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IR-4 Ornamental Horticulture Program
Dimethenamid-p Crop Safety

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Abstract

From 2007 to 2017, IR-4 completed 528 trials on Tower EC (dimethenamid-p). The data contained in this report was generated to register uses of dimethenamid-p on and around ornamental horticulture plants with over-the-top applications. The dimethenamid-p rates in the testing program were 0.97, 1.94 and 3.88 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. Tower EC had been applied to 154 plant genera or species. Of these, 63 plant species exhibited no or minimal transient injury after application at all three rates. Twenty one (21) crops exhibited no phytotoxicity at 0.97 lb ai per acre but did have some injury at 1.94 and 3.88 lb ai per acre. Nine crops – *Aquilegia sp., Catharanthus roseus, Cladrastis sp., Echeveria sp., Echinacea sp., Epilobium canum, Muhlenbergia dubia, Teucrium chamaedrys* and *Viburnum opulus* – exhibited significant phytotoxicity at even the lowest rate.

Introduction

Control of broadleaved weeds and sedges in the production of woody and herbaceous perennials can be problematic because nurseries grow many different types of plants and not all genera or species are listed on labels. These weeds can also be difficult to control in landscape settings for the same reason. Four herbicides, Freehand G (BAS 659 G; dimethenamid-p + pendimethalin), F6875 0.3G (sulfentrazone + prodiamine), Mesotrione SC, and Tower EC (BAS 656 EC; dimethenamid-p), were chosen for 2007 research activities into level of crop safety on over 38 different plant species. During 2008, 2009 and 2010, Freehand (dimethenamid-p + pendimethalin), Broadstar 0.25G VC1604 (flumioxazin), EXC3898 G (mesotrione), Tower EC and V-10142 G (imazasulfuron) were tested.This summary covers the results forTower EC from 2007 to 2017.

Materials and Methods

In the 2007 protocol, two applications of Tower EC were made approximately 8 weeks apart. In the protocols between 2008 and 2017 protocols, two applications of Tower EC were made approximately 6 weeks apart. The application rates were 0.97, 1.94 and 3.88 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. The following protocols were used: 07-009, 08-010, 09-011, 10-001, 11-004, 12-014, 13-014, 14-009,15-009, 16-010 and 17-010. Please visit http://ir4.rutgers.edu/ornamental/OrnamentalDrafts.cfm to view and download these protocols.

Tower ECwas supplied to researchers (See list of researchers in Appendix 1) by BASF Corporation.

Results and Summary

Phytotoxicity

Based on the type and nature of injury seen with Tower EC applications in the conducted research, 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 at the 1X rate sufficient to recommend growers not utilize this product, and 4) more data are needed to make informed recommendations.

Tower EC exhibited no or minimal negative impact on 63 plant species with over the top applications (Table 1). 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. In the research presented here, 21 plant species exhibited significant injury at higher rates even though little injury was observed at 1X (Table 2). Nine crops tested from 2007 to 2017 exhibited damage sufficient to recommend growers not utilize Tower EC as an over-the-top treatment for pre-emergent weed control (Table 3). For 60 genera/species, 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 individual trial summaries for Tower EC.

Table 1. List of Tower EC treated crops with no or minimal transitory injury.

Abelia grandiflora [1] *(see Neal)*
Abies fraseri [1]
Acer palmatum [1]
Acer rubrum [1]
Agapanthus africanus [1]
Agave sp. [1]
Berberis sp. [1] *(See Lieth, Mathers)*
Betula nigra [1]
Buxus sp. [1] *(See Mathers)*
Callistemon sp. [1]
Camelia sp. [1]
Carex sp. [1]
Caryopteris x clandonensis [1] *(See Beste/Frank)*
Ceanothus sp. [1]
Clematis sp. [1]
Cotoneaster sp. [1]
Delosperma sp. [1]
Dendranthema x morifolium [1, 2] *(See Klett 2013)*
Euonymus sp.
Gaura lindheimeri
Gleditsia sp. [1]
Hemerocallis sp. [1]
Hosta sp. [1]
Hydrangea macrophylla [1]
Hydrangea paniculata [1]
Hydrangea quercifolia [1]
Ilex cornuta [1]
Juglans nigra [1]
Juniperus sp. [1]
Lagerstroemia indica [1]
Lantana sp. [1]
Lavandula sp. [1]
Leucanthemum maximum
Leucothoe sp. [1]
Loropetalum sp. [1] *(See Neal)*
Magnolia sp. [1]
Malus domestica [1]
Nandina domestica [1]
Narcissus sp. [1]
Ophiopogon japonicas [1]
Picea abies [1]
Picea glauca [1]
Picea pungens [1]
Pieris japonica [1]
Pinus sp. [1]
Potentilla fruticosa [1]
Pseudotsuga menziesii [1]
Quercus acutissima [1]
Raphiolepis indica [1] *(See Lieth)*
Rosa sp. [1]
Sabal minor
Spiraea sp. [1]
Taxus sp. [1]
Ternstroemia sp.
Thuja occidentalis [1] *(See Lieth, Mathers)*
Thuja orientalis [1]
Thuja plicata [1]
Trachelospermum jasminoides [1]
Tsuga heterophylla [1] *(See Beste/Frank)*
Viburnum plicatum [1] *(See Beste/Frank)*
Viburnum tinus [1] *(See Neal)*
Wisteria spp. [1]
Zelkova serrata

[1] Registered already on EPA label.
[2] More information on cultivar and or species differences is warranted.

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

Buddleia davidii [1, 2]
Clethra alnifolia
Cornus florida [1]
Cornus kousa [1]
Cornus sericea [1]
Cotoneaster dammeri
Cryptomeria japonica [1]
Dryopteris sp. [1, 2]
Forsythia sp. [1, .3]
Hibiscus sp. [1, 2]
Iberis sp.
Ligustrum sp. [1]
Lonicera nitida
Nepeta cataria
Nepeta x faasseni
Quercus sp. [1, 2]
Rhododendron sp. [1, 2]
Salvia nemorosa/sylvestris [1]
Scaevola sp. [2]
Syringae sp. [1]
Viburnum nudum [1]

Table 3. List of Tower EC treated crops exhibiting significant injury.

Aquilegia sp. [4]
Catharanthus roseus
Cladrastis sp. [3]
Echeveria sp.
Echinacea sp. [4]
Epilobium canum [1]
Mulenbergia dubia [1]
Teucrium chamaedrys
Viburnum opulus [1]

Table 4. List of Tower EC treated crops where more information is needed.

Acer negundo [1]	*Distylium* sp.	*Osmanthus heterophyllus* [1]
Acer saccharinum [1]	*Echinacea* sp. [2]	*Osmundo regalis*
Aesculus glabra	*Echinocactus grusonii*	*Paeonia lactiflora.*
Albizia julibrissin	*Enkianthus* sp.	*Paeonia* sp.
Alder sp.	*Fagus* sp.	*Penstemon* sp.
Aloe sp.	*Fothergila gardenii*	*Philadelphus viginalis*
Arctostaphylos uva ursi	*Fraxinus americana*[1]	*Photinia fraserii*
Aronia melanocarpa	*Gardenia* sp.	*Photinia villosa*
Asclepias sp.	*Heteromeles arbutifolia*	*Quercus alba* [1]
Berlandiera lyrata	*Heuchera sanguinea*	*Quercus pinnata* [1]
Betula alba [1]	*Ilex x meserveae* [1]	*Quercus rubra* [1]
Caladium sp.	*Ilex verticillata* [1]	*Ribes viburnifolium*
Carya illinoensis	*Iris* sp. [1]	*Rudbeckia* sp.
Castanea sativa	*Itea virginica*	*Sedum* sp. [4]
Chasmanthium latifolium	*Kerria japonica*	*Stewartii pseudocamelia*
Cornus amomum [1]	*Lonicera sempervirens*	*Syringa* sp. [1, 2]
Crassula ovata	*Mammillaria melanocentra.*	*Tulipa* sp.
Crassula sp.	*Mammillaria* sp.	*Viburnum odoratissimum* [1]
Crataegus coccinoid	*Muhlenbergia capillaris*	*Viburnum x pragense* [1]
Cupressus arizonica	*Myrica pensylvanica*	*Washingtonia robusta*

[1] Registered already on EPA label.

[2] More information on cultivar differences might be warranted.

[3] Perhaps a single application only could be a label restriction.

[4] Listed in the label under sensitive ornamental plants.

Table 5. Detailed Summary of Crop Safety Testing with Dimethenamid-p.

Notes:Table entries are sorted by crop Latin name. Only those trials with research reports received by 12/12/16 are listed below.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
27074	Abelia (Abelia sp.) A. gaucheri	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
27074	Abelia (Abelia sp.) A. grandiflora	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.97, moderate stunting at 1.94 and 3.88 lb ai per acre.
27074	Abelia (Abelia sp.) A. grandiflora	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.97, slight to moderate stunting at 1.94 and 3.88 lb ai per acre.
27074	Abelia (Abelia sp.) A. grandiflora 'Edward Goucher'	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27074	Abelia (Abelia sp.) 'Edward Goucher'	Field Container	Lieth	CA	2008	Over the top	Slight, acceptable injury and no significant growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26537	Fir, Fraser (Abies fraseri)	Field In-Ground	Ahrens/Mervosh	CT	2007	Over the top	No injury at 0.97 and 1.94 lb ai per acre; moderate injury only after 1st application, with complete recovery, at 3.88 lb ai per acre
26537	Fir, Fraser (Abies fraseri)	Field In-Ground	Beste/Frank (ARS)	MD	2007	Over the top	Results not useful because of severe injury caused by very high temperature and drought conditions
26320	Fir, Fraser (Abies fraseri)	Field Container	Boydston	WA	2007	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26320	Fir, Fraser (Abies fraseri)	Field Container	Freiberger	NJ	2007	Over the top	Slight injury at 0.97, 1.94 and 3.99 lb ai per acre after 1st, moderate after 2nd application
26320	Fir, Fraser (Abies fraseri) 'Roan Mountain'	Field Container	Marshall	MI	2007	Over the top	One application. No injury at 0.97, 1.94 and 3.88 lb ai per acre
27808	Boxelder (Acer negundo L. var. negundo)	Field Container	Freiberger	NJ	2008	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre.
27808	Boxelder (Acer negundo L. var. negundo)	Field Container	Freiberger	NJ	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
27808	Boxelder (Acer negundo L. var. negundo)	Field Container	Jones	OH	2013	Over the top	No injury or significant growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27082	Maple, Japanese (Acer palmatum) 'Atropurpureum'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; reduced marketability for all treatments because of environmental stress
27082	Maple, Japanese (Acer palmatum) 'Atropurpureum'	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable.
26541	Maple, Red (Acer rubrum)	Field In-Ground	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
26194	Maple, Red (Acer rubrum)	Field Container	Freiberger	NJ	2007	Over the top	No injury at 0.97, 1.94 and 3.99 lb ai per acre after 1st, slight after 2nd application
26194	Maple, Red (Acer rubrum)	Field Container	Senesac	NY	2007	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
26194	Maple, Red (Acer rubrum) 'Summer'	Field Container	Gilliam	AL	2008	Over the top	No injury after the first application using 0.97, 1.84 and 3.88 lb ai per acre, but no to moderate injury after the second application increasing with rate; there was also a significant reduction in growth at the highest rate.
27091	Maple (Acer sp.) A. palmatum	Field Container	Ahrens/Mervosh	CT	2009	Over the top	No crop injury or reduction in growth with two applications at 0.97, 1.94, 3.88 lb ai per acre.
27091	Maple (Acer sp.) A. rubrum 'Sun Valley'	Field Container	Mathers (OSU)	OH	2008	Over the top	Significant injury at 0.97, 1.94 and 3.88 lb ai per acre after 1st, none after 2nd application
27091	Maple (Acer sp.) A. saccharinum	Field Container	Derr	VA	2009	Over the top	No significant injury at 0.97 and 1.94, significant at 3.88 lb ai per acre; no growth reduction.
27091	Maple (Acer sp.) Maple Japanese	Field Container	Harvey	WA	2009	Over the top	No injury at 0.97 and 1.94, slight at 3.88 lb ai per acre.
28201	Ohio Buckeye (Aesculus glabra)	Field Container	Persad	OH	2016	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28201	Ohio Buckeye (Aesculus glabra)	Field Container	Siefer	OH	2015	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28468	Lily-Of-The-Nile (Agapanthus sp.) A. africanus 'Big Blue'	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
28468	Lily-Of-The-Nile (Agapanthus sp.) A. africanus 'Peter Pan'	Field Container	Uber	CA	2008	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
28468	Lily-Of-The-Nile (Agapanthus sp.) 'Dwarf Blue'	Field Container	Wilen	CA	2012	Over the top	Slight, acceptable injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
31325	Agave (Agave sp.) A. ellemeetiana ' Santina'	Field Container	Wilen	CA	2013	Over the top	No to minor injury with 21, 42 and 84 fl oz per acre after 1st applic., unacceptable after 2nd application.
31325	Agave (Agave sp.) A. parrasana	Field Container	Villavicencio	CA	2013	Over the top	No injury with 21, minor with 42 and 84, fl oz per acre applied twice; no growth reduction.
31325	Agave (Agave sp.) 'Blue Flame'	Field Container	Villavicencio	CA	2012	Over the top	No injury with 21 and 42 fl oz per acre applied twice, slight discoloration and spotting only with 84 fl oz; no growth reduction.
29172	Mimosa Silk Tree (Albizia julibrissin)	Field Container	Czarnota	GA	2013	Over the top	Results inconclusive due to high injury at 21 fl oz per acre, and moderate injury, but not significant from untreated, with 42 and 84 fl oz.
29172	Mimosa Silk Tree (Albizia julibrissin)	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
31861	Alder (Alnus sp.)	Field Container	Cochran	IA	2016	Over the top	No significant injury with 2.65 and 5.3, moderate with 10.6 lb ai per acre applied twice; no growth reduction.
31324	Aloe (Aloe sp.) A. brevifolia	Field Container	Villavicencio	CA	2013	Over the top	Severe injury (leaf splitting) with 21,42 and 84 fl oz per acre applied twice.
31324	Aloe (Aloe sp.) 'Blue Elf'	Field Container	Villavicencio	CA	2012	Over the top	No injury with 21 fl oz per acre applied twice, slight necrosis with 24 and 84 fl oz; no growth reduction.
31324	Aloe (Aloe sp.) 'Little Gator'	Field Container	Wilen	CA	2014	Over the top	Slight injury with 21, 42 and 84 fl oz per acre; no significant growth reduction.
28222	Serviceberry, Canadian (Amelanchier canadensis)	Field In-Ground	Cochran	IA	2014	Over the top	Moderate injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice; slight growth reduction with 4X.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
28222	Serviceberry, Canadian (Amelanchier canadensis)	Field In-Ground	Cochran	IA	2015	Over the top	Minor injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice; no growth reduction.
28222	Serviceberry, Canadian (Amelanchier canadensis)	Field In-Ground	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29533	Columbine (Aquilegia sp.)	Field Container	Boydston	WA	2013	Over the top	Very slight necrosis with full recovery at 0.98, 1.97, and 3.94 lb ai per acre applied twice; no growth reduction; all plants saleable.
29533	Columbine (Aquilegia sp.) A. canadensis 'Little Lanterns'	Field Container	Senesac	NY	2014	Over the top	Severe injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29533	Columbine (Aquilegia sp.) A. chrysantha	Field Container	Klett	CO	2013	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
29533	Columbine (Aquilegia sp.) A. vulgaris 'Origami Mix'	Field Container	Boydston	WA	2014	Over the top	No significant injury with 0.98 and 1.97, moderate to severe injury (stunting and leaf burn) with 3.94 lb ai per acre applied twice; 1X- and 2X-treated plants marketable.
31084	Manzanita (Arctostaphylos sp.) A. uva ursi 'Massachusetts'	Field Container	DeFrancesco	OR	2016	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice; moderate growth reduction at 4X.
31084	Manzanita (Arctostaphylos sp.) A. uva ursi 'Massachusetts'	Field Container	Senesac	NY	2016	Over the top	Minor to moderate injury with complete recovery with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
32596	Black Chokeberry (Aronia melanocarpa)	Field Container	Cochran	IA	2016	Over the top	Slight to moderate injury with complete recovery with 0.98 and 1.97 lb ai per acre applied twice, moderate injury with 3.94 lb; no growth reduction.
32596	Black Chokeberry (Aronia melanocarpa)	Field Container	Cochran	IA	2017	Over the top	No significant injury with 0.98, moderate with 1.97 and 3.94 lb ai per acre applied twice; no significant growth reduction.
29975	Milkweed (Asclepias sp.) A. incarnata	Field Container	Senesac	NY	2014	Over the top	Slight injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29975	Milkweed (Asclepias sp.) A. sp.	Field Container	Derr	VA	2010	Over the top	Little to no crop injury with 1.0 lb ai per acre. 62 DAT and 14DAT2. Fair to v. good control of longstalked phyllanthus, tasselflower, s. crabgrass.
29975	Milkweed (Asclepias sp.) A. tuberosa	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	Acceptable injury, but moderate to severe growth reduction increasing with rates (0.98, 1.97 and 3.94 lb ai per acre) applied twice.
29975	Milkweed (Asclepias sp.) A. tuberosa	Field Container	Klett	CO	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice; high growth reduction 2X and 4X.
32953	Sprenger's Asparagus Fern (Asparagus densiflorus)	Field Container	Rivera	PR	2014	Over the top	Minor initial injury with quick recovery at 0.98, 1.97 and 3.94 lb ai per acre applied twice.
26283	Barberry (Berberis sp.)	Field Container	Harvey	WA	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26283	Barberry (Berberis sp.) B. thunbergii	Field Container	Uber	CA	2010	Over the top	No significant injury at 0.97, slight to moderate at 1.94 and 3.88 lb ai per acre; no significant growth reduction.
26283	Barberry (Berberis sp.) B. thunbergii 'Amber Glow'	Field Container	Uber	CA	2008	Over the top	Results inconclusive due to environmental stress; no significant injury at 0.97, 1.94 and 3.88 lb ai per acre after 1st application

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
26283	Barberry (Berberis sp.) B. thunbergii 'Atropurpurea'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
26283	Barberry (Berberis sp.) B. thunbergii atropurpureum 'Crimson Pygmy'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	Very slight injury at 0.97, 1.94 and 3.88 lb ai per acre; growth reduction at 2X and 4X but all plants marketable
26283	Barberry (Berberis sp.) B. thunbergii 'Crimson Pigmy'	Field Container	Lieth	CA	2008	Over the top	Unacceptable injury and growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
30152	Japanese Barberry (Berberis thunbergii) B. 'Crimson Pygmy'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Lincoln: Unacceptable crop injury with 32 oz/a.
31085	Chocolate Flower/Lyreleaf Greeneyes (Berlandiera lyrata)	Field Container	Mansue	NJ	2014	Over the top	Acceptable injury with 21, unacceptable injury and stunting with 42 and 84 fl oz per 100 gal applied twice.
29171	Birch, River (Betula nigra)	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice; no reduction in marketability.
29171	Birch, River (Betula nigra)	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No significant injury, growth or marketability reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29171	Birch, River (Betula nigra)	Field Container	DeFrancesco	OR	2011	Over the top	No significant injury after 1st application with 21 and 42 fl oz per acre,, moderate, with good recovery, with 84 fl oz; no significant injury after 2nd application; no growth reduction.
29171	Birch, River (Betula nigra)	Field Container	Neal	NC	2010	Over the top	No crop injury with any rate at any time during the evaluation period.
29171	Birch, River (Betula nigra) B. alba	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
26335	Butterfly Bush (Buddleia davidii) 'Nanho Purple'	Field Container	Wade	SC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26335	Butterfly Bush (Buddleia davidii) 'Royal Red'	Field Container	Fraelich	GA	2007	Over the top	Moderate injury at 0.97, severe at 1.94 and 3.88 lb ai per acre
26335	Butterfly Bush (Buddleia davidii) 'White Ball'	Field Container	Marshall	MI	2007	Over the top	One application. No significant injury at 0.97, 1.94 and 3.88 lb ai per acre
30151	Boxwood, Littleleaf (Buxus microphylla) B. microphylla 'Green velvet'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Lincoln: Unacceptable crop injury with 32 oz/a.
26305	Boxwood (Buxus sp.) B. microphylla 'Faulkner'	Field Container	Klett	CO	2007	Over the top	Two trials; no injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26305	Boxwood (Buxus sp.) B. sinica var. insularis 'Wintergreen'	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26305	Boxwood (Buxus sp.) 'Green Velvet'	Field Container	Marshall	MI	2007	Over the top	One application. No injury at 0.97, 1.94 and 3.88 lb ai per acre
29976	Elephant's-Ear, Angel-Wings (Caladium sp.) C. 'Florida Cardinal'	Field Container	Derr	VA	2010	Over the top	No crop injury with 1.0 lb ai per acre. Fair to v. good control of longstalked phyllanthus, tasselflower, s. crabgrass.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
28727	Bottlebrush (Callistemon sp.)	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice; no reduction in marketability.
28727	Bottlebrush (Callistemon sp.)	Field Container	Denny	MS	2013	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28727	Bottlebrush (Callistemon sp.)	Field Container	Lieth	CA	2010	Over the top	No injury or growth reduction with 0.97, 1.94 and 3.88 lb ai per acre applied twice.
28727	Bottlebrush (Callistemon sp.) 'Little John'	Field Container	Wilen	CA	2012	Over the top	Minor injury with 21, 42 and 84 fl oz per acre after 1st applic; acceptable injury and growth reduction with 1X and 2X, unacceptable with 4X after 2nd applic.
28727	Bottlebrush (Callistemon sp.) 'Little John'	Field Container	Wilen	CA	2012	Over the top	Slight, acceptable injury and growth reduction with 21 and 42, moderate with 84, fl oz per acre applied twice.
27109	Camellia (Camellia sp.) C. japonica	Field Container	Wade	GA	2009	Over the top	No injury or significant growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27109	Camellia (Camellia sp.) C. japonica 'Colonel Fiery'	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
27109	Camellia (Camellia sp.) C. sasanqua ‘White’	Field Container	Trader	MS	2008	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27109	Camellia (Camellia sp.) C. vernalis 'Yuletide'	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.97, 1.84 and 3.88 lb ai per acre.
28707	Sedge, Grassland (Carex divulsa)	Field Container	Wilen	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre; root dry weight significantly reduced at all rates.
28707	Sedge, Grassland (Carex divulsa)	Field Container	Wilen	CA	2010	Over the top	All plants were marketable. Minor chlorisis 4WAT2 with 0.97, 1.94, and 3.88 lb ai per acre increasing with rate.
28707	Sedge, Grassland (Carex divulsa) C. oshimensis 'Evergold'	Field Container	Boydston	WA	2010	Over the top	Two sequential applications of Tower 63.9% EC applied 6 weeks apart at 0.97, 1.94, and at 3.88 lb ai per acre did not injure sedge plants.
28224	Pecan (Non-Bearing) (Carya illinoensis)	Field In-Ground	Cochran	IA	2015	Over the top	Minor injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice; no growth reduction.
28224	Pecan (Non-Bearing) (Carya illinoensis)	Field In-Ground	Cochran	IA	2016	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27420	Blue Beard; Blue Spirea (Caryopteris x clandonensis)	Field Container	Neal	NC	2008	Over the top	No injury at 0.97, 1.94, and 3.88 lb ai per acre.
27420	Blue Beard; Blue Spirea (Caryopteris x clandonensis) 'Longwood Blue'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or flower number reduction, significant growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
27420	Blue Beard; Blue Spirea (Caryopteris x clandonensis) 'Sunshine Blue'	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
28202	European Chestnut (Castanea sativa)	Field Container	Cochran	IA	2015	Over the top	Minor injury with 0.98 and 1.97, moderate with 3.94 lb ai per acre applied twice; no growth reduction.
28202	European Chestnut (Castanea sativa)	Field Container	Cochran	IA	2016	Over the top	No significant injury with 0.98, moderate and severe with 1.97 and 3.94 lb ai per acre applied twice; no growth reduction.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
28203	Madagascar Periwinkle (Catharanthus roseus)	Field Container	Mansue	NJ	2015	Over the top	Moderate injury (petals bleaching and falling) with 21, 42 and 84 fl oz per acre applied twice; no growth reduction.
28203	Madagascar Periwinkle (Catharanthus roseus)	Field Container	Meador	CA	2015	Over the top	Severe injury with 21, 42 and 84 fl oz per acre applied twice.
28203	Madagascar Periwinkle (Catharanthus roseus) 'Pacifica XP Polka Dot'	Field Container	Senesac	NY	2014	Over the top	Severe injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28731	Ceanothus, Maritime (Ceanothus maritimus)	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all treated plants saleable.
28731	Ceanothus, Maritime (Ceanothus maritimus)	Field Container	Lieth	CA	2011	Over the top	Results not conclusive because of suspected product overdose for all treatments; researcher suggested to repeat trial.
28731	Ceanothus, Maritime (Ceanothus maritimus) 'Dark Star'	Field Container	Wilen	CA	2010	Over the top	No crop injury 28 DAT with one application 21, 42, or 84 oz/A but unacceptable injury with two applications for all rates.
29236	Ceanothus (Ceanothus sp.) 'Concha'	Field Container	Wilen	CA	2009	Over the top	No significant injury at 0.97 and 1.94, moderate at 3.88 lb ai per acre; root and shoot dry weights significantly reduced at all rates.
28735	Wild Lilac (Ceanothus x pallida)	Field Container	Lieth	CA	2010	Over the top	No injury with 0.97 and 1.94, very slight with 3.88 lb ai per acre, applied twice; no growth effects.
28735	Wild Lilac (Ceanothus x pallida) C. americanus	Field Container	Czarnota	GA	2013	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
28735	Wild Lilac (Ceanothus x pallida) 'Marie Simon'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all treated plants saleable.
31087	Indian Woodoats (Chasmanthium latifolium)	Field Container	Hanson	CA	2013	Over the top	No injury after 1st applic., slight to moderate injury (leaf necrosis) with 0.97, 1.94 and 3.88 lb ai per acre after 2nd applic.; moderate growth reduction with 2X and 4X.
31087	Indian Woodoats (Chasmanthium latifolium)	Field Container	Mansue	NJ	2013	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
31087	Indian Woodoats (Chasmanthium latifolium)	Field Container	Senesac	NY	2013	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
31087	Indian Woodoats (Chasmanthium latifolium)	Field Container	Wilen	CA	2014	Over the top	Moderate to high injury increasing with rates (21, 42 and 84 fl oz per acre) applied twice.
27820	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.)	Field Container	Mansue	NJ	2014	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
27820	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) ‘Sheffield Pink'	Field Container	Czarnota	GA	2007	Over the top	No significant injury at 0.97 and 1.94 lb ai per acre, significant at 3.88 lb
27820	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) C. x morifolium 'Bolero'	Field Container	Beste/Frank (ARS)	MD	2013	Over the top	No injury or growth reduction or reduction of flower number with 21, 42 and 84 fl oz per acre applied twice; no reduction in marketability.

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27820	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) C. 'Yolanda Yellow'	Field Container	Miller	CA	2016	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice; minor growth reduction.
27820	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) D. zawadskii 'Clara Curtis'	Field Container	Klett	CO	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre after 1st, slight with 4X after 2nd applic.; moderate growth reduction with 4X.
27548	Hardy Mum (Chrysanthemum/Dendranthema x morifolium)	Field Container	Derr	VA	2013	Over the top	No injury or flower rating reduction with 0.98 and 1.97 lb ai per acre applied twice; slight with 3.94 lb.
27548	Hardy Mum (Chrysanthemum/Dendranthema x morifolium) D. zawadskii	Field Container	Klett	CO	2013	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
27548	Hardy Mum (Chrysanthemum/Dendranthema x morifolium) 'Dazzler Stacy'	Field Container	Derr	VA	2007	Over the top	0, 1, and 6 % injury at 1, 2 and 4 lb ai per acre; 100 % control of rice flatsedge and fragrant flatsedge
26316	Yellowwood (Cladrastis sp.) C. kentukea	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	Slight injury with good recovery at 0.98 and 1.97, moderate injury at 3.94 lb ai per acre; no significant growth reduction. Reduced market value at 4X rate.
26316	Yellowwood (Cladrastis sp.) C. kentukea	Field Container	Freiberger	NJ	2007	Over the top	No significant injury at 0.97, 1.94 and 3.99 lb ai per acre after 1st, Minor at 2X and 4X after 2nd application
26316	Yellowwood (Cladrastis sp.) C. kentukea	Field Container	Mathers (OSU)	OH	2011	Over the top	Significant crop injury (leaf burn) with 1.94 and 3.88 lb ai per acre
27115	Leather Flower (Clematis sp.)	Field Container	Harvey	WA	2009	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre.
27115	Leather Flower (Clematis sp.) C. integrifolia	Field Container	Klett	CO	2008	Over the top	Trial 1: No injury at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction
27115	Leather Flower (Clematis sp.) C. integrifolia	Field Container	Klett	CO	2008	Over the top	Trial 2: No injury at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction
27115	Leather Flower (Clematis sp.) 'Gillian Blades' and others	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants saleable.
27120	Costal Sweetpepperbush (Clethra alnifolia)	Field Container	Ahrens/Mervosh	CT	2011	Over the top	No crop injury with two sequential applications at 0.97, 1.94, or 2.65 lb ai per acre.
27120	Costal Sweetpepperbush (Clethra alnifolia)	Field Container	Gilliam	AL	2010	Over the top	Injury unrelated to treatments (0.97, 1.94, 3.88 lb ai per acre) observed in all plants. Significant injury with 4x at 2WAT2 and stunting with 2x.
27120	Costal Sweetpepperbush (Clethra alnifolia) C. alnifolia 'Sixteen Candles'	Field Container	Neal	NC	2010	Over the top	Significant crop injury (necrosis followed by stunting) with 2x and 4x rates (1.94 and 3.88 lb ai per acre).
27380	Dogwood, Silky (Cornus amomum)	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
21424	Dogwood, Silky (Cornus amomum)	Field In-Ground	Garrett	MD	2001		
27380	Dogwood, Silky (Cornus amomum)	Field Container	Senesac	NY	2011	Over the top	Minor injury with two applications at 0.97, 1.94, and 3.88 lb aia but all plants marketable.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
27125	Dogwood, Flowering (Cornus florida)	Field Container	Ahrens/Mervosh	CT	2008	Over the top	Slight injury at 0.98, moderate to severe at 1.97 and 3.94 lb ai per acre after 2nd application; 1st application rates were 3.8 times higher than protocol rates.
27125	Dogwood, Flowering (Cornus florida)	Field Container	Ahrens/Mervosh	CT	2009	Over the top	Two applications at 0.97, 1.94, 3.88 lb ai per acre appear to be safe although 1x caused early injury. Powdery mildew problem made it difficult to rate and suggests tolerance be investigated further.
27125	Dogwood, Flowering (Cornus florida)	Field Container	Freiberger	NJ	2009	Over the top	Slight injury at 0.97 and 1.94. moderate at 3.88 lb ai per acre.
28862	Dogwood, Kousa (Cornus kousa)	Field Container	Ahrens/Mervosh	CT	2009	Over the top	No crop injury with two application at 0.97, 1.94, 3.88 lb ai per acre.
28862	Dogwood, Kousa (Cornus kousa)	Field Container	Ahrens/Mervosh	CT	2011	Over the top	Little to no crop injury with two sequential applications at 0.97, 1.94 or 2.65 lb ai per acre.
28862	Dogwood, Kousa (Cornus kousa)	Field Container	DeFrancesco	OR	2010	Over the top	All rates (0.97, 1.94, 3.88 lb ai per acre) exhibited minor but statistically different from the untreated with one and two applications.
28862	Dogwood, Kousa (Cornus kousa) C. kousa 'Milky Way'	Field Container	Mathers (OSU)	OH	2010	Over the top	Ohio: Data inconclusive because untreated exhibited injury.
28862	Dogwood, Kousa (Cornus kousa) 'Chinensis'	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre; reduced growth and marketability with 4X.
27379	Dogwood, Red Osier (Cornus sericea)	Field Container	Freiberger	NJ	2009	Over the top	Slight injury but some plant death at 0.97, 1.94 and 3.88 lb ai per acre.
21425	Dogwood, Red Osier (Cornus sericea)	Field In-Ground	Garrett	MD	2001		
27379	Dogwood, Red Osier (Cornus sericea)	Field Container	Peachey	OR	2013	Over the top	Slight injury and growth reduction with 21, moderate with 42 and 84 fl oz per acre, applied twice.
21425	Dogwood, Red Osier (Cornus sericea)	Field In-Ground	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27379	Dogwood, Red Osier (Cornus sericea)	Field Container	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27419	Cotoneaster (Cotoneaster dammeri)	Field Container	Neal	NC	2010	Over the top	No injury at 1x (0.97 lb ai per acre), injury with 2x only immediately following retreatment, significant injury with 4x.
27419	Cotoneaster (Cotoneaster dammeri) 'Royal Beauty'	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre appplied twice; no effect on marketability.
27130	Cotoneaster (Cotoneaster sp.) C. dammeri 'Lowfast'	Field Container	Regan	WA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre after 1st, slight to high injury increasing with rates after 2nd application; significant growth reduction.
27130	Cotoneaster (Cotoneaster sp.) C. glaucaphyllus	Field Container	Uber	CA	2008	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre; significant growth reduction at 4X
27130	Cotoneaster (Cotoneaster sp.) C. horizontalis 'Perpusillus'	Field Container	Lieth	CA	2008	Over the top	Phytotoxicity data inconclusive, significant growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27130	Cotoneaster (Cotoneaster sp.) C. pameyii	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31088	Pygmyweed (Crassula sp.)	Field Container	Gilliam	AL	2015	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
31088	Pygmyweed (Crassula sp.) C. ovata	Field Container	Villavicencio	CA	2012	Over the top	Slight to moderate reddish leaf color with 21, 42 and 84 fl oz per acre applied twice, slight necrosis at 1X and 2X, moderate at 4X; moderate growth reduction.
27135	Hawthorn (Crataegus sp.) C. coccinoid	Field Container	Freiberger	NJ	2009	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre.
27135	Hawthorn (Crataegus sp.) C. mollis	Field Container	Jones	OH	2013	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27140	Japanese Cedar (Cryptomeria japonica) 'Black Dragon'	Field Container	Neal	NC	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
27140	Japanese Cedar (Cryptomeria japonica) C. japonica	Field Container	Mickelbart	IN	2009	Over the top	No significant differences in treated (21,42,84 fl oz/A) for height, width, % growth 12 WAT. The high rate did cause significant phytotoxicity rating at 6WAT.
27140	Japanese Cedar (Cryptomeria japonica) 'Yoshino'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.97, moderate at 1.94 and severe at 3.88 lb ai per acre
30565	Cypress, Leyland (Cupressocyparis leylandii)	Field Container	Beste	MD	2015	Over the top	No injury with 0.98 and 1.97 lb ai per acre, minor with 3.94 lb ai after 2nd applic with complete recovery; no growth reduction.
30565	Cypress, Leyland (Cupressocyparis leylandii)	Field Container	Witcher	TN	2016	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27382	Cypress (Cupressus sp.)	Field Container	Uber	CA	2011	Over the top	No crop injury or reduction in growth with 0.97, 1,94, 3.88 lb ai per acre.
27382	Cypress (Cupressus sp.) C. arizonica 'Carolina Sapphire'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.98 and 1.97, slight at 3.94 lb ai per acre
30833	Delosperma (Delosperma sp.) 'Cooper's Ice'	Greenhouse	Wilen	CA	2012	Over the top	No injury with 21 and 32 fl oz per acre; poor liverwort control.
31089	Delosperma (Delosperma sp.) D. congestum 'White Nugget'	Field Container	Klett	CO	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre after 1st, very slight with 4X after 2nd applic.; moderate growth reduction with 2X and 4X.
31089	Delosperma (Delosperma sp.) D. cooperi	Field Container	Derr	VA	2013	Over the top	Slight injury but no flower count reduction at 0.98, 1.97 and 3.94 lb ai per acre applied twice.
30833	Delosperma (Delosperma sp.) D. cooperi 'Fire Spinner'	Greenhouse	Derr	VA	2012	Over the top	Minor initial injury, with complete recovery, at 21 and 32 fl oz per 100 gal w/ or w/o irrigation. Acceptable liverwort control only with high rate w/o irrig.
31089	Delosperma (Delosperma sp.) D. cooperi 'Purple Mountain'	Field Container	Boydston	WA	2014	Over the top	No significant injury or growth reduction with 0.98, slight and moderate with 1.97 and 3.94 lb ai per acre applied twice; 1X- and 2X-treated plants marketable.
31089	Delosperma (Delosperma sp.) D. nubigenum 'Basutoland'	Field Container	Senesac	NY	2013	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
31089	Delosperma (Delosperma sp.) 'Fire Spinner'	Field Container	Derr	VA	2013	Over the top	Very minor injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.

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32599	Distylium (Distylium sp.)	Field Container	Neal	NC	2016	Over the top	No injury or growth reduction with 0.98 lb ai per acre applied twice; moderate with 1.96 and 3.92 lb ai per acre after 2nd applic.
30529	Fern, Shaggy Shield (Dryopteris cycadina)	Field Container	Neal	NC	2013	Over the top	Slight injury with 21 and 42, moderate with 84, fl oz per acre applied twice.
30529	Fern, Shaggy Shield (Dryopteris cycadina)	Field Container	Peachey	OR	2013	Over the top	No injury with 21 and 42, moderate with 84 fl oz per acre, applied twice; no growth reduction.
30528	Fern, Autumn (Dryopteris erythrosora)	Field Container	Senesac	NY	2013	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
30528	Fern, Autumn (Dryopteris erythrosora) 'Brilliance'	Field Container	Neal	NC	2013	Over the top	Virtually no injury with 21, moderate with 42 and 84, fl oz per acre applied twice.
31207	Echeveria (Echeveria sp.) 'Blue 2'	Field Container	Wilen	CA	2016	Over the top	Moderate to severe injury with 21, 42 and 84 fl oz per acre applied twice.
31207	Echeveria (Echeveria sp.) E. shaviana 'Black Prince'	Field Container	Senesac	NY	2016	Over the top	Minor injury with 0.98, moderate with 1.97 and 3.94 lb ai per acre applied twice.
31207	Echeveria (Echeveria sp.) 'Imbricata'	Field Container	Villavicencio	CA	2012	Over the top	Severe necrosis and moderate discoloration with 21, 42 and 84 fl oz per acre applied twice; significant growth reduction.
29534	Purple Coneflower (Echinacea sp.)	Field Container	Mansue	NJ	2013	Over the top	Trial not conducted because plants did not develop correctly.
29534	Purple Coneflower (Echinacea sp.) E. purpurea alba	Field Container	Klett	CO	2013	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
29534	Purple Coneflower (Echinacea sp.) 'Magnus'	Field Container	Boydston	WA	2013	Over the top	No injury or growth reduction with 0.98 and 1.97 lb ai per acre applied twice; moderate with 3.94 lb; 4X plants not saleable.
31208	Golden Barrel Cactus (Echinocactus grusonii)	Field Container	Uber	CA	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
31208	Golden Barrel Cactus (Echinocactus grusonii)	Field Container	Villavicencio	CA	2012	Over the top	Very minor spotting with 21, 42 and 84 fl oz per acre applied twice; slight chlorosis and growth reduction only at 4X.
31208	Golden Barrel Cactus (Echinocactus grusonii)	Field Container	Villavicencio	CA	2013	Over the top	No injury with 21 and 42, very minor chlorosis with 84, fl oz per acre applied twice; very slight growth reduction only at 4X.
32600	Enkianthus (Enkianthus sp.)	Field Container	Neal	NC	2016	Over the top	No injury with 0.98, moderate to severe with 1.96 and 3.92 lb ai per acre applied twice; no growth reduction. High incidence of Phytophthora root rot in plants in this study.
28711	Hummingbird Trumpet (Epilobium canum)	Field Container	Klett	CO	2015	Over the top	plants failed to thrive
28711	Hummingbird Trumpet (Epilobium canum)	Field Container	Wilen	CA	2009	Over the top	Moderate to high injury increasing with rates (0.97, 1.94 and 3.88 lb ai per acre); root and shoot dry weights significantly reduced at all rates.
27145	Burning Bush (Euonymus alatus) E. alatus 'Compactus'	Field Container	Boydston	WA	2008	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable

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28205	Wintercreeper (Euonymus fortunei) 'Coloratus'	Field Container	Boydston	WA	2014	Over the top	No significant injury or growth reduction with 0.98 and 1.97, slight with 3.94 lb ai per acre applied twice; all treated plants marketable.
28205	Wintercreeper (Euonymus fortunei) 'Emerald N Gold'	Field Container	DeFrancesco	OR	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice; moderate growth reduction at all rates.
28205	Wintercreeper (Euonymus fortunei) 'Ivory Jade'	Field Container	Beste	MD	2014	Over the top	No injury or growth reduction with 0.97, 1.91 and 3.84 lb ai per acre applied twice; no reduction in marketability.
30566	Spindle Tree, Japanese (Euonymus japonicus)	Field Container	Peachey	OR	2013	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
30566	Spindle Tree, Japanese (Euonymus japonicus)	Field Container	Uber	CA	2013	Over the top	No injury with 21 and 42, minor with 84, fl oz per acre applied twice; no growth reduction.
30566	Spindle Tree, Japanese (Euonymus japonicus) E. japonica 'Elata'	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
27273	Beech (Fagus sp.)	Field Container	Freiberger	NJ	2012	Over the top	No sufficient data collected because plants never broke dormancy and died, or died before trial conclusion.
27273	Beech (Fagus sp.) F. grandifolia	Field Container	Peachey	OR	2013	Over the top	Phytotoxicity determination inconclusive; no growth reduction with 21, 42 and 84 fl oz per acre applied twice.
27273	Beech (Fagus sp.) F. grandifolia	Field Container	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27273	Beech (Fagus sp.) F. sylvatica	Field Container	DeFrancesco	OR	2014	Over the top	Injury results unreliable; moderate growth reduction with 21, 42 and 84 fl oz per 100 gal.
27273	Beech (Fagus sp.) F. sylvatica	Field Container	Jones	OH	2013	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28257	Forsythia (Forsythia sp.)	Field Container	Freiberger	NJ	2012	Over the top	No injury after the 1st application with 21, 42 and 84 fl oz per acre; slight injury (leaf burn) with 1X and 2X, moderate with 4X after 2nd application.
28257	Forsythia (Forsythia sp.) F. × intermedia ‘Lynwood Gold’	Field Container	Gilliam	AL	2013	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
28257	Forsythia (Forsythia sp.) F. x intermedia 'Golden Bell'	Field Container	Mickelbart	IN	2008	Over the top	No injury at 2.65, 5.3 and 10.6 lb ai per acre with single application 3 weeks after transplanting.
28257	Forsythia (Forsythia sp.) 'Lynwood Gold'	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
28206	Dwarf Fothergilla (Fothergilla gardenii)	Field Container	Beste	MD	2016	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28206	Dwarf Fothergilla (Fothergilla gardenii) 'Mount Airy'	Field Container	Senesac	NY	2016	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
21426	Ash, Green (Fraxinus pennsylvanica)	Field In-Ground	Garrett	MD	2001		
26258	Ash (Fraxinus sp.) F. americana	Field In-Ground	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
31090	Gardenia (Gardenia sp.) G. jasmonoides 'Frostproof'	Field Container	Witcher	TN	2016	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
31090	Gardenia (Gardenia sp.) G. veitchii	Field Container	Uber	CA	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.

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29535	Beeblossom, Lindheimer's (Gaura lindheimeri) 'Belleza White Evolution'	Field Container	Klett	CO	2014	Over the top	No injury or significant growth reduction with 21, 42 and 84 fl oz per acre applied twice.
29535	Beeblossom, Lindheimer's (Gaura lindheimeri) 'Crimson Butterflies'	Field Container	Senesac	NY	2014	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29535	Beeblossom, Lindheimer's (Gaura lindheimeri) 'Whirling Butterflies'	Field Container	Boydston	WA	2014	Over the top	No significant injury with 0.98 and 1.97, moderate injury with good recovery at 3.94 lb ai per acre applied twice; slight growth reduction at all rates; all treated plants marketable.
27151	Locust (Gleditsia sp.) G. triacanthos L. 'Inermis'	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in growth with two applications at 1.97 and 3.94 lb ai per acre.
26230	Locust (Gleditsia sp.) G. tricanthos	Field In-Ground	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
27151	Locust (Gleditsia sp.) Gleditsia triacanthos	Field Container	Mathers (OSU)	OH	2009	Over the top	Acceptable injury at 0.97, 1.94 and 3.88 lb ai per acre after 1st, no injury after 2nd application; no growth reduction
29168	Daylily (Hemerocallis sp.)	Field Container	Rivera	PR	2014	Over the top	Minor initial injury with quick recovery at 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29168	Daylily (Hemerocallis sp.)	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
29168	Daylily (Hemerocallis sp.) 'Green Flutter'	Field Container	Senesac	NY	2010	Over the top	Slight crop injury with two applications at 0.97, 1.94, 3.88 recovering during latter half of evaluation period.
29168	Daylily (Hemerocallis sp.) 'H. Happy Returns'	Field Container	Derr	VA	2010	Over the top	No crop injury with 1.0, 2.0, 4.0 lb ai per acre 19 and 33 DAT and 4DAT2. Excellent control of spotted spurge with 2-4.0 lb ai per acre 19 and 33DAT.
29168	Daylily (Hemerocallis sp.) H. sp. 'Stella d'Oro'	Field Container	Mathers (OSU)	OH	2010	Over the top	Ohio: Little to no crop injury to 'Stella d'Oro at 0.97, 1.94, and 3.88 lb ai per acre.
29168	Daylily (Hemerocallis sp.) H. sp. 'Strawberry Candy'	Field Container	Mathers (OSU)	MI	2010	Over the top	Lincoln: Minor stunting at higher rates (1.94, 3.88 lb ai per acre).
29168	Daylily (Hemerocallis sp.) H. 'Stella d'Oro'	Field Container	Boydston	WA	2011	Over the top	No crop injury or reduction in growth with two applications at 0.97, 1.94, 3.88 lb ai per acre.
30838	Daylily (Hemerocallis sp.) 'Happy Returns' & 'Stella de Oro'	Greenhouse	Ahrens/Mervosh	CT	2012	Over the top	Virtually no injury with 21, 42 and 84 fl oz per acre applied once.
29168	Daylily (Hemerocallis sp.) 'Stella de' Oro'	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all treated plants saleable.
28743	Toyon (Heteromeles arbutifolia)	Field Container	Wilen	CA	2009	Over the top	Moderate injury at 0.97, 1.94 and 3.88 lb ai per acre; root and shoot dry weights not significantly reduced.
30671	Coral Bells (Heuchera sanguinea) 'Bressingham'	Field Container	Senesac	NY	2014	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
30671	Coral Bells (Heuchera sanguinea) 'Firefly'	Field Container	Boydston	WA	2014	Over the top	Slight injury with good recovery with 0.98 and 1.97, moderate injury with 3.94 lb ai per acre applied twice; 1X- and 2X-treated plants marketable.
30671	Coral Bells (Heuchera sanguinea) 'Pink Lipstick'	Field Container	Klett	CO	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre after 1st, very slight with 4X after 2nd applic.; moderate growth reduction with 4X.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
30671	Coral Bells (Heuchera sanguinea) 'Ruby Bells'	Field Container	Beste	MD	2014	Over the top	No significant injury or growth reduction with 0.98, 1.96 and 3.89 lb ai per acre applied twice; no reduction in marketability.
26298	Rosemallow (Hibiscus sp.)	Field Container	Harvey	WA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
26298	Rosemallow (Hibiscus sp.)	Field Container	Rivera	PR	2014	Over the top	Minor initial injury with quick recovery at 0.98, 1.97 and 3.94 lb ai per acre applied twice.
26298	Rosemallow (Hibiscus sp.) H. moscheuto	Field Container	Senesac	NY	2008	Over the top	Slight injury at 0.98, moderate at 1.98 and 3.94 lb ai per acre
26298	Rosemallow (Hibiscus sp.) H. rosa-sinensis 'White Wing'	Field Container	Uber	CA	2009	Over the top	Slight injury at 0.97 and 1.94, unacceptable at 3.88 lb ai per acre.
26298	Rosemallow (Hibiscus sp.) H. syriacus 'Blue Satin'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury at 0.97 and 1.94, very slight at 3.88 lb ai per acre; no growth or flower number reduction, all plants marketable
26298	Rosemallow (Hibiscus sp.) H. syriacus 'Red Heart'	Field Container	Freiberger	NJ	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
26298	Rosemallow (Hibiscus sp.) 'Rose Queen'	Field Container	Wade	SC	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre; moderate stunting at 2X and 4X to make plants unsaleable
30842	Plantain Lily (Hosta sp.) ‘Blue Hawaii’	Greenhouse	Derr	VA	2013	Over the top	Low injury with 21 and 32 fl oz per acre w/ or w/o irrigation. High liverwort control at both rates w/o irrig.
30672	Plantain Lily (Hosta sp.) ‘Fortunei Aureomarginata’	Field Container	Boydston	WA	2013	Over the top	No injury or growth reduction with 0.98, 1.97, and 3.94 lb ai per acre applied twice; all plants saleable.
30672	Plantain Lily (Hosta sp.) H. fortunei 'Francee'	Field Container	Fraelich	GA	2013	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice; all plants marketable.
30672	Plantain Lily (Hosta sp.) H. fortunei 'Francee'	Field Container	Mansue	NJ	2013	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
30842	Plantain Lily (Hosta sp.) H. fortunei 'Gold Standard'	Greenhouse	Ahrens/Mervosh	CT	2012	Over the top	Slight injury with 21, 42 and 84 fl oz per acre applied once.
30672	Plantain Lily (Hosta sp.) H. fortunei 'Gold Standard'	Field Container	Senesac	NY	2014	Over the top	Minor injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
30672	Plantain Lily (Hosta sp.) 'Wide Brim'	Field Container	Reding	OH	2014	Over the top	No significant injury with 0.98 and 1.47, slight with 3.94, lb ai per acre applied twice; no significant growth reduction; all plants marketable.
26250	Hydrangea (Hydrangea sp.)	Field Container	Ahrens/Mervosh	CT	2011	Over the top	Little to no crop injury or reduction in growth with two sequential applications at 0.97, 1.94 or 3.88 lb ai per acre.
26250	Hydrangea (Hydrangea sp.)	Field Container	Mathers (OSU)	OH	2007		Moderate to significant yellowing and stunting increasing with rate.
26250	Hydrangea (Hydrangea sp.)	Field Container	Rivera	PR	2014	Over the top	Minor injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice; no growth reduction.
26250	Hydrangea (Hydrangea sp.) 'Angel Robe'	Field Container	Lieth	CA	2007	Over the top	Unacceptable injury at 0.97, 1.94 and 3.88 lb ai per acre.
30150	Hydrangea (Hydrangea sp.) H. arborescens 'Invincibelle amorences'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Slight crop injury decreasing with time from 32 oz/A.

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26250	Hydrangea (Hydrangea sp.) H. macrophylla ‘Nikko Blue’	Field Container	Czarnota	GA	2007	Over the top	No significant injury at 0.97 and 1.94 lb ai per acre, significant at 3.88 lb
30150	Hydrangea (Hydrangea sp.) H. macrophylla 'Endless Summer'	Greenhouse	Ahrens/Mervosh	CT	2012	Over the top	Slight injury with 21 and 42, moderate with 84 fl oz per acre applied once.
26250	Hydrangea (Hydrangea sp.) H. macrophylla 'Endless Summer'	Field Container	Wade	SC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26250	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	No injury at 0.97 and 1.94, slight injury with complete recovery at 3.88 lb ai per acre; all plants marketable
26250	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	Field Container	Fraelich	GA	2007	Over the top	Slight to moderate injury (chlorosis) at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
26250	Hydrangea (Hydrangea sp.) H. paniculata 'PeeGee'	Field Container	Mickelbart	IN	2008	Over the top	No injury at 2.65, 5.3 and 10.6 lb ai per acre with single application 3 weeks after transplanting.
26250	Hydrangea (Hydrangea sp.) H. quercifolia 'Alice'	Field Container	Senesac	NY	2007	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre
31091	Candytuft (Iberis sp.)	Field Container	Uber	CA	2013	Over the top	Moderate to severe injury increasing with rates (21, 42 and 84 fl oz per acre) applied twice.
31091	Candytuft (Iberis sp.) 'Candytuft'	Field Container	Boydston	WA	2013	Over the top	No injury or growth reduction with 0.98, 1.97, and 3.94 lb ai per acre applied twice; all plants saleable.
31091	Candytuft (Iberis sp.) Iberis sempervirens	Field Container	Klett	CO	2013	Over the top	Slight injury and growth reduction with 21, severe with 42 and 84 fl oz per acre applied twice.
28204	Inkberry (Ilex glabra) 'Shamrock'	Field Container	Mervosh	CT	2015	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice. Horseweed control excellent.
28204	Inkberry (Ilex glabra) 'Shamrock'	Field Container	Neal	NC	2015	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
28204	Inkberry (Ilex glabra) 'Shamrock'	Field Container	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
26331	Holly (Ilex sp.) ‘Conaf’	Field Container	Czarnota	GA	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26331	Holly (Ilex sp.) I. cornuta 'Bufordii Nana'	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26331	Holly (Ilex sp.) I. cornuta 'Carissa'	Field Container	Fraelich	GA	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26331	Holly (Ilex sp.) I. cornuta 'Needlepoint'	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
26331	Holly (Ilex sp.) I. crenata 'Compacta'	Field Container	Wade	SC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26331	Holly (Ilex sp.) I. verticillata 'Winter Gold'	Field Container	Senesac	NY	2007	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre
30153	Holly, Blue (Ilex x meserveae) I. 'China Girl'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Moderate crop injury with 32 oz per acre.
31898	Iris (Iris sp.)	Field In-Ground	Senesac	NY	2014	Over the top	Trial not completed due to crop failure; will be repeated in 2015.
31898	Iris (Iris sp.) ‘Blue Diamond’	Field In-Ground	Miller	WA	2015	Over the top	Moderate injury (less flowers, lower bulb weight) with 21, 42 and 84 fl oz per acre applied twice.

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31898	Iris (Iris sp.) 'Blue Diamond'	Field In-Ground	Miller	WA	2016	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice; slight reduction of total bulb weight at 4X.
31898	Iris (Iris sp.) I. reticulata	Field In-Ground	Senesac	NY	2015	Over the top	No injury with 0.97 and 1.94, slight with 3.88 lb ai per acre applied twice.
28207	Virginia Sweetspire (Itea virginica) 'Henry's Garnet'	Field Container	Gilliam	AL	2014	Over the top	No foliar injury, but slight to severe growth reduction, with 21, 42 and 84 fl oz per acre applied twice; only 1X plants marketable.
28207	Virginia Sweetspire (Itea virginica) 'Henry's Garnet'	Field Container	Marble	FL	2016	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice; slight to moderate growth reduction; all plants marketable.
28207	Virginia Sweetspire (Itea virginica) 'Henrys Garnet'	Field Container	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
19628	Walnut, Black (Non-Bearing) (Juglans nigra)	Field In-Ground	Beste/Frank (ARS)	MD	2008	Over the top	Virtually no injury at 0.97, 1.94 and 3.88 lb ai per acre; growth reduction only at 4X; all plants marketable
27377	Walnut, Black (Non-Bearing) (Juglans nigra)	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	Data not reliable. No significant injury at 0.97 and 1.94, moderate at 3.88 lb ai per acre.
19628	Walnut, Black (Non-Bearing) (Juglans nigra)	Field In-Ground	Beste/Frank (ARS)	MD	2010	Over the top	No significant injury with 0.98, moderate initial injury with good recovery at 1.97 and 3.94 lb ai per acre applied twice; significant height reduction increasing with rates; plants marketable.
19628	Walnut, Black (Non-Bearing) (Juglans nigra)	Field In-Ground	Beste/Frank (ARS)	MD	2011	Over the top	No significant injury or growth reduction with 0.99, 1.97 and 3.94 lb ai per acre applied twice; plants marketable.
27377	Walnut, Black (Non-Bearing) (Juglans nigra)	Field Container	Freiberger	NJ	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
27377	Walnut, Black (Non-Bearing) (Juglans nigra)	Field Container	Senesac	NY	2011	Over the top	No crop injury with two applications at 0.97, 1.94, and 3.88 lb aia.
26268	Juniper (Juniperus sp.)	Field Container	Harvey	WA	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26268	Juniper (Juniperus sp.)	Field Container	Mathers (OSU)	OH	2007	Over the top	No injury observed.
26268	Juniper (Juniperus sp.) J. chinensis 'Sea Green'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
26268	Juniper (Juniperus sp.) J. chinensis 'Sea Green'	Field Container	Mickelbart	IN	2008	Over the top	No injury at 2.65, 5.3 and 10.6 lb ai per acre with single application 3 weeks after transplanting.
26268	Juniper (Juniperus sp.) J. communis 'Gold Totem Pole'	Field Container	Senesac	NY	2007	Over the top	Virtually no injury at 0.97, 1.94 and 3.88 lb ai per acre
26268	Juniper (Juniperus sp.) J. davunica 'Parsonii'	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26268	Juniper (Juniperus sp.) J. horizontalis 'Youngstown'	Field Container	Regan	OR	2007	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26268	Juniper (Juniperus sp.) J. squamata 'Blue Star'	Field Container	Ahrens/Mervosh	CT	2007	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre

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31092	Japanese Rose (Kerria japonica) K. japonica 'Pleniflora'	Field Container	Senesac	NY	2013	Over the top	Minor injury with complete recovery with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
26339	Crape Myrtle (Lagerstroemia indica)	Field Container	Fraelich	GA	2007	Over the top	Slight injury at 0.97, moderate at 1.94 and 3.88 lb ai per acre
26339	Crape Myrtle (Lagerstroemia indica) 'Catawea'	Field Container	Wade	SC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26339	Crape Myrtle (Lagerstroemia indica) 'Dynamite'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	Slight injury after 1st application, with quick recovery at 0.97, 1.94 and 3.88 lb ai per acre; significant growth reduction at 4X but all plants marketable
26339	Crape Myrtle (Lagerstroemia indica) L. x 'Muskogee'	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
27312	Lantana (Lantana sp.) L. camara 'Dwarf Radiation'	Field Container	Lieth	CA	2009	Over the top	No significant crop injury with two applications at 0.97, 1.94, 3.88 lb aia during 10 week trial.
27312	Lantana (Lantana sp.) L. montevidensis 'Lynwood Gold'	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
27312	Lantana (Lantana sp.) 'New Gold'	Field Container	Czarnota	GA	2007	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per
27312	Lantana (Lantana sp.) 'New Gold'	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.97, 1.84 and 3.88 lb ai per acre.
27169	Lavender (Lavandula sp.) L. angustifolia 'Hidcote'	Field Container	Boydston	WA	2009	Over the top	No injury at 0.97 and 1.94, moderate at 3.88 lb ai per acre; all treated plants saleable.
27169	Lavender (Lavandula sp.) L. angustifolia 'Munstead'	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.97 and 1.94, moderate stunting at 3.88 lb ai per acre.
27169	Lavender (Lavandula sp.) L. angustifolia 'Munstead'	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27169	Lavender (Lavandula sp.) L. intermedia 'Provence'	Field Container	Boydston	WA	2008	Over the top	No injury at 0.97 and 1.94, slight at 3.88 lb ai per acre; no growth reduction; all plants marketable
27169	Lavender (Lavandula sp.) 'Munstead'	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
31093	Max Chrysanthemum (Leucanthemum maximum) 'Alaska'	Field Container	Derr	VA	2013	Over the top	Virtually no injury with 0.98 and 1.97, minor with 3.94, lb ai per acre applied twice.
31093	Max Chrysanthemum (Leucanthemum maximum) L. x superbum 'Becky'	Field Container	DeFrancesco	OR	2014	Over the top	No to slight injury with 21, 42 and 84 fl oz per acre applied twice; no growth reduction.
31093	Max Chrysanthemum (Leucanthemum maximum) L. x superbum 'Becky'	Field Container	Senesac	NY	2013	Over the top	Minor injury with complete recovery at 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27174	Doghobble (Leucothoe sp.) L. (or Agarista) populifolia	Field Container	Derr	VA	2011	Over the top	Little to no injury with 1, 2, 4 lb ai per acre. Excellent control of s. crabgrass, but no control of redroot pigweed, annual sedge, or doveweed with 1 lb ai per acre.

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27174	Doghobble (Leucothoe sp.) L. fontanesiana	Field Container	Mickelbart	IN	2009	Over the top	There were no treatment effects on growth ratings with 21, 42, 84 fl. Oz./A. Phytotoxicity was observed after first and second application but by 6WAT only the high rate was significantly different from the untreated.
27174	Doghobble (Leucothoe sp.) L. fontanesiana 'Rainbow'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all treated plants saleable.
27383	Privet (Ligustrum sp.) L. lucidum	Field Container	Uber	CA	2008	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre; significant growth reduction at 4X
27383	Privet (Ligustrum sp.) L. vulgare	Field Container	Freiberger	NJ	2008	Over the top	Slight injury at 0.97 and 1.94, moderate at 3.88 lb ai per acre
27383	Privet (Ligustrum sp.) L. x vicaryi	Field Container	Senesac	NY	2009	Over the top	No injury at 0.97, very slight at 1.9 and 3.9 lb ai per acre after 2nd application.
32213	Honeysuckle (Lonicera sp.) L. nitida 'Edmee Gold'	Field Container	Gilliam	AL	2016	Over the top	Injury considered unacceptable with 21, 42 and 84 fl oz per acre applied twice, although 1X and 2X not significant from untreated check.
32213	Honeysuckle (Lonicera sp.) L. nitida 'Lemon Beauty'	Field Container	DeFrancesco	OR	2014	Over the top	No injury with 21 and 42 fl oz per 100 gal applied twice, slight with 84 fl oz at end of trial; moderate to severe growth reduction.
32213	Honeysuckle (Lonicera sp.) L. sempervirens 'Alabama'	Field Container	Senesac	NY	2016	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
26368	Loropetalum (Loropetalum sp.)	Field Container	Derr	VA	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre.
26368	Loropetalum (Loropetalum sp.) L. chinense rubrum	Field Container	Czarnota	GA	2007	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre
26368	Loropetalum (Loropetalum sp.) L. chinense rubrum	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26368	Loropetalum (Loropetalum sp.) L. chinensis 'Ruby'	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.97, slight to moderate stunting at 1.94 and 3.88 lb ai per acre.
26312	Magnolia (Magnolia sp.) M. grandiflora 'Alta'	Field Container	Wade	SC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26312	Magnolia (Magnolia sp.) M. stellata 'Centennial'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
26312	Magnolia (Magnolia sp.) M. virginiana	Field Container	Fraelich	GA	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
27185	Apple (Malus sp.) M. domestica	Field Container	DeFrancesco	OR	2011	Over the top	No injury after 1st application with 21, very slight, with complete recovery, with 42 and 84 fl oz per acre; no injury after 2nd application; no growth reduction.
27185	Apple (Malus sp.) 'M.domestica'	Field Container	Mathers (OSU)	OH	2009	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre.
27185	Apple (Malus sp.) 'Prairie Fire'	Field Container	Jones	OH	2013	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27185	Apple (Malus sp.) 'Spring Snow'	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all treated plants saleable

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31086	Globe Cactus (Mammillaria sp.)	Field Container	Meador	CA	2015	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
31086	Globe Cactus (Mammillaria sp.) Mammillaria melanocentra	Field Container	Uber	CA	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
28212	Muhly, Hairyawn (Muhlenbergia capillaris)	Field Container	Gilliam	AL	2014	Over the top	No to slight injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice; all plants marketable.
28212	Muhly, Hairyawn (Muhlenbergia capillaris)	Field Container	Senesac	NY	2014	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28715	Pine Muhly (Muhlenbergia dubia)	Field Container	Klett	CO	2013	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
28715	Pine Muhly (Muhlenbergia dubia)	Field Container	Senesac	NY	2014	Over the top	Very slight injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
28715	Pine Muhly (Muhlenbergia dubia)	Field Container	Wilen	CA	2009	Over the top	No significant injury at 0.97, moderate at 1.94 and 3.88 lb ai per acre; significant growth reduction at 4X.
28200	Bayberry, Northern (Myrica pensylvanica)	Field Container	Freiberger	NJ	2012	Over the top	No sufficient data collected because plants never broke dormancy and died, or died before trial conclusion.
28200	Bayberry, Northern (Myrica pensylvanica)	Field Container	Senesac	NY	2016	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
26324	Sacred Bamboo (Nandina domestica)	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.97, 1.84 and 3.88 lb ai per acre.
26324	Sacred Bamboo (Nandina domestica) 'Fire Power'	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.97, 1.84 and 3.88 lb ai per acre with two applications.
26324	Sacred Bamboo (Nandina domestica) 'Firepower'	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97 and 1.94, slight at 3.88 lb ai per acre.
26324	Sacred Bamboo (Nandina domestica) N. domestica	Field Container	Lieth	CA	2009	Over the top	Significant crop injury with 0.97, 1.94,and 3.88 lb aia compared to untreated increasing with time and second application (20-40% by 60DAT). Dramatic reduction in height compared to untreated.
31899	Daffodil (Narcissus sp.)	Field In-Ground	Senesac	NY	2014	Over the top	Trial not completed due to crop failure; will be repeated in 2015.
31899	Daffodil (Narcissus sp.) ‘Flower Carpet'	Field In-Ground	Miller	WA	2015	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
31899	Daffodil (Narcissus sp.) 'Flower Carpet'	Field In-Ground	Miller	WA	2016	Over the top	No injury or reduction of growth and yield with 21, 42 and 84 fl oz per acre applied twice.
31899	Daffodil (Narcissus sp.) 'Golden Echo'	Field In-Ground	Senesac	NY	2015	Over the top	Slight injury with complete recovery at 0.97 and 1.94, moderate to slight with 3.88 lb ai per acre applied twice.
27193	Catnip (Nepeta cataria) N. cataria	Field Container	Lieth	CA	2009	Over the top	Significant crop injury (10-25%) with 0.97, 1.94,and 3.88 lb aia compared to untreated 2WAT. (Crop injury ratings after 2WAT inconclusive due to damage on all plants.) Plant volume decreased by half with 1.94 and 3.88 lb aia rates 60DAT.
27193	Catnip (Nepeta cataria) 'Psfike'	Field Container	Klett	CO	2008	Over the top	Trial 1: Some injury (chlorosis) at 0.97, 1.94 and 3.88 lb ai per acre; growth reduction at 4X

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
27193	Catnip (Nepeta cataria) 'Psfike'	Field Container	Klett	CO	2008	Over the top	Trial 2: No injuryat 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction
27198	Nepeta (Nepeta x faassenii)	Field Container	Lieth	CA	2008	Over the top	Unacceptable injury at 0.97, 1.94 and 3.88 lb ai per acre
27198	Nepeta (Nepeta x faassenii) 'Walker's Low'	Field Container	Boydston	WA	2012	Over the top	No injury or growth reduction with 0.97, 1.94 and 3.88 lb ai per acre applied twice; all plants saleable.
27198	Nepeta (Nepeta x faassenii) 'Walker's Low'	Field Container	Senesac	NY	2008	Over the top	Slight injury at 0.98 and 1.98, moderate at 3.94 lb ai per acre
27198	Nepeta (Nepeta x faassenii) 'Walker's Low'	Field Container	Wilen	CA	2012	Over the top	Minor, acceptable injury with 21, 42 and 84 fl oz per acre after 1st applic; unacceptable injury and growth reduction after 2nd applic.
29245	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonica	Field Container	Uber	CA	2012	Over the top	No injury with 0.97, 1.94 and 3.88 lb ai per acre applied twice; very slight growth reduction at 2X and 4X.
29245	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonicas	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
29245	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonicas	Field Container	Czarnota	GA	2012	Over the top	No injury with 21 and 42 fl oz per acre, slight with complete recovery with 84 fl oz, applied twice; no height reduction.
29245	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonicas	Field Container	Gilliam	AL	2013	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
30846	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonicus 'Nana'	Greenhouse	Wilen	CA	2013	Over the top	Excellent crop safety with 21 and 32 fl oz per acre; excellent liverwort control by 44 DAT.
29253	Holly Olive (Osmanthus heterophyllus) Holly Olive; false	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
29253	Holly Olive (Osmanthus heterophyllus) O. fragrans	Field Container	Gilliam	AL	2013	Over the top	Moderate injury after 1st application with 21, 42 and 84 fl oz per acre, with good recovery to slight injury after 2nd applic; no growth reduction; treated plants marketable.
31877	Fern, Royal (Osmunda regalis)	Greenhouse	Derr	VA	2013	Over the top	Low injury with 21 and 32 fl oz per acre w/ or w/o irrigation. High liverwort control at both rates w/o irrig.
31956	Fern, Royal (Osmunda regalis)	Field Container	Neal	NC	2013	Over the top	Slight injury with 21, moderate with 42 and 84, fl oz per acre applied twice.
29084	Peony (Paeonia sp.) P. lactiflora 'Edulis Superba'	Field Container	Senesac	NY	2016	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29084	Peony (Paeonia sp.) P. lactiflora 'Karl Rosenfield'	Field Container	Boydston	WA	2011	Over the top	No crop injury or reduction in growth with two applications at 0.97, 1.94, and 3.88 lb ai per acre.
31930	Peony (Paeonia sp.) 'President Roosevelt'	Field In-Ground	Miller	WA	2015	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
31930	Peony (Paeonia sp.) 'President Roosevelt'	Field In-Ground	Miller	WA	2016	Over the top	No injury with 21 and 42, moderate but not significant, with 84 fl oz per acre applied twice; no reduction in flower numbers.
29084	Peony (Paeonia sp.) 'Sarah Bernhardt'	Field Container	Gilliam	AL	2016	Over the top	Unacceptable injury with 21, 42 and 84 fl oz per acre applied twice.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
31094	Beard-Tongue (Penstemon sp.) P. barbatus 'Navigator Mix'	Field Container	Reding	OH	2014	Over the top	No significant injury or growth reduction with 0.98 and 1.47, moderate with good recovery with 3.94, lb ai per acre applied twice; all plants marketable.
31094	Beard-Tongue (Penstemon sp.) P. digitalis 'Huskers Red'	Field Container	Boydston	WA	2014	Over the top	Slight to moderate injury (leaf burn) with good recovery at 0.98, 1.97 and 3.94 lb ai per acre applied twice; no significant growth reduction; 1X- and 2X-, and most 4X-treated plants marketable.
31094	Beard-Tongue (Penstemon sp.) P. pinifolius 'Mersea Yellow'	Field Container	DeFrancesco	OR	2015	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
31094	Beard-Tongue (Penstemon sp.) 'Purple Riding Hood'	Field Container	Mathers	OH	2015	Over the top	Results inconclusive because all plants died from a root disease infection.
28739	Mock Orange (Philadelphus sp.)	Field Container	Freiberger	NJ	2012	Over the top	Inconclusive results because plants died off early in both treated and control plants.
28739	Mock Orange (Philadelphus sp.) P. viginalis 'Snow Dwarf'	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.97 and 1.94, slight at 3.88 lb ai per acre.
28475	Chokeberry (Photinia sp.)	Field Container	Czarnota	GA	2013	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
28475	Chokeberry (Photinia sp.) P. fraseri	Field Container	Uber	CA	2008	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre after 1st, moderate at 2X and 4X after 2nd application; significant growth reduction at 4X
28475	Chokeberry (Photinia sp.) P. fraserii	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
28475	Chokeberry (Photinia sp.) P. villosa	Field Container	Beste	MD	2014	Over the top	Acceptable injury with 1, 2 and 4 lb ai per acre applied twice, but moderate growth reduction with 2X and 4X; marketability reduction at 2X and 4X.
19626	Spruce, Norway (Picea abies)	Field In-Ground	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
19626	Spruce, Norway (Picea abies)	Field In-Ground	Beste/Frank (ARS)	MD	2008	Over the top	Injury moderate though not significant at trial end at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction; reduced marketability at 2X and 4X
19629	Spruce, White; Cat (Picea glauca)	Field In-Ground	Persad	OH	2016	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29511	Spruce, Colorado (Picea pungens)	Field In-Ground	Beste/Frank (ARS)	MD	2011	Over the top	No significant injury, growth or marketability reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
26291	Spruce (Picea sp.) P. abies	Field Container	Mathers (OSU)	OH	2008	Over the top	No injury to very slight chlorosis increasing with rate (0.97, 1.94, 3.88 lb ai per acre).
26291	Spruce (Picea sp.) P. abies	Field Container	Regan	WA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre; slight growth reduction at 4X.
26291	Spruce (Picea sp.) P. glauca	Field Container	Freiberger	NJ	2007	Over the top	No injury at 0.97, 1.94 and 3.99 lb ai per acre
26291	Spruce (Picea sp.) P. glauca	Field Container	Freiberger	NJ	2012	Over the top	No sufficient data collected because plants never broke dormancy and died, or died before trial conclusion.

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26291	Spruce (Picea sp.) P. glauca	Field Container	Mickelbart	MI	2009	Over the top	Phytotoxicity was zero at all observation times with no treatment effects on growth involving 21, 42, 84 fl oz./A 12 WAT.
26291	Spruce (Picea sp.) P. pungens	Field Container	Senesac	NY	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26291	Spruce (Picea sp.) P. pungens	Field Container	Senesac	NY	2008	Over the top	No significant injury at 0.98, slight at 1.98, moderate at 3.94 lb ai per acre
26291	Spruce (Picea sp.) P. pungens glauca	Field Container	Klett	CO	2008	Over the top	Trial 1: No injury at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction
26291	Spruce (Picea sp.) P. pungens glauca	Field Container	Klett	CO	2008	Over the top	Trial 2: No injury at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction
27209	Andromeda, Fetterbush (Pieris sp.) P. japonica 'Dorothy Wycoff'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury at 0.97 and 1.94, slight at 3.88 lb ai per acre; no growth reduction, all plants marketable
27209	Andromeda, Fetterbush (Pieris sp.) P. japonica 'Mountain Fire'	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27209	Andromeda, Fetterbush (Pieris sp.) P.japonica 'Dorothy Wycoff'	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable.
27214	Pine (Pinus sp.)	Field Container	Freiberger	NJ	2012	Over the top	No sufficient data collected because plants never broke dormancy and died, or died before trial conclusion.
27214	Pine (Pinus sp.) P. eldarica	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
27214	Pine (Pinus sp.) P. halapensis	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
27214	Pine (Pinus sp.) P. mugo	Field Container	Harvey	WA	2008	Over the top	No injury at 0.97, minor injury at 1.94 3.88 lb ai per acre after 2nd application that was gone 2 weeks later
27214	Pine (Pinus sp.) P. strobus	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27214	Pine (Pinus sp.) P. taeda	Field Container	Fraelich	GA	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable.
27214	Pine (Pinus sp.) Pine Mungo	Field Container	Harvey	WA	2009	Over the top	No injury at 0.97 and 1.94, slight at 3.88 lb ai per acre.
27378	Pine, Loblolly (Pinus taeda)	Field Container	Fraelich	GA	2015	Over the top	No injury or difference in plant growth and marketability with 21, 42 and 84 fl oz per acre applied twice.
27378	Pine, Loblolly (Pinus taeda)	Field Container	Neal	NC	2015	Over the top	No injury with 21 and 42 fl oz per acre applied twice, very slight with 84 fl oz.
27219	Cinquefoil (Potentilla sp.) P. fruticosa 'Abbotswood'	Field Container	Lieth	CA	2009	Over the top	Slight(15-20%) but statistically significant crop injury with 0.97, 1.94,and 3.88 lb aia compared to untreated 6WAT. Lack of significant plant growth treatment effect suggest Tower is considered safe for application to Potentilla.
27219	Cinquefoil (Potentilla sp.) P. fruticosa 'Goldfinger'	Field Container	Uber	CA	2008	Over the top	No significant injury at 0.97 and 1.94, significant at 3.88 lb ai per acre; no significant growth reduction
27219	Cinquefoil (Potentilla sp.) P. fruticosa 'Monsidh'	Field Container	Klett	CO	2008	Over the top	Trial 1: No injury at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction

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27219	Cinquefoil (Potentilla sp.) P. fruticosa 'Monsidh'	Field Container	Klett	CO	2008	Over the top	Trial 2: No injury at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction
27219	Cinquefoil (Potentilla sp.) P. neumaniana 'Verna'	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants saleable.
26222	Fir, Douglas (Pseudotsuga menziesii)	Field Container	Boydston	WA	2007	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26222	Fir, Douglas (Pseudotsuga menziesii)	Field Container	Harvey	WA	2007	Over the top	Unreliable results due to transplant shock
26222	Fir, Douglas (Pseudotsuga menziesii) 'Blue'	Field Container	Marshall	MI	2007	Over the top	One application. No injury at 0.97, 1.94 and 3.88 lb ai per acre
26222	Fir, Douglas (Pseudotsuga menziesii) P. menziesii glauca	Field Container	Freiberger	NJ	2007	Over the top	No injury at 0.97, 1.94 and 3.99 lb ai per acre after 1st, significant at 1X after 2nd application
27797	Oak, Sawtooth (Quercus acutissima)	Field In-Ground	Beste/Frank (ARS)	MD	2008	Over the top	Slight injury with complete recovery at trial end at 0.97, 1.94 and 3.88 lb ai per acre; height reduction at 4X but all plants marketable.
27797	Oak, Sawtooth (Quercus acutissima)	Field In-Ground	Beste/Frank (ARS)	MD	2011	Over the top	Slight to moderate injury with 0.98, 1.97 and 3.94 lb ai per acre after 1st application, complete recovery in 3 months; reduced height at 1X and 4X but no reduced market value.
27797	Oak, Sawtooth (Quercus acutissima)	Field In-Ground	Beste/Frank (NER)	MD	2013	Over the top	No injury with 21 and 42, moderate injury with quick and complete recovery at 84 fl oz per acre, applied twice; slight growth reduction at 2X and 4X; no reduction in marketability.
27384	Oak, Sawtooth (Quercus acutissima)	Field Container	Gilliam	AL	2013	Over the top	Slight injury with complete recovery after 1st, no injury after 2nd, application with 21, 42 and 84 fl oz per acre applied twice; no growth reduction.
27421	Oak, Nuttall (Quercus nuttallii)	Field Container	Beste	MD	2016	Over the top	Significant injury with good recovery at 0.98, 1.97 and 3.94 lb ai per acre applied twice; moderate to high growth reduction increasing with rates.
27421	Oak, Nuttall (Quercus nuttallii)	Field Container	Gilliam	AL	2013	Over the top	Acceptable injury after 1st, no injury after 2nd, application with 21, 42 and 84 fl oz per acre applied twice; no growth reduction.
19627	Oak, Red (Quercus rubra)	Field In-Ground	Garrett	MD	2001		
27225	Oak (Quercus sp.) Q. alba	Field Container	Freiberger	NJ	2008	Over the top	Slight injury at 0.97 and 1.94, moderate at 3.88 lb ai per acre.
27225	Oak (Quercus sp.) Q. pinnata	Field Container	Mathers (OSU)	OH	2011	Over the top	Significant crop injury (leaf burn) and growth reduction with two sequential applications at 0.97,, 1.94, 3.88 lb ai per acre.
27225	Oak (Quercus sp.) Q. rubra	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable.
27225	Oak (Quercus sp.) Q. rubra	Field Container	Mathers (OSU)	OH	2008	Over the top	Severe injury at 0.97, 1.94 and 3.88 lb ai per acre.
27230	Indian Hawthorn (Rhaphiolepis indica)	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.97, 1.84 and 3.88 lb ai per acre with two applications.

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27230	Indian Hawthorn (Rhaphiolepis indica) 'Indian Princess'	Field Container	Lieth	CA	2008	Over the top	Slight, acceptable injury at 4X but unacceptable growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
27230	Indian Hawthorn (Rhaphiolepis indica) 'Pink Lady'	Field Container	Uber	CA	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
27230	Indian Hawthorn (Rhaphiolepis indica) R. umbellata 'Eleanor Taber'	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26287	Azalea (Rhododendron sp.) 'Amelia Rose'	Field Container	Gilliam	AL	2007	Over the top	Slight injury after 1st but none after 2nd application only at 3.88 lb ai per acre (4X); no growth reduction
30847	Azalea (Rhododendron sp.) 'Delaware Valley White'	Greenhouse	Ahrens/Mervosh	CT	2012	Over the top	Very slight injury with 21, 42 and 84 fl oz per acre applied once.
26287	Azalea (Rhododendron sp.) 'Fashion'	Field Container	Fraelich	GA	2007	Over the top	Slight injury (chlorosis) at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
26287	Azalea (Rhododendron sp.) 'Fashion'	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.97 and 1.94, slight stunting at 3.88 lb ai per acre.
26287	Azalea (Rhododendron sp.) 'Gwenda'	Field Container	Wade	SC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26287	Azalea (Rhododendron sp.) R. x 'Crete' (Yakushimanum hybrid)	Field Container	Senesac	NY	2007	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre
26287	Azalea (Rhododendron sp.) 'Vulcan'	Field Container	Regan	OR	2007	Over the top	Moderate injury after the 2nd application and growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
28719	Island Gooseberry (Ribes viburnifolium)	Field Container	Wilen	CA	2009	Over the top	No significant injury at 0.97, moderate at 1.94 and 3.88 lb ai per acre; root and shoot dry weights not significantly reduced.
26198	Rose (Rosa sp.) ‘Nearly Wild’	Field Container	Czarnota	GA	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26198	Rose (Rosa sp.) 'Flower Carpet Red'	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26198	Rose (Rosa sp.) 'Nearly Wild'	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26198	Rose (Rosa sp.) 'Nearly Wild'	Field Container	Lieth	CA	2007	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26198	Rose (Rosa sp.) 'Nearly Wild'	Field Container	Wade	SC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26198	Rose (Rosa sp.) R. virginiana	Field Container	Senesac	NY	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre after 1st application; slight and moderate injury at 2X and 4X after 2nd application with complete recovery in 4 weeks
30673	Coneflower (Rudbeckia sp.) 'Goldsturm'	Field Container	Boydston	WA	2013	Over the top	Virtually no injury and no growth reduction with 0.98 and 1.97 lb ai per acre applied twice, moderate with 3.94 lb; 4X plants not saleable.
30673	Coneflower (Rudbeckia sp.) R. hirta	Field Container	Klett	CO	2013	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
27821	Dwarf Palmetto (Sabal minor)	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.

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27821	Dwarf Palmetto (Sabal minor)	Field Container	Marble	FL	2015	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
27821	Dwarf Palmetto (Sabal minor)	Field Container	Witcher	TN	2016	Over the top	No injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
30676	Woodland Sage (Salvia nemorosa) 'May Night'	Field Container	Beste/Frank (ARS)	MD	2012	Over the top	Slight injury, significant flower reduction with 0.98 and 1.97 and 3.94 lb ai per acre; reduction in marketability.
30676	Woodland Sage (Salvia nemorosa) 'May Night'	Field Container	Boydston	WA	2014	Over the top	No significant injury with 0.98, slight and moderate with some recovery at 1.97 and 3.94 lb ai per acre applied twice; slight growth reduction at 4X; all treated plants marketable.
30676	Woodland Sage (Salvia nemorosa) 'May Night'	Field Container	Reding	OH	2014	Over the top	Moderate to severe injury and growth reduction with 0.98, 1.47 and 3.94 lb ai per acre applied twice; treated plants not marketable.
30676	Woodland Sage (Salvia nemorosa) S. sylvestris 'Blue Hill'	Field Container	Senesac	NY	2013	Over the top	No to minor injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
30676	Woodland Sage (Salvia nemorosa) 'Sensation Deep Rose'	Field Container	Klett	CO	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre after 1st, very slight with 4X after 2nd applic.; slight and moderate growth reduction with 2X and 4X.
26201	Woodland Sage (Salvia x sylvestris) 'May Night'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury and growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26201	Woodland Sage (Salvia x sylvestris) 'May Night'	Field Container	Klett	CO	2007	Over the top	Two trials; slight injury (leaf discoloration) at 0.97, 1.94 and 3.88 lb ai per acre; no growth reduction
26201	Woodland Sage (Salvia x sylvestris) S. nemorosa 'Cardonna'	Field Container	Derr	VA	2007	Over the top	8, 14, and 53 % injury at 1, 2 and 4 lb ai per acre; 100 % control of rice flatsedge and fragrant flatsedge
26201	Woodland Sage (Salvia x sylvestris) S. nemorosa 'May Night'	Field Container	Mathers (OSU)	OH	2007	Over the top	Slight injury (burning and yellowing) at 0.97, 1.94 and 3.92 lb ai per acre after 1st application but plants quickly recovered; slight growth reduction at 4X
26201	Woodland Sage (Salvia x sylvestris) 'Snow Hill'	Field Container	Boydston	WA	2007	Over the top	No injury but slight growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; plants saleable
29977	Naupaka (Scaevola sp.) 'Mauve Clusters'	Field Container	Wilen	CA	2012	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
29977	Naupaka (Scaevola sp.) S. aemula 'Scala Blue'	Field Container	Pemberton	TX	2012	Over the top	No injury or growth reduction with 0.97, 1.94 and 3.88 lb ai per acre applied twice; delayed flowering up to 4 weeks.
29977	Naupaka (Scaevola sp.) S. 'Cajun Blue'	Field Container	Derr	VA	2010	Over the top	Little to no crop injury with 1.0 lb ai per acre. 62 DAT and 14DAT2. Fair to very good control of longstalked phyllanthus, tasselflower, s. crabgrass.
30674	Stonecrop (Sedum sp.)	Field Container	Uber	CA	2013	Over the top	Moderate to severe injury increasing with rates (21, 42 and 84 fl oz per acre) applied twice.
30674	Stonecrop (Sedum sp.) S. reflexum 'Blue Spruce'	Field Container	Reding	OH	2014	Over the top	No significant injury or growth reduction with 0.98, moderate and severe with 1.47 and 3.94, lb ai per acre applied twice; 2X- and 4X-treated plants not marketable.
30674	Stonecrop (Sedum sp.) S. ternatum 'Larinem Park'	Field Container	Senesac	NY	2013	Over the top	No injury with 0.98 and 1.97, minor injury with complete recovery at 3.94, lb ai per acre applied twice.

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26279	Bridal-Wreath (Spiraea sp.)	Field Container	Harvey	WA	2007	Over the top	No injury after the first application at 0.97, 1.94 and 3.88 lb ai per acre, significant injury only at 4X rate after the second application
26279	Bridal-Wreath (Spiraea sp.) S. decumbens	Field Container	Senesac	NY	2007	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre
26279	Bridal-Wreath (Spiraea sp.) S. prunifolia	Field Container	Freiberger	NJ	2007	Over the top	No injury at 0.97, 1.94 and 3.99 lb ai per acre after 1st, moderate after 2nd application
26279	Bridal-Wreath (Spiraea sp.) S. thunbergii	Field Container	Mickelbart	IN	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre with single application 3 weeks after transplanting.
26279	Bridal-Wreath (Spiraea sp.) Spiraea x bumalda 'Gold Mound'	Field Container	Ahrens/Mervosh	CT	2007	Over the top	Very slight injury at 0.97, 1.94 and 3.88 lb ai per acre
27280	Camellia, Mountain (Stewartia sp.) S. pseudocamelia	Field Container	Senesac	NY	2011	Over the top	No crop injury with two applications at 0.97, 1.94, and 3.88 lb aia.
27248	Lilac (Syringa sp.) 'Miss Kim'	Field Container	Harvey	WA	2008	Over the top	No injury at 0.97 and 1.94, minor injury at 3.88 lb ai per acre
27248	Lilac (Syringa sp.) S x tribida 'Lark Song'	Field Container	Mathers (OSU)	OH	2008	Over the top	No significant injury or growth reduction at 0.97 and 1.94, moderate injury at 3.88 lb ai per acre
27248	Lilac (Syringa sp.) S. microphylla 'Superba'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	Significant injury (stem and leaf distortion), no growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; 1X marginally marketable, higher rates unacceptable
30149	Lilac (Syringa sp.) S. 'Paliban'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Moderate crop injury with 32 oz/A. No ratings taken first two weeks due to dormancy.
28223	Bald Cypress (Taxodium distichum)	Field Container	Neal	NC	2015	Over the top	No injury after 1st applic. with 21, 42 and 84 fl oz per acre, slight with good recovery after 2nd applic.
26308	Yew (Taxus sp.)	Field Container	Harvey	WA	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26308	Yew (Taxus sp.) T. baccata	Field Container	Senesac	NY	2007	Over the top	Slight to moderate injury at 0.97, 1.94 and 3.88 lb ai per acre with complete recovery by 4 weeks after 2nd application
26308	Yew (Taxus sp.) T. baccata fasigata	Field Container	Freiberger	NJ	2007	Over the top	No injury at 0.97, 1.94 and 3.99 lb ai per acre
26308	Yew (Taxus sp.) T. baccata 'Repandens'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants marketable
27256	Ternstroemia (Ternstroemia sp.)	Field Container	Neal	NC	2010	Over the top	No crop injury with any rate during the evaluation period.
27256	Ternstroemia (Ternstroemia sp.) 'Leann'	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.97, 1.84 and 3.88 lb ai per acre.
27256	Ternstroemia (Ternstroemia sp.) T. gymnanthera	Field Container	Gilliam	AL	2011	Over the top	No crop injury with 0.97, 1.94, 3.88 lb ai per acre but slight reduction in growth with 1x and 4x.
28723	Wall Germander (Teucrium chamaedrys)	Field Container	Klett	CO	2013	Over the top	Severe injury and growth reduction with 21, 42 and 84 fl oz per acre applied twice.
28723	Wall Germander (Teucrium chamaedrys)	Field Container	Peachey	OR	2013	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
28723	Wall Germander (Teucrium chamaedrys)	Field Container	Wilen	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre; root dry weight significantly reduced at all rates.
26226	Red Cedar, Western (Thuja plicata)	Field Container	Boydston	WA	2007	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26226	Red Cedar, Western (Thuja plicata)	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26226	Red Cedar, Western (Thuja plicata) 'Stoneham Gold'	Field Container	Senesac	NY	2008	Over the top	Slight injury at 0.98 and 1.98, moderate at 3.94 lb ai per acre
26226	Red Cedar, Western (Thuja plicata) T. plicata 'Watnong Green'	Field Container	Ahrens/Mervosh	CT	2008	Over the top	Slight injury at 0.98 and 1.97, marginal at 3.94 lb ai per acre after 2nd application; 1st application rates were 3.8 times higher than protocol rates.
26275	Red Cedar, Arborvitae (Thuja sp.)	Field Container	Mathers (OSU)	OH	2007	Over the top	No to slight injury at highest rate.
30154	Red Cedar, Arborvitae (Thuja sp.) T. occidenatlis 'Nigra'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Minor crop injury initially 1WAT decreasing with time until second application causing slight to minor (13-23%) crop injury with 32 oz per acre.
26275	Red Cedar, Arborvitae (Thuja sp.) T. occidentalis 'Emerald Green'	Field Container	Ahrens/Mervosh	CT	2007	Over the top	No injury after the 1st application at 0.97, 1.94 and 3.88 lb ai per acre; slight injury after 2nd application at the higher rates
26275	Red Cedar, Arborvitae (Thuja sp.) T. occidentalis 'Emerald Green'	Field Container	Lieth	CA	2007	Over the top	Unacceptable injury (burning of shoot tips) and distorted growth at 0.97, 1.94 and 3.88 lb ai per acre
26275	Red Cedar, Arborvitae (Thuja sp.) T. occidentalis 'Nigra'	Field Container	Senesac	NY	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26275	Red Cedar, Arborvitae (Thuja sp.) T. orientalis 'Green Giant'	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
29169	Confederate Jasmine (Trachelospermum jasminoides)	Field Container	Koivunen	CA	2015	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
29169	Confederate Jasmine (Trachelospermum jasminoides)	Field Container	Marble	FL	2015	Over the top	No significant injury or growth reduction with 0.98 and 1.97, slight and acceptable with 3.94 lb ai per acre applied twice.
29169	Confederate Jasmine (Trachelospermum jasminoides)	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
26663	Hemlock, Western (Tsuga heterophylla)	Field In-Ground	Beste/Frank (ARS)	MD	2007	Over the top	Results not useful because of severe injury caused by very high temperature and drought conditions
26663	Hemlock, Western (Tsuga heterophylla)	Field In-Ground	Beste/Frank (ARS)	MD	2008	Over the top	Moderate to severe injury at 0.97, 1.94 and 3.88 lb ai per acre.
26237	Hemlock, Western (Tsuga heterophylla)	Field Container	Boydston	WA	2007	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre
26237	Hemlock, Western (Tsuga heterophylla)	Field Container	Boydston	WA	2008	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; treated plants saleable
27265	Hemlock (Tsuga sp.)	Field Container	Ahrens/Mervosh	CT	2011	Over the top	Variable crop injury with two sequential applications at 0.97, 1.94, 3.88 lb ai per acre.

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
27265	Hemlock (Tsuga sp.) T. canadensis	Field Container	Boydston	WA	2011	Over the top	Little to no crop injury with 0.97 and 1.94 lb ai per acre but 3.88 lb ai per acre caused significant injury and reduction in growth. 4x treated plants not saleable.
27265	Hemlock (Tsuga sp.) T. heterophylla	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all treated plants saleable.
31900	Tulip (Tulipa sp.)	Field In-Ground	Senesac	NY	2014	Over the top	Trial not completed due to crop failure; will be repeated in 2015.
31900	Tulip (Tulipa sp.) 'Ile de France'	Field In-Ground	Miller	WA	2015	Over the top	Moderate foliar injury with 21, 42 and 84 fl oz per acre applied twice; slight reduction of bulb number with 21 and 42, moderate with 84 fl oz.
31900	Tulip (Tulipa sp.) 'Flair'	Field In-Ground	Senesac	NY	2015	Over the top	No injury with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
31900	Tulip (Tulipa sp.) 'Ile de France'	Field In-Ground	Miller	WA	2016	Over the top	No injury or yield reduction with 21, 42 and 84 fl oz per acre applied twice; minor growth reduction at 4X.
27422	Viburnum (Viburnum nudum) 'Brandywine'	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury at 0.97 and 1.94, severe at 3.88 lb ai per acre; significant growth reduction, unmarketable with 2X and 4X.
27422	Viburnum (Viburnum nudum) V. nudum 'Winterthur'	Field Container	Senesac	NY	2007	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre
27422	Viburnum (Viburnum nudum) 'Winterthur'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury at 0.97, unacceptable at 1.94 and 3.88 lb ai per acre; growth reduction at all rates; 1X plants marketable.
27422	Viburnum (Viburnum nudum) 'Winterthur'	Field Container	Trader	MS	2009	Over the top	Slight injury at 0.97 and 1.94, moderate at 3.88 lb ai per acre; growth reduction at all rates.
27423	Viburnum; Euopean Cranberrybush (Viburnum opulus)	Field Container	Grunwald	OR	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants saleable.
27423	Viburnum; Euopean Cranberrybush (Viburnum opulus) 'Roseum'	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	Slight to moderate injury and growth reduction at 0.97, 1.94 and 3.88 lb ai per acre.
27423	Viburnum; Euopean Cranberrybush (Viburnum opulus) 'Roseum'	Field Container	Trader	MS	2009	Over the top	No significant injury at 0.97, slight and moderate at 1.94 and 3.88 lb ai per acre; growth reduction at all rates.
27424	Japanese Snowball (Viburnum plicatum) 'Mariesii'	Field Container	Grunwald	OR	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants saleable.
27424	Japanese Snowball (Viburnum plicatum) 'Summer Snowflake'	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury at 0.97 and 1.94, slight at 3.88 lb ai per acre; no growth reduction; all plants marketable.
27424	Japanese Snowball (Viburnum plicatum) 'Summer Snowflake'	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre; significant growth reduction with 2X and 4X; all plants marketable.
27424	Japanese Snowball (Viburnum plicatum) V. plicatum 'Shasta'	Field Container	Ahrens/Mervosh	CT	2007	Over the top	Slight injury at 0.97, 1.94 and 3.88 lb ai per acre
27424	Japanese Snowball (Viburnum plicatum) V. plicatum 'Shoshoni'	Field Container	Beste/Frank (ARS)	MD	2007	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre; significant growth reduction but plants considered marketable

PR#	Crop	Production Site	Researcher	State	Year	Application Type	Results
27424	Japanese Snowball (Viburnum plicatum) V. plicatum tomentosum 'Shasta'	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
26254	Arrowwood (Viburnum sp.) V. odoratissimum	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
26254	Arrowwood (Viburnum sp.) V. opulus	Field Container	Regan	OR	2007	Over the top	Very slight injury after the first application at 0.97, 1.94 and 3.88 lb ai per acre but slight to moderate injury and growth reduction after the second application.
26254	Arrowwood (Viburnum sp.) V. x 'Juddi'	Field Container	Mickelbart	IN	2008	Over the top	No injury at 2.65, 5.3 and 10.6 lb ai per acre with single application 3 weeks after transplanting.
26254	Arrowwood (Viburnum sp.) V. x pragense	Field Container	Neal	NC	2007	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre
27425	Viburnum; Spring Boquet (Viburnum tinus)	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury at 0.97, slight with complete recovery at 1.94 and 3.88 lb ai per acre; no growth reduction.
27425	Viburnum; Spring Boquet (Viburnum tinus)	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre.
27425	Viburnum; Spring Boquet (Viburnum tinus) 'Compactum'	Field Container	Neal	NC	2009	Over the top	No injury at 0.97, 1.94 and 3.88 lb ai per acre after 1st, moderate stunting at 4X after 2nd application.
27425	Viburnum; Spring Boquet (Viburnum tinus) 'Spring Bouquet'	Field Container	Grunwald	OR	2009	Over the top	No injury or growth reduction at 0.97, 1.94 and 3.88 lb ai per acre; all plants saleable.
32954	Washington Fan Palm (Washingtonia robusta)	Field Container	Rivera	PR	2014	Over the top	Minor initial injury with quick recovery at 0.98, 1.97 and 3.94 lb ai per acre applied twice; no growth reduction.
29170	Wisteria (Wisteria sp.) W. sempervirens	Field Container	Uber	CA	2009	Over the top	No significant injury at 0.97, 1.94 and 3.88 lb ai per acre.
29170	Wisteria (Wisteria sp.) W. sinensis	Field Container	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.
29170	Wisteria (Wisteria sp.) W. sinensis	Field Container	Uber	CA	2014	Over the top	No injury with 21, 42 and 84 fl oz per acre applied twice.
27285	Japanese Zelkova (Zelkova serrata)	Field Container	Freiberger	NJ	2009	Over the top	Virtually no injury at 0.97 and 1.94, slight at 3.88 lb ai per acre.
27285	Japanese Zelkova (Zelkova serrata)	Field Container	Marble	FL	2017	Over the top	No injury or growth reduction with 21, 42 and 84 fl oz per acre applied twice.
27285	Japanese Zelkova (Zelkova serrata)	Field Container	Persad	OH	2014	Over the top	No significant injury or growth reduction with 0.98, 1.97 and 3.94 lb ai per acre applied twice.

Label Suggestions

We recommend that the 5 crops exhibiting no injury in these experiments be added to the current Tower EC label for over-the-top applications.

Euonymus sp.
Gaura lindheimeri
Leucanthemum maximum
Sabal minor
Ternstroemia sp.

We also suggest that the 5 plant species / genera exhibiting significant injury with over-the-top applications be added to the sensitive ornamental species list.

Catharanthus roseus
Cladrastis sp.
Echeveria sp.
Teucrium chamaedrys
Viburnum opulus

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