	Cogongrass; Japanese Bloodgrass (Imperata cylindrica) 'Red Baron'	Field Container	Senesac	NY	2001	Over the top	No to very slight injury after single application of 2.5, 5.0 or 10.0 lb ai per acre on actively growing plants.	N	20080616e.pdf
28018	Cogongrass; Japanese Bloodgrass (Imperata cylindrica) 'Red Baron'	Field Container	Senesac	NY	2010	Over the top	No injury with 2.5 and 5 lb ai per acre. Slight injury with each application at 10 lb ai per acre decreasing with time.	N	20101129c.pdf
23801	Poker Plant, Red-Hot-Poker (Kniphofia sp.)	Field Container	Gilliam	AL	2005	Broadcast	No injury.	N	20060217t4.pdf
23801	Poker Plant, Red-Hot-Poker (Kniphofia sp.)	Field Container	Neal	NC	2004	Over the top	No injury.	N	20040104j.pdf
23801	Poker Plant, Red-Hot-Poker (Kniphofia sp.) 'Flamenco'	Field Container	Boydston	WA	2005	Broadcast	No injury.	N	20060217u5.pdf
23801	Poker Plant, Red-Hot-Poker (Kniphofia sp.) 'Flamenco Mix'	Field Container	Derr	VA	2005	Broadcast	No injury, but reduced shoot weight.	N	20060217x5.pdf
23801	Poker Plant, Red-Hot-Poker (Kniphofia sp.) K. uvaria 'Border Ballet'	Field Container	Lieth	CA	2004	Broadcast	No injury.	N	20040104k.pdf
26838	Poker Plant, Red-Hot-Poker (Kniphofia sp.) 'Novelty Mix'	Greenhouse	Freiberger	NJ	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070417a.pdf
23801	Poker Plant, Red-Hot-Poker (Kniphofia sp.) 'Pfitzer's Hybrid'	Field Container	Neal	NC	2005	Broadcast	No injury.	N	20060217y5.pdf
20817	Yellow Archangel (Lamiastrum galeobdolon) 'Herman's Pride'	Field Container	Klett	CO	2011	Broadcast	Trial 1: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
20817	Yellow Archangel (Lamiastrum galeobdolon) 'Herman's Pride'	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
20817	Yellow Archangel (Lamiastrum galeobdolon) 'Herman's Pride'	Field Container	Neal	NC	2001	Over the top	No initial injury with single application of 2.5, 5.0 and 10.0 lb ai per acre over actively growing, very young plants, but after 4 to 6 weeks stunting was apparent increasing with rate.	N	20080616p.pdf
20796	Yellow Archangel (Lamiastrum galeobdolon) 'Herman's Pride'	Field In-Ground	Senesac	NY	2001	Over the top	Slight transient injury at all rates (2.5, 5.0 and 10.0 lb ai per acre) with single application on actively growing plants.	N	20080616f.pdf
25443	Shrub Verbena (Lantana sp.) L. hybrida 'New Gold'	Field In-Ground	Chen	LA	2005	Broadcast	No significant injury at 2.5 lb ai per acre; slight injury at 5 and 10 lb ai per acre	Y	20060202q.pdf
24697	Shrub Verbena (Lantana sp.) L. montevidensis	Field Container	Lieth	CA	2005	Broadcast	No injury or plant suppression	Y	20060303b2.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23802	Lavender, English (Lavandula angustifolia)	Field Container	Gilliam	AL	2004		No injury. All rates significantly reduced naturally-occurring indigenous weed population (prostrate spurge, gripeweed, oxalis).	Y	20040104n.pdf
23802	Lavender, English (Lavandula angustifolia) 'Munstead'	Field Container	Neal	NC	2004		Slight stunting at all rates.	Y	20040104l.pdf
23802	Lavender, English (Lavandula angustifolia) 'Munstead'	Field Container	Senesac	NY	2004		No injury.	Y	20040104m.pdf
23802	Lavender, English (Lavandula angustifolia) 'Vera'	Field Container	Lieth	CA	2004		No injury.	Y	20040104o.pdf
25438	Shasta Daisy (Leucanthemum maximum) 'Snow Lady'	Field Container	Lieth	CA	2006	Over the top	Slight injury and growth reduction at 2.5, 5 and 10 lb ai per acre.	Y	20070717t.pdf
20845	Blue Lyme Grass (Leymus arenarius) 'Blue Dune'	Field Container	Senesac	NY	2001	Over the top	No injury at all rates (2.5, 5.0, 10.0 lb ai per acre) with single application on actively growing plants.	N	20080616g.pdf
20845	Blue Lyme Grass (Leymus arenarius) Elymus arenarius	Field Container	Mickelbart	IN	2009	Over the top	Pytotoxicity ratings were zero (0) for all treatments (2.5, 5.0, 10 lb ai per acre) at all rates throughout the experiment; no significant differences in height or width compared to untreated.	N	20101028a.pdf
23803	Golden Rockets (Ligularia stenocephala)	Field Container	Fraelich	GA	2005	Broadcast	No injury or growth differences at all rates.	N	20061108j.pdf
23803	Golden Rockets (Ligularia stenocephala) 'Dark Leaf'	Field Container	Boydston	WA	2005	Broadcast	No injury.	N	20060217u2.pdf
23803	Golden Rockets (Ligularia stenocephala) 'The Rocket'	Field Container	Senesac	NY	2005	broadcast	No significant injury.	N	20060202m.pdf
23804	Blue flax (Linum perenne L. ssp. Perenne)	Field Container	Senesac	NY	2004	Broadcast	No statistically significant injury.	N	20040104r.pdf
23804	Blue flax (Linum perenne L. ssp. Perenne) 'Saphyr'	Field Container	Neal	NC	2004	Broadcast	No injury at 2.5 and 5 lb ai per acre; slight injury at 10 lb ai per acre.	N	20040104q.pdf
23804	Blue flax (Linum perenne L. ssp. Perenne) 'Sapphire'	Field Container	Lieth	CA	2004	Broadcast	No injury.	N	20040104p.pdf
24984	Lilyturf, Big Blue;Giant (Liriope muscari) 'Big Blue'	Field In-Ground	Chen	LA	2005	Broadcast	No injury.	Y	20060202q.pdf
20847	Moneywort (Lysimachia nummularia) 'Aurea'	Field Container	Senesac	NY	2001	Over the top	No to slight infjury increasing with rate (2.5, 5.0, 10.0 lb ai per acre) with single application on actively growing plants.	N	20080616h.pdf
20819	Mazus (Mazus reptans)	Field Container	Senesac	NY	2001	Over the top	No injury with single application of 2.5, 5.0 and 10.0lb ai per acre on actively growing plants.	N	20080616i.pdf
23805	Virginia bluebells (Mertensia virginica)	Field Container	Beste/Frank (ARS)	MD	2005	Over the top	All plants were unmarketable at the end of the study.	N	20060120a2.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
29651	Muhly, hairyawn (Muhlenbergia capillaris)	Field Container	Lieth	CA	2010	Broadcast	No crop injury but significant growth suppression with one or two applications at 2.5, 5.0, and 10.0 lb ai per acre.	N	20110624b.pdf
29651	Muhly, hairyawn (Muhlenbergia capillaris)	Field Container	Stamps	FL	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre; no growth reduction.	N	20100301a.pdf
29651	Muhly, hairyawn (Muhlenbergia capillaris)	Field Container	Uber	CA	2010	Broadcast	No crop injury with two applications of 2.5, 5.0, 10 lb ai per acre. Good efficacy observed on hairy bittercress and spotted spurge	N	20101223b.pdf
23806	Catmint (Nepeta x faasseni) 'Dropmore'	Field Container	Gilliam	AL	2004	Broadcast	No injury. All rates significantly reduced naturally-occurring indigenous weed population (prostrate spurge, gripeweed, oxalis).	N	20040104s.pdf
23806	Catmint (Nepeta x faasseni) 'Dropmore'	Field Container	Lieth	CA	2004	Broadcast	No injury.	N	20040104v.pdf
23806	Catmint (Nepeta x faasseni) N. nervosa 'Blue Carpet'	Field Container	Neal	NC	2004	Broadcast	All rates caused unacceptable injury.	N	20040104t.pdf
23806	Catmint (Nepeta x faasseni) 'Walker's Low'	Field Container	Senesac	NY	2001	Over the top	No injury with single application of 2.5, 5.0 and 10.0 lb ai per acre on actively growing plants.	N	20080616j.pdf
23806	Catmint (Nepeta x faasseni) 'Walker's Low'	Field Container	Senesac	NY	2004	Broadcast	No injury.	N	20040104u.pdf
23806	Catmint (Nepeta x faasseni) 'Walkers Low'	Field Container	Derr	VA	2004	Broadcast	All rates caused slight injury. Good control of large crabgrass at 2.5 lb ai per acre; excellent control at higher rates. Excellent control of spotted spurge at all rates.	N	20040103z.pdf
24798	Evening Primrose, Sundrops (Oenothera sp.) O. berlandieri 'Siskiyou'	Field Container	Boydston	WA	2009	Over the top	No significant injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	Y	20100120i.pdf
24798	Evening Primrose, Sundrops (Oenothera sp.) O. speciosa 'Rosea'	Field Container	Lieth	CA	2009	Over the top	No significant suppression of height or width with 2.5, 5.0, 10.0 lb aia. No crop injury with labeled rate but approximately 20 injury by 4WAT with 5.0 and 10 lb aia increasing to 30% with second application to end of trial.	Y	20100430g.pdf
23807	Devil's-tongue prickly pear (Opuntia humifusa) 'Bunny Ears'	Field Container	Senesac	NY	2010	Broadcast	No crop injury with 2.5, 5, 10 lb ai per acre.	N	20101129c.pdf
23807	Devil's-tongue prickly pear (Opuntia humifusa) 'Lemon Form'	Field Container	Senesac	NY	2005	Broadcast	No injury.	N	20060202j.pdf
24799	Hopflower Oregano (Origanum libanoticum)	Field Container	Klett	CO	2005	Broadcast	All rates caused slight to moderate visual injury.	N	20060215c4.pdf
24799	Hopflower Oregano (Origanum libanoticum)	Field Container	Klett	CO	2005	Broadcast	All rates caused slight to moderate visual injury.	N	20060215c4.pdf
24799	Hopflower Oregano (Origanum libanoticum)	Field Container	Lieth	CA	2006	Over the top	Unacceptable injury and growth reduction at 2.5, 5 and 10 lb ai per acre.	N	20070717m.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
31346	Fern, Royal (Osmunda regalis) O. 'American Royal'	Field Container	Derr	VA	2011	Broadcast	Minor crop injury with 2.5, 5.0, 10 lb ai per acre and reduction in fresh shoot weight with 4x rate. Good groundsel control.	N	20120321b.pdf
20820	Peony (Paeonia sp.) 'Festiva Maxima'	Field Container	Senesac	NY	2001	Over the top	No injury with single application of 2.5, 5.0 and 10.0 lb ai per acre on dormant plants.	N	20080616k.pdf
20820	Peony (Paeonia sp.) P. lactiflora 'Sarah Bernhardt'	Field Container	Neal	NC	2001	Over the top	No significant injury with single application of 2.5, 5.0 or 10.0 lb ai per acre over actively growing plants.	N	20080616q.pdf
23526	Switch-Grass (Panicum virgatum)	Field Container	Boydston	WA	2004	Broadcast	No injury. Significantly reduced kochia, barnyardgrass, chickweed and green foxtail	N	20040104w.pdf
23526	Switch-Grass (Panicum virgatum)	Field Container	Boydston	WA	2006	Broadcast	No injury or growth reduction at all rates.	N	20061109s.pdf
26834	Switch-Grass (Panicum virgatum)	Greenhouse	Freiberger	NJ	2006	Over the top	High injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070417a.pdf
23526	Switch-Grass (Panicum virgatum)	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
23526	Switch-Grass (Panicum virgatum) 'Dallas Blues'	Field Container	Mathers	OH	2005	Broadcast	No injury.	N	20060124c.pdf
24800	Beard-Tongue (Penstemon sp.)	Field Container	Derr	VA	2005	Broadcast	All rates caused slight injury and reduced shoot weight.	N	20060217x4.pdf
24800	Beard-Tongue (Penstemon sp.)	Field Container	Reding	OH	2005	Broadcast	No injury.	N	20060213c2.pdf
24800	Beard-Tongue (Penstemon sp.) 'Husker Red'	Field Container	Neal	NC	2005	Broadcast	Severe injury at all rates.	N	20060217y6.pdf
24800	Beard-Tongue (Penstemon sp.) P X mexicali 'Red Rocks'	Field Container	Lieth	CA	2005	Broadcast	No significant injury at 2.5 lb ai per acre; significant plant growth suppression at 10 lb ai per acre.	N	20060303b6.pdf
24800	Beard-Tongue (Penstemon sp.) P. hartwegii 'Scarlet Queen'	Field Container	Boydston	WA	2005	Broadcast	No injury.	N	20060217u6.pdf
26837	Pentas (Pentas sp.) 'New Look Pink'	Greenhouse	Freiberger	NJ	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070417a.pdf
28754	Mock Orange (Philadelphus sp.) P. Innocence	Field Container	Reding	OH	2010	Broadcast	No crop injury or difference in growth from one or two applications at 2.5, 5.0, 10.0 lb ai per acre.	N	20110131b.pdf
28754	Mock Orange (Philadelphus sp.) P. viginalis 'Snow Dwarf'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 2.5, 5 and 10 lb ai per acre.	N	20091214a.pdf
24711	Phlox (Phlox sp.) 'London Grove Blue'	Field Container	Senesac	NY	2010	Broadcast	Slight to moderate crop injury with 2.5, 5 and 10 lb ai per acre decreasing with time.	N	20101129c.pdf
24711	Phlox (Phlox sp.) P. paniculata	Field Container	Boydston	WA	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre after 1st, severe injury at 2X and 4X after 2nd application; all 1X treated plants saleable.	N	20100120h.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
24711	Phlox (Phlox sp.) P. paniculata 'Purple Flame'	Field Container	Boydston	WA	2010	Over the top	No injury at 2.5, 5 and 10 lb ai per acre; slight plant width reduction at 4X; all treated plants saleable.	N	20101130g.pdf
24711	Phlox (Phlox sp.) P. subulata 'Fort Hill'	Field Container	Klett	CO	2011	Broadcast	Trial 1: Significant reduction in dry mass for plants treated with 2.5 and 10 lb ai per acre (1x an 4x). Dry mass reduction for 1x treated pots may have been influenced by weeds in pot.	N	20111209c.pdf
24711	Phlox (Phlox sp.) P. subulata 'Fort Hill'	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with 2.5, 5.0, 10 lb ai per acre.	N	20111209c.pdf
24711	Phlox (Phlox sp.) P. subulata 'White Delight'	Field Container	Boydston	WA	2011	Broadcast	Slight injury and minor to moderate reduction in width with 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20111201i.pdf
20849	Creeping Phlox, Moss Pink (Phlox subulata)	Field Container	Lieth	CA	2012	Over the top	Moderate to severe injury and growth reduction with 2.5, 5.0 and 10.0 lb ai per acre applied twice.	N	20130226d.pdf
20848	Creeping Phlox, Moss Pink (Phlox subulata) 'Candy Strip'	Field In-Ground	Chen	LA	2005	Broadcast	No significant injury at 2.5 and 5 lb ai per acre rates; slight injury (leaf burn and loss of flowers) at 10 lb ai per acre.	N	20060202q.pdf
20849	Creeping Phlox, Moss Pink (Phlox subulata) 'Candy Stripe'	Field Container	Senesac	NY	2010	Broadcast	No injury with 2.5 lb ai per acre. Slight injury with 5 and 10 lb ai.	N	20101129c.pdf
20849	Creeping Phlox, Moss Pink (Phlox subulata) 'Drummons Pink'	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20101130e.pdf
20849	Creeping Phlox, Moss Pink (Phlox subulata) 'Emerald Blue'	Field Container	Senesac	NY	2001	Over the top	Very slight to moderate injury increasing with rate (2.5, 5.0, 10.0 lb ai per acre) and time with single application on actively growing plants.	N	20080616l.pdf
20849	Creeping Phlox, Moss Pink (Phlox subulata) 'Red Wing'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; treated plants saleable.	N	20091201q.pdf
24803	New Zealand Flax (Phormium sp.) P. colinsoi	Field Container	Lieth	CA	2005	Broadcast	No injury; significant increase in plant growth.	N	20060303b3.pdf
24803	New Zealand Flax (Phormium sp.) P. tenax 'Rubra'	Field Container	Uber	CA	2010	Broadcast	No crop injury with two applications of 100, 200, 400 lb per acre. Good efficacy observed on hairy bittercress and spotted spurge	N	20101223b.pdf
24803	New Zealand Flax (Phormium sp.) 'Sundowner'	Field Container	Wilen	CA	2012	Over the top	Slight, acceptable injury and no growth reduction with 100, 200 and 400 lb per acre applied twice.	N	20121108b.pdf
23808	Jacob's Ladder (Polemonium sp.)	Field Container	Beste/Frank (ARS)	MD	2005	Over the top	Single application caused no injury; second application caused significant injury with dead plants at the end of the experiment.	N	20060120a3.pdf
23808	Jacob's Ladder (Polemonium sp.)	Field Container	Reding	OH	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre) after 1st, high injury (necrosis and stunting) after 2nd application.	N	20070410a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23808	Jacob's Ladder (Polemonium sp.) 'Heavenly Habit'	Field Container	Boydston	WA	2005	Broadcast	Single application caused no injury; second injury caused some cupping of leaves and stunting. Plants were still saleable.	N	20080718h.pdf
23808	Jacob's Ladder (Polemonium sp.) P. 'Caeruleum Blue'	Field Container	Treat	WA	2006	Broadcast	No results due to crop failure across all treatments.	N	20070113m.pdf
23808	Jacob's Ladder (Polemonium sp.) P. reptans	Field Container	Fraelich	GA	2006	Broadcast	Moderate injury and severe stunting at all rates.	N	20061110h.pdf
23808	Jacob's Ladder (Polemonium sp.) P. reptans 'Stairway to Heaven'	Field Container	Linderman	OR	2006	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20070111h.pdf
24805	Primrose, Fairy (Primula malacoides)	Field Container	Lieth	CA	2005	Broadcast	Significant injury and plant growth suppression.	N	20060303b4.pdf
24805	Primrose, Fairy (Primula malacoides) 'Prima Carmine Rose'	Field Container	Treat	WA	2006	Broadcast	Trial failed; no data collected.	N	20070113v.pdf
26161	Rose (Rosa sp.) 'Double Knockout'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20091201t.pdf
26161	Rose (Rosa sp.) 'Pink Knockout'	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 2.5, 5, 10 lb ai per acre	N	20091119f.pdf
26161	Rose (Rosa sp.) 'Rainbow Knockout'	Field Container	Czarnota	GA	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20091214a.pdf
25304	Mexican Petunia (Ruellia carolinensis) R. brittoniana 'Katie'	Field In-Ground	Chen	LA	2005	Broadcast	No significant injury at 2.5 and 5.0 lb ai per acre; slight injury (purple leaves) at 10 lb ai per acre.	N	20060202q.pdf
24806	Ruscus (Ruscus hypophyllum)	Field Container	Stamps	FL	2009	Over the top	No significant injury at 2.5, 5 and 10 lb ai per acre; no significant growth reduction.	N	20100301a.pdf
29652	Palmetto Palm (Sabal minor)	Field Container	Stamps	FL	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre; no growth reduction.	N	20100301a.pdf
24807	Lavender cotton (Santolina chamaecyparissus)	Field Container	Klett	CO	2011	Broadcast	Trial 1: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
24807	Lavender cotton (Santolina chamaecyparissus)	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
24807	Lavender cotton (Santolina chamaecyparissus)	Field Container	Lieth	CA	2012		Severe injury and growth reduction with 2.5, 5.0 and 10.0 lb ai per acre applied twice.	N	20130226d.pdf
24807	Lavender cotton (Santolina chamaecyparissus) 'Compacta'	Field Container	Lieth	CA	2005	Broadcast	No injury; significant increase in plant growth.	N	20060303b5.pdf
24807	Lavender cotton (Santolina chamaecyparissus) 'Silver Gray'	Field Container	Wilen	CA	2012	Over the top	Slight, acceptable injury and no growth reduction with 100, 200 and 400 lb per acre applied twice.	N	20121108b.pdf
26034	Pincushion Flower (Scabiosa sp.) 'Blue Diamonds'	Greenhouse	Mickelbart	IN	2006	Over the top	Significant injury at 2.5 and 10 lb ai per acre but not at 5 lb ai; no growth reduction.	N	20070411b.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23527	Little Blue Stem (Schizachyrium scoparium)	Field Container	Neal	NC	2010	Broadcast	No crop injury during first 4 weeks but significant crop injury and root inhibition with second application at all rates (2.5. 5. 10 lb ai per acre) suggesting not safe for container label.	N	20110308e.pdf
23527	Little Blue Stem (Schizachyrium scoparium)	Field Container	Williams	IL	2009	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20110208l.pdf
23527	Little Blue Stem (Schizachyrium scoparium) 'The Blues'	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
20851	Stonecrop (Sedum sp.) 'Autumn Joy'	Field Container	Neal	NC	2001	Over the top	No injury at 2.5 lb ai per acre after single application, but stunting and tip necrosis occurred with 5 and 10 lb ai per acre. Injury was slight and possibly acceptable to growers who can wait for new growth, but not for landscape uses.	Y	20080616r.pdf
20851	Stonecrop (Sedum sp.) 'Autumn Joy'	Field Container	Williams	IL	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	Y	20110208m.pdf
20851	Stonecrop (Sedum sp.) S. reflexum 'Blue Spruce'	Field Container	Senesac	NY	2001	Over the top	No injury with single applciation of 2.5, 5.0 or 10.0 lb ai per acre on actively growing plants.	Y	20080616m.pdf
23811	Hen and chicks (Sempervivum arachnoideum)	Field Container	Lieth	CA	2006	Over the top	No injury or growth reduction at 2.5, 5 and 10 lb ai per acre.	N	20070717n.pdf
23811	Hen and chicks (Sempervivum arachnoideum)	Field Container	Senesac	NY	2004	Broadcast	No injury.	N	20040103r.pdf
23811	Hen and chicks (Sempervivum arachnoideum) 'Purple Beauty'	Field Container	Beste/Frank (ARS)	MD	2005	Over the top	No injury.	N	20060120a4.pdf
23810	Hen and chicks (Sempervivum tectorum) 'Cobweb'	Field Container	Ahrens/Mervosh	CT	2005	Ground, broadcast over top	Slight injury at 2.5 lb ai per acre; moderate at 5 and 10 lb ai per acre.	N	20060123h.pdf
23810	Hen and chicks (Sempervivum tectorum) 'Desert Bloom'	Field Container	Boydston	WA	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre; all treated plants saleable.	N	20100120g.pdf
23810	Hen and chicks (Sempervivum tectorum) 'Sunset'	Field Container	Lieth	CA	2004	Broadcast	No injury.	N	20040103s.pdf
23814	Goldenrod, Wrinkleleaf (Solidago rugosa)	Field Container	Fraelich	GA	2005	Broadcast	No injury or growth differences at all rates.	N	20061108k.pdf
23814	Goldenrod, Wrinkleleaf (Solidago rugosa)	Field Container	Reding	OH	2005	Broadcast	No injury.	N	20060213c4.pdf
23814	Goldenrod, Wrinkleleaf (Solidago rugosa)	Field Container	Roys	WA	2005	Broadcast	No injury.	N	20060217w7.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23814	Goldenrod, Wrinkleleaf (Solidago rugosa) 'Fireworks'	Field Container	Lieth	CA	2004	Over the top	No injury.	N	20040103t.pdf
23814	Goldenrod, Wrinkleleaf (Solidago rugosa) 'Fireworks'	Field Container	Neal	NC	2004	Over the top	No injury.	N	20040103u.pdf
23815	Goldenrod, Seaside (Solidago sempervirens)	Field Container	Fraelich	GA	2005	Broadcast	No injury or growth differences at all rates.	N	20061108i.pdf
23815	Goldenrod, Seaside (Solidago sempervirens)	Field Container	Fraelich	GA	2006	Broadcast	No injury or growth differences at all rates.	N	20061110h.pdf
23815	Goldenrod, Seaside (Solidago sempervirens)	Field Container	Senesac	NY	2004	Over the top	No injury.	N	20040103v.pdf
24808	Goldenrod (Solidago sp.) S. cabadensis 'Crown of Rays'	Field Container	Treat	WA	2006	Broadcast	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070113w.pdf
24808	Goldenrod (Solidago sp.) S. specisa	Field Container	Fraelich	GA	2006	Broadcast	No injury or growth differences at all rates.	N	20061110h.pdf
24808	Goldenrod (Solidago sp.) S.sempervirens	Field Container	Linderman	OR	2006	Over the top	No injury at 2.5, 5 and 10 lb ai per acre.	N	20070111g.pdf
23816	Goldenrod, Showy (Solidago specisa)	Field Container	Roys	WA	2005	Broadcast	No injury.	N	20060217w8.pdf
23812	Goldenrod, Autumn (Solidago sphacelata)	Field Container	Fraelich	GA	2006	Broadcast	No injury or growth differences at all rates.	N	20061110h.pdf
23812	Goldenrod, Autumn (Solidago sphacelata)	Field Container	Roys	WA	2005	Broadcast	No injury.	N	20060217w6.pdf
23524	Indian Grass, Wood Grass (Sorghastrum sp.)	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5, 5, 10 lb ai per acre.	N	20101129c.pdf
23524	Indian Grass, Wood Grass (Sorghastrum sp.) S. nutans	Field Container	Klett	CO	2010	Broadcast	Trial 2: no crop injury with 2.5, 5,10 lb a per acre. No differences in height, width, or dry mass compared to control. 1x had less weed control compared to weeded check.	N	20110128a.pdf
23524	Indian Grass, Wood Grass (Sorghastrum sp.) S. nutans	Field Container	Klett	CO	2010	Over the top	Trial 1: no crop injury with 2.5, 5,10 lb ai per acre. No differences in height, width, or dry mass compared to control. 1x and 2x had less weed control compared to weeded check.	N	20110128a.pdf
23524	Indian Grass, Wood Grass (Sorghastrum sp.) S. nutans	Field Container	Mickelbart	MI	2011	Broadcast	No injury or differences in final height at 2.5, 5.0 and 10.0 lb ai per acre.	N	20111003a.pdf
23524	Indian Grass, Wood Grass (Sorghastrum sp.) S. nutans	Field Container	Senesac	NY	2003	Over the top	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20080623d.pdf
23524	Indian Grass, Wood Grass (Sorghastrum sp.) S. nutans	Field Container	Williams	IL	2009	Broadcast	No injury at 2.5, 5.0 and 10.0 lb ai per acre.	N	20110208n.pdf
24842	Feather Grass, Mexican (Stipa sp.) S. capillata	Field Container	Klett	CO	2010	Broadcast	Trial 1: no crop injury with 2.5, 5,10 lb a per acre. No differences in height, width, or dry mass between treated and untreated. 1x had less weed control than weeded check.	N	20110128a.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
24842	Feather Grass, Mexican (Stipa sp.) S. capillata	Field Container	Klett	CO	2010	Broadcast	Trial 2: no crop injury with 2.5, 5,10 lb a lb per acre. 1x and 2x had less weed control than weeded check.	N	20110128a.pdf
24842	Feather Grass, Mexican (Stipa sp.) S. tenuissima	Field Container	Lieth	CA	2010	Broadcast	Significant crop injury with 5.0 and 10.0 lb ai per acre and growth suppression with 10.0 lb (none with 2.5 lb ai per acre).	N	20110624b.pdf
20824	Thyme, Creeping (Thymus praecox)	Field Container	Senesac	NY	2010	Over the top	No injury at 2.5 lb ai per acre but slight injury at 5 and 10 lb ai.	N	20101129c.pdf
20824	Thyme, Creeping (Thymus praecox) 'Albiflorus'	Field Container	Senesac	NY	2001	Over the top	No injury with single application of 2.5, 5.0 and 10.0 lb ai per acre on actively growing plants.	N	20080616n.pdf
20824	Thyme, Creeping (Thymus praecox) 'Elfin'	Field Container	Lieth	CA	2010	Over the top	No injury with 100, slight and moderate with 200 and 400 lb per acre, applied twice; moderate to high growth reduction from 1X to 4X.	N	20130130d.pdf
20824	Thyme, Creeping (Thymus praecox) 'Purple Carpet'	Field Container	Boydston	WA	2010	Over the top	No injury at 2.5, 5 and 10 lb ai per acre; increased plant width at 2X and 4X; all treated plants saleable.	N	20101130d.pdf
23817	Foamflower, Heartleaf (Tiarella cordifolia)	Field Container	Senesac	NY	2005	Over the top	No injury after the first application; significant injury after second application at all rates.	N	20060202j.pdf
23817	Foamflower, Heartleaf (Tiarella cordifolia) T. wherryi	Field Container	Neal	NC	2004	Over the top	Slight stunting at 2.5 lb ai per acre; significant injury at 5 and 10 lb ai per acre.	N	20040104x.pdf
29655	Palm, Windmill (Trachycarpus fortunei)	Field Container	Stamps	FL	2009	Over the top	No injury at 2.5, 5 and 10 lb ai per acre; no significant growth reduction.	N	20100301a.pdf
29655	Palm, Windmill (Trachycarpus fortunei)	Field Container	Uber	CA	2011	Broadcast	No crop injury or reduction in growth with 100, 200 and 400 lb ai per acre.	N	20111214e.pdf
24811	Spiderwort (Tradescantia ohiensis) 'Baby Bunny Bellies'	Field Container	Lieth	CA	2006	Over the top	Minor injury but unacceptable growth reduction at 2.5, 5 and 10 lb ai per acre.	N	20070717p.pdf
26844	Spiderwort (Tradescantia sp.)	Greenhouse	Freiberger	NJ	2006	Over the top	No injury at all rates (2.5, 5 and 10 lb ai per acre).	N	20070417a.pdf
24810	Spiderwort (Tradescantia x andersoniana)	Field Container	Derr	VA	2005	Broadcast	No injury.	N	20060217x1.pdf
24810	Spiderwort (Tradescantia x andersoniana) 'Osprey'	Field Container	Boydston	WA	2005	Broadcast	No ignificant injury at 2.5 lb ai per acre; 5 and 10 lb ai per acre slightly delayed blooming.	N	20060217u7.pdf
24810	Spiderwort (Tradescantia x andersoniana) 'Sweet Kate'	Field Container	Mathers	OH	2005	Over the top	No injury.	N	20060124c.pdf
23529	Cattails (Typha minima)	Field Container	Senesac	NY	2010	Over the top	No crop injury with 2.5, 5, 10 lb ai per acre.	N	20101129c.pdf
25307	Vervain (Verbena sp.) V. canadensis 'Homestead Purple'	Field In-Ground	Chen	LA	2005	Broadcast	No significant injury at 2.5 and 5 lb ai per acre; slight injury (leaf burn) at 10 lb ai per acre.	N	20060202q.pdf
24710	Vervain (Verbena sp.) V. canadensis 'Homestead Purple'	Field Container	Neal	NC	2005	Broadcast	Little to no injury at 2.5 lb ai per acre; moderate and severe injury at 5 and 10 lb ai per acre rates.	N	20060217y7.pdf

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results	EPA Reg	File Name
23818	Ironweed, New York (Vernonia noveboracensis)	Field Container	Neal	NC	2004	Over the top	No injury at 2.5 and 5 lb ai per acre; slight injury at 10 lb ai per acre.	N	20040103w.pdf
23818	Ironweed, New York (Vernonia noveboracensis)	Field Container	Senesac	NY	2004	Over the top	No injury.	N	20040103x.pdf
23818	Ironweed, New York (Vernonia noveboracensis)	Field Container	Senesac	NY	2009	Over the top	Slight injury at 2.5, 5.and 10 lb ai per acre.	N	20091130h.pdf
24812	Turkish veronica (Veronica liwanensis)	Field Container	Boydston	WA	2005	Over the top	All rates caused significant injury and reduced plant growth.	N	20060217v.pdf
24812	Turkish veronica (Veronica liwanensis) Veronica repens 'Big Blue'	Field Container	Lieth	CA	2006	Over the top	Unacceptable injury and growth reduction at 2.5, 5 and 10 lb ai per acre.	N	20070717r.pdf
20825	Speedwell, Brooklime (Veronica sp.)	Field Container	Reding	OH	2010	Broadcast	No crop injury or difference in growth from one or two applications at 2.5, 5.0, 10.0 lb ai per acre.	N	20100131b.pdf
20825	Speedwell, Brooklime (Veronica sp.) 'Goodness Grows'	Field Container	Boydston	WA	2004	Over the top	No injury. Significantly reduced kochia, barnyardgrass, chickweed and green foxtail.	N	20040105d.pdf
20825	Speedwell, Brooklime (Veronica sp.) V. spicata 'Goodness Grows'	Field Container	Boydston	WA	2010	Over the top	No significant injury at 2.5, 5 and 10 lb ai per acre after 1st, moderate after 2nd application; no growth reduction.	N	20101105c.pdf
20825	Speedwell, Brooklime (Veronica sp.) V. spicata 'Goodness Grows'	Field Container	Klett	CO	2011	Broadcast	Trial 1: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
20825	Speedwell, Brooklime (Veronica sp.) V. spicata 'Goodness Grows'	Field Container	Klett	CO	2011	Broadcast	Trial 2: No crop injury or reduction in growth with two sequential applications at 2.5, 5,0, and 10 lb ai per acre.	N	20111209c.pdf
25212	Speedwell, Spiked (Veronica spicata)	Field Container	Lieth	CA	2012	Over the top	Moderate injury and severe growth reduction with 2.5, 5.0 and 10.0 lb ai per acre applied twice.	N	20130226d.pdf
25212	Speedwell, Spiked (Veronica spicata)	Field Container	Senesac	NY	2009	Over the top	Slight injury at 2.5, severe at 5 and 10 lb ai per acre.	N	20091130h.pdf
25212	Speedwell, Spiked (Veronica spicata) 'Goodness Grows'	Field Container	Boydston	WA	2009	Over the top	No significant injury but reduced plant growth at 2.5, 5 and 10 lb ai per acre; 1X treated plants saleable.	N	20091103b.pdf
25212	Speedwell, Spiked (Veronica spicata) 'Royal Candles'	Field Container	Boydston	WA	2010	Over the top	Slight injury at 2.5 and 5, moderate at 10 lb ai per acre; most plants at 1X and 2X saleable.	N	20101105d.pdf

Label Suggestions

It is suggested that 52 crop genera or species exhibiting no injury in these experiments be added to the Snapshot 2.5TG label under the Groundcovers/Perennials header. These crops were demonstrated to have no or transient minimal injury at up to 10 lb ai per acre, or twice the highest labeled rate.

Agastache aurantiaca
Agastache rupestris
Amsonia hubrichtii
Andropogon gerardii
Antennaria parvifolia
Armeria maritime
Artemisia stelleria
Artemisia versicolor
Asarum canadense
Ascelpias sp.
Baptisia australis
Bergenia cordifolia
Calamagrostis acutiflora
Canna sp.
Ceanothus sp.[1]
Centranthus ruber
Chasmanthium latifolium
Delphinium sp. (See Senesac 2010)
Dianthus deltoides[1]
Dianthus chinensis[1]
Echinacea sp.
Eupatorium maculatum
Eupatorium purpureum
Geranium cantabrigiense (see Lieth 2010)
Gerbera jamesonii
Gomphrena sp.
Helenium autumnale
Helianthus salicifolius
Helleborus niger
Helianthemum sp.
Helianthus maximiliani
Heliopsis sp.
Hibiscus syriacus[1]
Hierochloe odorata
Iberis sp. (See Boydston report)
Imperata cylindrica
Kniphofia sp.
Lamiastrum galeobdolon
Ligularia stenocephala
Linum perenne
Muhlenbergia capillaries
Nepeta x faasseni
Panicum virgatum
Santolina chamaecyparissus
Sempervivum arachnoideum
Solidago rugosa
Solidago sempervirens
Solidago sphacelata
Sorghastrum nutans
Stipa sp. (see Lieth 2010)
Thymus praecox
Tradescantia x andersoniana

[1] Genera or closely related species already registered.

It is suggested that the following crops be added where injury has been observed:

Agastache rugosa X foeniculum
Amsonia tabernaemontana
Antennaria dioica
Antennaria neglecta
Arachniodes simplicor
Athyrium nipponicum
Cimicifuga racemosa
Cyrtomium falcatum
Digitalis thaspi
Epimedium sp.
Heuchera sanguine[1]
Mertensia virginica
Nepeta nervosa 'Blue Carpet'
Origanum libanoticum
Polemonium sp.
Polystichium polyblepharum
Primula malacoides
Sempervivum tectorum
Tiarella cordifolia
Tradescantia ohiensis
Verbena canadensis[1]
Veronica repens
Veronica spicata

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