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## **IR-4 Ornamental Horticulture Program Flumioxazin Crop Safety**

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## **Abstract**

Flumioxazin has been registered in the United States since 2003 for uses in and around ornamental plants in production nurseries and in landscapes. Between 2000 and 2013, the IR-4 Project has conducted 618 trials using three granular formulations (BroadStar 0.17G, BroadStar 0.25G and BroadStar 0.25G VC1604) and a wettable dry granular formulation (SureGuard 51WDG). This is the first summary across all the available data for these 4 formulations generated through the IR-4 Project.

Sixty-three plant species or genera exhibited no or minimal transitory phytotoxicity to applications of BroadStar G formulations. Of these, nine are not currently listed on the current BroadStar 0.25G label. It is recommended that these be added to the label. Sixteen crops exhibited significant damage after over the top applications of BroadStar G formulations at all tested rates. Of these, thirteen are not currently in the list of 'Sensitive Species' on the current BroadStar 0.25G label. It is recommended that these be added to the label.

Eleven plant species or genera exhibited no or minimal, transitory phytotoxicity to over the top applications of SureGuard 51WDG formulation; all these are already in the current label. Thirty-three crops demonstrated significant phytotoxicity at all tested rates of SureGuard 51WDG. If a list of 'Sensitive Species' is added to the current label, these crops could be included.

## Introduction

Flumioxazin (BroadStar 0.25G and SureGuard 51WDG) has been registered in the United States since 2003 for uses in and around ornamental plants in production nurseries and in landscapes. Between 2000 and 2013, the IR-4 Project has conducted over 616 trials using three granular formulations (BroadStar 0.17G, BroadStar 0.25G and BroadStar 0.25G VC1604) and a wettable dry granular formulation (SureGuard 51WDG). This is the first summary across all the available data for these 4 formulations generated through the IR-4 Project. While flumioxazin labels in the United States are fairly broad with many listed crops, this document will lead to amendments placing new crops on the current labels.

## Materials and Methods

Because this research was conducted over several years with different protocols, application rates and whether repeat applications were made varied. Rates ranged from 0.17 to 1.5 lb ai per acre and either 1 or 2 applications were made. A minimum of four plants (replicate treatments) were required with many researchers exceeding this minimum. Phytotoxicity was recorded using a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill) at approximately 1, 2, 4, 7, 8 and 10 weeks after initial application. The protocols used were 05-001, 06-011, 07-009, 08-010, 09-011, 10-001, 11-004, 12-015, 13-015. Please visit <http://ir4.rutgers.edu/ornamental/OrnamentalDrafts.cfm> to view and download some of these protocols.

BroadStar 0.17G, BroadStar 0.25G, BroadStar 0.25G VC1604 and SureGuard 51WDG were supplied to researchers (See list of researchers in Appendix 1) by Valent Corporation.

## Results and Summary

### ***Phytotoxicity***

Based on the type and nature of injury seen with flumioxazin 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 sufficient to recommend growers not utilize this product, and 4) more data is needed to make informed recommendations.

### ***Phytotoxicity of BroadStar G Formulations***

In general, BroadStar G formulations exhibited no or minimal negative impact on a wide range of plant species or genera (Table 1). Sixty-three plant species or genera fell into this category; fifty-three of these are already listed in the current BroadStar 0.25G label. However, one of these (*Buddleia davidii*) is included in the list of 'Sensitive Species'. 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. For eight crop species, there was no or little injury exhibited at the 0.17 to 0.375 lb ai per acre rates, but significant phytotoxicity occurred at 0.5 lb ai per acre or higher (Table 2); the current label recommends not to use on one of these (*Clethra alnifolia*).

Only sixteen crops exhibited sufficient damage at all tested rates to not recommend BroadStar G over the top applications (Table 3). The current Broadstar 0.25G label recommends not to use on three of these (*Hydrangea spp.*, *Nandina domestica* 'Firepower' and *Spirea japonica*). For seventy-five species/genera, 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). Sixty-three of these crops exhibited no or minimal transitory injury, and twelve species or genera are already in the current label.

Please see Table 5 through Table 16 for summary of results for Broadstar 0.17G, Broadstar 0.25G and Broadstar 0.25G VC1604, and Table 21 for a list of research on all BroadStar G formulations and a summary of the individual trial results.

**Table 1. List of BroadStar G treated crops with no or minimal transitory injury.**

<i>Abelia x grandiflora</i> <sup>1</sup> (0.25 – 1.5 lb ai/acre)	<i>Juniperus communis</i> <sup>1</sup> (0.25 – 1.5 lb ai/acre)
<i>Acer ginnala</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Juniperus conferta</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Acer palmatum</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Juniperus horizontalis</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Acer pennsylvanicum</i> <sup>1</sup> (0.17 – 0.68 lb ai/acre)	<i>Juniperus ridgii</i> <sup>1</sup> (0.17 – 0.68 lb ai/acre)
<i>Acer rubrum</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Juniperus squamata</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Acer saccharinum</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Lagerstroemia indica</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Acer saccharum</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Lavandula angustifolia</i> (0.375 – 1.5 lb ai/acre)
<i>Artemisia lactiflora</i> (0.25 – 1.0 lb ai/acre)	<i>Loropetalum sp.</i> (0.375 – 1.5 lb ai/acre)
<i>Berberis thunbergii</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre) *	<i>Magnolia sp.</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Buddleia davidii</i> <sup>4</sup> (0.17 – 1.5 lb ai/acre)	<i>Malus sp.</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Buxus microphylla</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Myrica pennsylvanica</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Buxus sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Picea abies</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Camellia japonica</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Picea glauca</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Camellia sasanqua</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Picea omorika</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Camellia vernalis</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Pieris japonica</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Carex buchananii</i> (0.25 – 1.5 lb ai/acre)	<i>Pinus mugo</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Cornus florida</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Pinus nigra</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)
<i>Cornus sericea</i> <sup>1</sup> (0.17 – 0.68 lb ai/acre)	<i>Pinus taeda</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Cotoneaster sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Potentilla sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Cryptomeria japonica</i> (0.375 – 1.5 lb ai/acre)	<i>Prunus sp.</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Euonymus alatus</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Pseudotsuga menziesii</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Festuca ovina glauca</i> (0.17 – 1.0 lb ai/acre)	<i>Quercus sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Forsythia sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Raphiolepis indica</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Fraxinus sp.</i> <sup>1</sup> (0.17 – 0.68 lb ai/acre)	<i>Rhododendron sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Gardenia sp.</i> <sup>1</sup> (0.25 – 1.5 lb ai/acre)	<i>Rosa sp.</i> <sup>1</sup> (0.25 – 1.5 lb ai/acre)
<i>Gleditsia triacanthos</i> (0.17 – 1.5 lb ai/acre)	<i>Salvia sylvestris</i> (0.17 – 1.5 lb ai/acre) (See Senesac)
<i>Gypsophila elegans</i> (0.17 – 0.68 lb ai/acre)	<i>Syringa sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Hedera helix</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	<i>Taxus x media</i> <sup>1</sup> (0.25 – 1.5 lb ai/acre)
<i>Ilex cornuta</i> <sup>1</sup> (0.25 – 1.5 lb ai/acre)	<i>Thuja occidentalis</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Ilex crenata</i> <sup>1, 2</sup> (0.17 – 1.5 lb ai/acre)	<i>Verbena sp.</i> (0.17 – 1.5 lb ai/acre)
<i>Ilex glabra</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	<i>Viburnum sp.</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Ilex x meserveae</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	

\*No injury when applied to mature foliage, but injury did occur when applied at bud break

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

*Clethra alnifolia*<sup>4</sup> (0.17 – 1.0 lb ai/acre)  
*Cleyera japonica* (0.17 – 1.0 lb ai/acre)  
*Hakonechloa sp.* (0.25 – 1.0 lb ai/acre)  
*Hemerocallis sp.* (0.17 – 1.0 lb ai/acre)  
*Lantana sp.* (0.375 – 1.5 lb ai/acre)  
*Ligustrum lucidum*<sup>1</sup> (0.375 – 1.5 lb ai/acre)  
*Sedum reflexum* (0.375 – 1.5 lb ai/acre)  
*Sedum stefco* (0.375 – 1.5 lb ai/acre)

**Table 3. List of BroadStar G treated crops exhibiting significant injury.**

*Achillea millefolium*  
*Athyrium georingianum*  
*Cerastium tomentosum*  
*Cuphea hyssopifolia*  
*Hosta sp.*  
*Hydrangea sp.*<sup>4</sup>  
*Ilex crenata*<sup>1, 4</sup> 'Green Lustre'  
*Jasminum nudiflorum*  
*Liriope sp.*  
*Nandina domestica*<sup>4</sup> 'Firepower'  
*Nepeta x faasseni*  
*Phalaris arundinacea*  
*Phlox sp.*  
*Ruellia brittoniana*  
*Sedum spurium*  
*Spirea sp.*<sup>4</sup>



**Table 4. List of BroadStar G treated crops where more information is needed.**

<i>Agapanthus africanus</i> <sup>3</sup>	<i>Ophiopogon japonicus</i>
<i>Agapanthus sp.</i> <sup>3</sup>	<i>Origanum libanoticum</i> <sup>3</sup>
<i>Calluna vulgaris</i> <sup>3</sup>	<i>Osmanthus heterophyllus</i> <sup>1, 3</sup>
<i>Carex divulsa</i>	<i>Ostepermum sp.</i> <sup>3</sup>
<i>Carex oshimensis</i>	<i>Pachysandra terminalis</i> <sup>3</sup>
<i>Caryopteris x clandonensis</i>	<i>Paeonia lactiflora</i> <sup>3</sup>
<i>Ceanothus pallida</i>	<i>Pennisetum setaceum</i> <sup>3</sup>
<i>Ceanothus sp.</i>	<i>Philadelphus viginialis</i> <sup>3</sup>
<i>Cedrus deodara</i> <sup>1, 3</sup>	<i>Photinia x fraseri</i> <sup>1, 3</sup>
<i>Chamaecyparis obtusa</i> <sup>3</sup>	<i>Pinus bungeana</i> <sup>1, 3</sup>
<i>Chrysanthemum sp.</i> <sup>3</sup>	<i>Pittosporum tobira</i>
<i>Clematis integrifolia</i> <sup>3</sup>	<i>Podocarpus macrophyllus</i> <sup>3</sup>
<i>Clematis sp.</i> <sup>3</sup>	<i>Rhus sp.</i> <sup>3</sup>
<i>Cortaderia selloana</i>	<i>Ribes viburnifolium</i> <sup>1, 3</sup>
<i>Crataegus coccinoid</i> <sup>3</sup>	<i>Rosmarinus officinalis</i> <sup>3</sup>
<i>Crataegus monogyna</i> <sup>3</sup>	<i>Sabal minor</i> <sup>3</sup>
<i>Cupressus sp.</i> <sup>1, 3</sup>	<i>Salvia daghestanica</i> <sup>3</sup>
<i>Cytisus purgans</i> <sup>3</sup>	<i>Salvia nemorosa</i> <sup>3</sup>
<i>Daphne odora</i> <sup>3</sup>	<i>Salvia sylvestris</i>
<i>Delosperma alba</i> <sup>3</sup>	<i>Scutellaria racemosa</i> <sup>3</sup>
<i>Deschampsia sp.</i> <sup>3</sup>	<i>Sedum ellacombianum</i> <sup>3</sup>
<i>Deutzia sp.</i> <sup>4</sup>	<i>Sedum spectabile</i> <sup>3</sup>
<i>Elaeagnus angustifolia</i> <sup>3</sup>	<i>Spiraea sp.</i> <sup>3, 4</sup>
<i>Epilobium canum</i> <sup>3</sup>	<i>Spiraea thunbergii</i> <sup>3, 4</sup>
<i>Erica cinerea</i> <sup>3</sup>	<i>Stewartia pseudocamelia</i> <sup>3</sup>
<i>Gelsemium sempervirens</i>	<i>Taxus cuspidata</i> <sup>1, 3</sup>
<i>Gleditsia internis</i> <sup>3</sup>	<i>Ternstroemia sp.</i> <sup>3</sup>
<i>Helleborus orientalis</i>	<i>Teucrium chamaedrys</i>
<i>Heteromeles arbutifolia</i> <sup>3</sup>	<i>Thuja plicata</i> <sup>1, 3</sup>
<i>Iberis sp.</i> <sup>3</sup>	<i>Trachelospermum asiaticum</i> <sup>3</sup>
<i>Leucothoe fontanesiana</i> <sup>3</sup>	<i>Tsuga mertensiana</i> <sup>1, 3</sup>
<i>Lonicera sp.</i>	<i>Vaccinium sp.</i> <sup>1, 3</sup>
<i>Loropetalum chinense rubrum</i> <sup>3</sup>	<i>Veronica sp.</i> <sup>3</sup>
<i>Mahonia aquifolium</i> <sup>1, 3</sup>	<i>Vinca sp.</i>
<i>Muhlenbergia dubia</i> <sup>3</sup>	<i>Weigela sp.</i> <sup>1, 3</sup>
<i>Myrica cerifera</i> <sup>3, 4</sup>	<i>Yucca smalliana</i> <sup>3</sup>
<i>Nandina domestica</i> <sup>4</sup>	<i>Zelkova serrata</i> <sup>3</sup>
<i>Nepeta cataria</i>	

<sup>1</sup>Genera or closely related species already registered on current Broadstar 0.25G label.

<sup>2</sup> More information different cultivars is warranted.

<sup>3</sup> For these plants, the one or two trials presented here indicate no phytotoxicity or slight, transient injury, but these findings need to be confirmed.

<sup>4</sup> Genera or closely related species already on list of 'Sensitive Species' in current label.

**Table 5. List of BroadStar 0.17G treated crops with no or minimal transitory injury.**

<i>Abelia grandiflora</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)	<i>Juniperus squamata</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Berberis thunbergii</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre) *	<i>Liriope muscari</i> 'Big Blue' (0.17 – 1.0 lb ai/acre)
<i>Buddleia davidii</i> <sup>4</sup> (0.17 -1.0 lb ai per acre)	<i>Prunus sp.</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Buxus microphylla</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	<i>Pseudotsuga menziesii</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Gypsophila elegans</i> (0.17 – 0.68 lb ai/acre)	<i>Quercus rubra</i> <sup>1</sup> (0.17 – 0.68 lb ai/acre)
<i>Hedera helix</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	<i>Rhododendron sp.</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Ilex crenata</i> <sup>1, 2</sup> 'Compacta' (0.17 – 1.0 lb ai/acre)	<i>Thuja occidentalis</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Ilex x meserveae</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	<i>Viburnum sp.</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)
<i>Juniperus conferta</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)	
<i>Juniperus horizontalis</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	

\*No injury when applied to mature foliage, but injury did occur when applied at bud break

**Table 6. List of BroadStar 0.17G treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity**

<i>Clethra alnifolia</i> <sup>4</sup> (0.17 – 1.0 lb ai/acre)
<i>Cleyera japonica</i> (0.17 – 1.0 lb ai/acre)
<i>Hakonechloa sp.</i> (0.25 – 1.0 lb ai/acre)
<i>Hemerocallis sp.</i> (0.17 – 1.0 lb ai/acre)
<i>Liriope muscari</i> 'Variegata' (0.17 – 1.0 lb ai/acre)
<i>Pieris japonica</i> (0.17 – 1.0 lb ai/acre)
<i>Spiraea nipponica</i> <sup>4</sup> (0.17 – 1.0 lb ai/acre)

**Table 7. List of BroadStar 0.17G treated crops exhibiting significant injury.**

<i>Achillea millefolium</i>
<i>Cerastium tomentosum</i>
<i>Hosta fortunei</i>
<i>Hosta nigrescens</i>
<i>Hosta plantaginea</i>
<i>Hydrangea arborescens</i> <sup>4</sup>
<i>Ilex crenata</i> <sup>1, 2</sup> 'Green Lustre'
<i>Jasminum nudiflorum</i>
<i>Nandina domestica</i> <sup>4</sup> 'Firepower'
<i>Phalaris arundinacea</i>

**Table 8. List of BroadStar 0.17G treated crops where more information is needed.**

<i>Abies koreana</i> <sup>1, 3</sup>	<i>Myrica pennsylvanica</i> <sup>1, 3</sup>
<i>Acer ginnala</i> <sup>1, 3</sup>	<i>Ophiopogon japonicus</i>
<i>Acer palmatum</i> <sup>1, 3</sup>	<i>Origanum libanoticum</i> <sup>3</sup>
<i>Berberis gladwynensis</i> <sup>1, 3</sup>	<i>Osteopermum sp.</i> <sup>3</sup>
<i>Buxus sp.</i> <sup>1, 3</sup>	<i>Pachysandra terminalis</i> <sup>3</sup>
<i>Calluna vulgaris</i> <sup>3</sup>	<i>Pennisetum setaceum</i> <sup>3</sup>
<i>Cornus florida</i> <sup>1, 3</sup>	<i>Picea omorika</i> <sup>3</sup>
<i>Cornus sericea</i> <sup>1, 3</sup>	<i>Pinus bungeana</i> <sup>3</sup>
<i>Cotoneaster dammeri</i> <sup>1, 3</sup>	<i>Pinus mugo</i> <sup>3</sup>
<i>Cotoneaster lucidus</i> <sup>1, 3</sup>	<i>Pittosporum tobira</i>
<i>Cotoneaster sp.</i> <sup>1, 3</sup>	<i>Potentilla fruticosa</i>
<i>Cupressus sp.</i> <sup>1, 3</sup>	<i>Potentilla tabernaemontani</i> <sup>3</sup>
<i>Cytisus purgans</i> <sup>3</sup>	<i>Prunus x cistena</i> <sup>3</sup>
<i>Daphne odora</i> <sup>3</sup>	<i>Prunus dulcis</i> <sup>3</sup>
<i>Delosperma alba</i> <sup>3</sup>	<i>Prunus maritima</i> <sup>3</sup>
<i>Elaeagnus angustifolia</i> <sup>1, 3</sup>	<i>Rhus sp.</i> <sup>3</sup>
<i>Erica cinerea</i> <sup>1, 3</sup>	<i>Salvia daghestanica</i> <sup>3</sup>
<i>Euonymus alatus</i> <sup>1, 3</sup>	<i>Salvia sylvestris</i> <sup>3</sup>
<i>Festuca ovina glauca</i> <sup>3</sup>	<i>Scutellaria racemosa</i> <sup>3</sup>
<i>Forsythia x intermedia</i> <sup>1, 3</sup>	<i>Spiraea vanhouttei</i>
<i>Forsythia suspense</i> <sup>1, 3</sup>	<i>Spiraea cantoniensis</i> <sup>3</sup>
<i>Fraxinus americana</i> <sup>1, 3</sup>	<i>Taxus cuspidata</i> <sup>3</sup>
<i>Gazania sp.</i> <sup>3</sup>	<i>Taxus x media</i> <sup>3</sup>
<i>Gelsemium sempervirens</i>	<i>Thuja plicata atrovirens</i> <sup>3</sup>
<i>Gleditsia tricanthos</i> <sup>3</sup>	<i>Tsuga mertensiana</i> <sup>1, 3</sup>
<i>Hedera colchica dentata</i> <sup>1, 3</sup>	<i>Vaccinium sp.</i> <sup>1, 3</sup>
<i>Hydrangea macrophylla</i>	<i>Veronica sp.</i> <sup>3</sup>
<i>Iberis sp.</i> <sup>3</sup>	<i>Viburnum x bodnantense</i> <sup>1, 3</sup>
<i>Ilex glabra</i> <sup>1, 3</sup>	<i>Viburnum. x dentatum</i> <sup>1, 3</sup>
<i>Juniperus communis</i> <sup>1, 3</sup>	<i>Viburnum plicatum tomentosum</i> <sup>1, 3</sup>
<i>Lagerstroemia indica</i> <sup>1, 3</sup>	<i>Vinca sp.</i>
<i>Lonicera sp.</i>	<i>Weigela sp.</i> <sup>1, 3</sup>
<i>Mahonia aquifolium</i> <sup>1, 3</sup>	<i>Yucca smalliana</i> <sup>3</sup>

<sup>1</sup> Genera or closely related species already registered on current Broadstar 0.25G label.

<sup>2</sup> More information on different cultivars is warranted.

<sup>3</sup> For these plants, the one or two trials presented here indicate no phytotoxicity or slight, transient injury, but these findings need to be confirmed.

<sup>4</sup> Genera or closely related species already on list of 'Sensitive Species' in current label.

**Table 9. List of BroadStar 0.25G treated crops with no or minimal transitory injury.**

*Acer rubrum*<sup>1</sup> (0.17 – 3.88 lb ai/acre)  
*Gardenia sp.*<sup>1</sup> (0.25 – 1.5 lb ai/acre)  
*Rhododendron sp.*<sup>1</sup> (0.25 – 1.0 lb ai/acre)  
*Verbena sp.* (0.17 – 1.5 lb ai/acre)

**Table 10. List of BroadStar 0.25G treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity**

*Clethra alnifolia*<sup>4</sup> (0.25 – 1.0 lb ai/acre)  
*Lantana sp.* (0.375 – 1.5 lb ai/acre)  
*Spiraea nipponica*<sup>4</sup> (0.25 – 1.0 lb ai/acre)

**Table 11. List of BroadStar 0.25G treated crops exhibiting significant injury.**

*Athyrium georingianum*  
*Cuphea hyssopifolia*  
*Hydrangea macrophylla*<sup>4</sup>  
*Hydrangea quercifolia*<sup>4</sup>  
*Liriope sp.*  
*Phalaris arundinacea*  
*Phlox sp.*  
*Ruellia brittoniana*

**Table 12. List of BroadStar 0.25G treated crops where more information is needed.**

<i>Abelia zanderi</i> <sup>1,3</sup>	<i>Ilex sp.</i> <sup>1,3,4</sup>
<i>Abies koreana</i> <sup>1, 3</sup>	<i>Juniperus conferta</i> <sup>3</sup>
<i>Abies balsamea</i> <sup>1, 3</sup>	<i>Lagerstroemia indica</i> <sup>1, 3</sup>
<i>Abies fraseri</i> <sup>1, 3</sup>	<i>Lantana sp.</i>
<i>Abies sp.</i> <sup>1, 3</sup>	<i>Ligustrum sp.</i> <sup>1,3</sup>
<i>Acer palmatum</i> <sup>1, 3</sup>	<i>Liriope sp.</i>
<i>Acer pennsylvanicum</i> <sup>1, 3</sup>	<i>Liriope spicata</i> <sup>3</sup>
<i>Agapanthus africanus</i> <sup>3</sup>	<i>Loropetalum chinense</i> <sup>3</sup>
<i>Agapanthus sp.</i> <sup>3</sup>	<i>Myrica cerifera</i> <sup>3, 4</sup>
<i>Artemisia lactiflora</i> <sup>3</sup>	<i>Myrica pennsylvanica</i> <sup>1, 3</sup>
<i>Artemisia schmidtiana</i> <sup>3</sup>	<i>Nandina domestica</i> <sup>4</sup>
<i>Berberis thunbergii</i> <sup>1, 3</sup>	<i>Ophiopogon japonicus</i>
<i>Carex buechananii</i> <sup>3</sup>	<i>Picea abies</i> <sup>1, 3</sup>
<i>Cedrus deodara</i> <sup>1, 3</sup>	<i>Picea glauca</i> <sup>1, 3</sup>
<i>Chamaecyparis obtusa</i> <sup>3</sup>	<i>Pieris japonica</i> <sup>1, 3</sup>
<i>Chrysanthemum sp.</i> <sup>3</sup>	<i>Pinus mugo</i> <sup>1, 3</sup>
<i>Clethra alnifolia</i> <sup>4</sup>	<i>Pinus nigra</i> <sup>1, 3</sup>
<i>Clethra japonica</i> <sup>4</sup>	<i>Podocarpus macrophyllus</i> <sup>3</sup>
<i>Cortaderia selloana</i>	<i>Rosa sp.</i> <sup>1, 3</sup>
<i>Deschampsia sp.</i> <sup>3</sup>	<i>Rosmarinus officinalis</i> <sup>3</sup>
<i>Deutzia sp.</i> <sup>4</sup>	<i>Salvia sylvestris</i> <sup>3</sup>
<i>Festuca ovina glauca</i> <sup>3</sup>	<i>Spiraea nipponica</i> <sup>4</sup>
<i>Forsythia x intermedia</i> <sup>1, 3</sup>	<i>Syringa josikaea</i> <sup>1, 3</sup>
<i>Fraxinus pennsylvanica</i> <sup>1, 3</sup>	<i>Ternstroemia sp.</i>
<i>Helleborus orientalis</i>	<i>Trachelospermum asiaticum</i> <sup>3</sup>

<sup>1</sup>Genera or closely related species already registered on current Broadstar 0.25G label.

<sup>2</sup> More information on different cultivars is warranted.

<sup>3</sup> For these plants, the one or two trials presented here indicate no phytotoxicity or slight, transient injury, but these findings need to be confirmed.

<sup>4</sup> Genera or closely related species already on list of 'Sensitive Species' in current label.

**Table 13. List of BroadStar 0.25G VC1604 treated crops with no or minimal transitory injury.**

<i>Abelia x grandiflora</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Picea sp.</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Acer palmatum</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Pieris japonica</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Acer rubrum</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Pinus mugo</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Berberis thunbergii</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Pinus taeda</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Buddleia davidii</i> <sup>4</sup> (0.375 – 1.5 lb ai/acre)	<i>Potentilla fruticosa</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Cornus florida</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Raphiolepis indica</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Cryptomeria japonica</i> (0.375 – 1.5 lb ai/acre)	<i>Rhododendron sp.</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Lagerstromia indica</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	<i>Rosa sp.</i> <sup>1</sup> (See Harvey) (0.375 – 1.5 lb ai/acre)
<i>Lavandula angustifolia</i> (0.375 – 1.5 lb ai/acre)	<i>Salvia sylvestris</i> (0.17 – 1.5 lb ai/acre) (See Senesac)
<i>Loropetalum sp.</i> (0.375 – 1.5 lb ai/acre)	<i>Thuja occidentalis</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Malus sp.</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)	

\*No injury when applied to mature foliage, but injury did occur when applied at bud break

**Table 14. List of BroadStar 0.25G VC1604 treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity**

<i>Clethra alnifolia</i> <sup>4</sup> (0.375 – 1.5 lb ai/acre)
<i>Ligustrum lucidum</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Philadelphus viginalis</i> (0.375 – 1.5 lb ai/acre)
<i>Rosa woodsii</i> <sup>1</sup> (0.375 – 1.5 lb ai/acre)
<i>Sedum reflexum</i> (0.375 – 1.5 lb ai/acre)
<i>Sedum stefco</i> (0.375 – 1.5 lb ai/acre)

**Table 15. List of BroadStar 0.25G VC1604 treated crops exhibiting significant injury.**

<i>Hydrangea sp.</i> <sup>4</sup>
<i>Nepeta x faasseni</i>
<i>Sedum spurium</i>
<i>Spiraea japonica</i>

**Table 16. List of BroadStar 0.25G VC1604 treated crops where more information is needed.**

<i>Abelia zanderi</i> <sup>1, 3</sup>	<i>Magnolia grandiflora</i> <sup>1, 3</sup>
<i>Abies balsamea</i> <sup>1, 3</sup>	<i>Magnolia stellata</i> <sup>1, 3</sup>
<i>Abies fraseri</i> <sup>1, 3</sup>	<i>Magnolia virginiana</i> <sup>1, 3</sup>
<i>Acer ginnala</i> <sup>1, 3</sup>	<i>Muhlenbergia dubia</i> <sup>3</sup>
<i>Acer saccharum</i> <sup>1, 3</sup>	<i>Nandina domestica</i> <sup>4</sup>
<i>Agapanthus africanus</i> <sup>3</sup>	<i>Nepeta cataria</i>
<i>Agapanthus sp.</i> <sup>3</sup>	<i>Ophiopogon japonicus</i> <sup>3</sup>
<i>Buxus sp.</i> <sup>1, 3</sup>	<i>Osmanthus heterophyllus</i> <sup>1, 3</sup>
<i>Carex divulsa</i>	<i>Paeonia lactiflora</i> <sup>3</sup>
<i>Carex oshimensis</i>	<i>Philadelphus viginalis</i> <sup>3</sup>
<i>Caryopteris x clandonensis</i>	<i>Photinia x fraseri</i> <sup>1, 3</sup>
<i>Ceanothus pallida</i>	<i>Pieris japonica</i> <sup>1, 3</sup>
<i>Ceanothus sp.</i>	<i>Quercus alba</i> <sup>1, 3</sup>
<i>Clematis integrifolia</i> <sup>3</sup>	<i>Quercus rubra</i> <sup>1, 3</sup>
<i>Clematis sp.</i> <sup>3</sup>	<i>Quercus sp.</i> <sup>1, 3</sup>
<i>Cotoneaster glaucophyllus</i> <sup>1, 3</sup>	<i>Raphiolepis umbellata</i> <sup>1, 3</sup>
<i>Cotoneaster horizontalis</i> <sup>1, 3</sup>	<i>Ribes viburnifolium</i> <sup>1, 3</sup>
<i>Crataegus coccinoid</i> <sup>3</sup>	<i>Sabal minor</i> <sup>3</sup>
<i>Crataegus monogyna</i> <sup>3</sup>	<i>Salvia nemorosa</i> <sup>3</sup>
<i>Epilobium canum</i> <sup>3</sup>	<i>Salvia sylvestris</i>
<i>Euonymus alatus</i> <sup>1, 3</sup>	<i>Sedum ellacombianum</i> <sup>3</sup>
<i>Euonymus fortunei</i> <sup>1, 3</sup>	<i>Sedum spectabile</i> <sup>3</sup>
<i>Forsythia x intermedia</i> <sup>1, 3</sup>	<i>Spiraea sp.</i> <sup>3, 4</sup>
<i>Gleditsia internis</i> <sup>3</sup>	<i>Spiraea thunbergii</i> <sup>3, 4</sup>
<i>Gleditsia triacanthos</i> <sup>3</sup>	<i>Stewartia pseudocamelia</i> <sup>3</sup>
<i>Heteromeles arbutifolia</i> <sup>3</sup>	<i>Syringa macrophylla</i> <sup>1, 3</sup>
<i>Hydrangea macrophylla</i> <sup>3, 4</sup>	<i>Syringa patula</i> <sup>1, 3</sup>
<i>Hydrangea paniculata</i> <sup>3, 4</sup>	<i>Syringa reticulata</i> <sup>1, 3</sup>
<i>Ilex cornuta</i> <sup>1, 3</sup>	<i>Taxus baccata</i> <sup>1, 3</sup>
<i>Ilex crenata</i> <sup>1, 2, 3</sup>	<i>Ternstroemia sp.</i> <sup>3</sup>
<i>Ilex glabra</i> <sup>1, 3</sup>	<i>Teucrium chamaedrys</i>
<i>Juniper andorra</i> <sup>1, 3</sup>	<i>Thuja plicata</i> <sup>1, 3</sup>
<i>Juniper chinensis</i> <sup>1, 3</sup>	<i>Viburnum. x burkwoodii</i> <sup>1, 3</sup>
<i>Juniper communis</i> <sup>1, 3</sup>	<i>Viburnum plicatum tomentosum</i> <sup>1, 3</sup>
<i>Juniper conferta</i> <sup>1, 3</sup>	<i>Viburnum tinus</i> <sup>1, 3</sup>
<i>Leucothoe fontanesiana</i> <sup>3</sup>	<i>Zelkova serrata</i> <sup>3</sup>
<i>Loropetalum chinense rubrum</i> <sup>3</sup>	

<sup>1</sup> Genera or closely related species already registered on current Broadstar 0.25G label.

<sup>2</sup> More information on different cultivars is warranted.

<sup>3</sup> For these plants, the one or two trials presented here indicate no phytotoxicity or slight, transient injury, but these findings need to be confirmed.

<sup>4</sup> Genera or closely related species already on list of 'Sensitive Species' in current label.

### ***Phytotoxicity of SureGuard 51WDG***

**In general, SureGuard 51WDG exhibited no or minimal negative impact on conifers and two other plant species (Table 17). Eleven plant species or genera fell into this category; all of these are already listed in the current SureGuard label. 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. For three crop species, there was no or little injury exhibited at the 0.25 or 0.375 lb ai per acre rates, but significant phytotoxicity occurred at 0.5 lb ai per acre or higher (**

Table 18). Thirty-three crops exhibited sufficient damage to not recommend SureGuard 51WDG over the top applications (Table 19). In Table 20, thirty-seven ornamental genera or species are listed where only 1 or 2 trials were conducted through IR-4. Nineteen of these crops exhibited no or minimal transitory injury, and nine species or genera are already in the current label.

Please see Table 22 for a list of research and a summary of the individual trial results with SureGuard 51WDG.

**Table 17. List of SureGuard 51WDG treated crops with no or minimal transitory injury with applications over dormant or actively growing plants.**

<i>Abies balsamea</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	<i>Pinus nigra</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)
<i>Abies fraseri</i> <sup>1, 2</sup> (0.25 – 0.68 lb ai/acre)	<i>Pinus eliottii</i> <sup>1</sup> (0.17 – 0.68 lb ai/acre)
<i>Juniperus communis</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)	<i>Pinus thunbergiana</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)
<i>Juniperus horizontalis</i> <sup>1</sup> (0.17 – 0.34 lb ai/acre)	<i>Quercus rubra</i> <sup>1</sup> (0.17 – 1.5 lb ai/acre)
<i>Juniperus squamata</i> <sup>1</sup> (0.17 – 1.0 lb ai/acre)	<i>Thuja sp.</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)
<i>Pinus mugo</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)	

<sup>1</sup>Genera or closely related species already registered on current Sureguard 51WDG label.

<sup>2</sup> Applications on actively growing plants caused injury.

**Table 18. List of SureGuard 51WDG treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity**

<i>Berberis thunbergii</i> <sup>1</sup> (0.25 – 1.0 lb ai/acre)
<i>Clethra alnifolia</i> (0.25 – 1.0 lb ai/acre)
<i>Vinca minor</i> (0.375 – 1.5 lb ai/acre)

<sup>1</sup> Application during bud break caused injury, but no visible injury occurred with applications to mature foliage.



**Table 19. List of SureGuard 51WDG treated crops exhibiting significant injury.**

<i>Buxus macrophylla</i> 'Green Velvet'	<i>Picea abies</i>
<i>Cotoneaster dammeri</i>	<i>Picea glauca</i>
<i>Deutzia gracilis</i>	<i>Pieris japonica</i>
<i>Helleborus niger</i>	<i>Potentilla fruticosa</i>
<i>Hemerocallis</i> sp.	<i>Rhododendron</i> sp.
<i>Hydrangea macrophylla</i>	<i>Rosa</i> sp.
<i>Hydrangea paniculata</i>	<i>Rudbeckia fulgida speciosa</i>
<i>Iberis</i> sp.	<i>Salvia sylvestris</i>
<i>Ilex crenata</i>	<i>Spirea nipponica</i>
<i>Ilex x meserveae</i>	<i>Spirea x vanhouttei</i>
<i>Ilex verticillata</i>	<i>Vaccinium ashei</i>
<i>Lagerstroemia indica</i>	<i>Viburnum carlesii</i>
<i>Liriope muscari</i>	<i>Viburnum dentatum</i>
<i>Liriope spicata</i>	<i>Viburnum juddii</i>
<i>Osmunda regalis</i>	<i>Viburnum plicatum</i> var. <i>tomentosum</i>
<i>Pennisetum setaceum</i>	<i>Viburnum x bodnantense</i>
<i>Phalaris arundinacea</i>	

**Table 20. List of SureGuard 51WDG treated crops where more information is needed.**

<i>Abies bornmuelleriana</i> <sup>1, 2</sup>	<i>Fraxinus pennsylvanica</i> <sup>2</sup>
<i>Abies lasiocarpa</i> <sup>1, 2</sup>	<i>Hedera helix</i>
<i>Abies procera</i> <sup>1</sup>	<i>Hibiscus</i> sp.
<i>Acer rubrum</i> <sup>1, 2</sup>	<i>Hosta</i> sp. <sup>2</sup>
<i>Achillea millefolium</i> <sup>2</sup>	<i>Hydrangea quercifolia</i>
<i>Betula nigra</i> <sup>1, 2</sup>	<i>Juniperus virginiana</i> <sup>1</sup>
<i>Buddleia davidii</i> <sup>2</sup>	<i>Lilium longiflorum</i> <sup>2</sup>
<i>Carex</i> sp.	<i>Nandina domestica</i>
<i>Cedrus deodara</i>	<i>Pseudotsuga menziesii</i> <sup>1</sup>
<i>Ceratiola ericoides</i> <sup>2</sup>	<i>Rosa virginiana</i>
<i>Ceratostigma plumbaginoides</i>	<i>Sequoiadendron giganteum</i>
<i>Chamaecyparis obtusa</i> <sup>2</sup>	<i>Syringa</i> sp.
<i>Chamaecyparis pisifera</i> <sup>2</sup>	<i>Taxus cuspidata</i> <sup>1, 2</sup>
<i>Cleyera japonica</i> <sup>2</sup>	<i>Trachelospermum asiaticum</i> <sup>2</sup>
<i>Cortaderia selloana</i>	<i>Verbena</i> sp. <sup>2</sup>
<i>Cotinus coggygria</i> <sup>2</sup>	<i>Viburnum nudum</i>
<i>Echinacea</i> sp.	<i>Viburnum rhytidophyllum</i>
<i>Euonymus alatus</i> <sup>2</sup>	<i>Viburnum trilobum</i> <sup>2</sup>
<i>Forsythia</i> sp.	

<sup>1</sup> Genera or closely related species already registered on the current Sureguard 51WDG label.

<sup>2</sup> For these plants, the one or two trials presented here indicate no phytotoxicity or slight, transient injury, but these findings need to be confirmed.

**Table 21. Detailed Summary of Crop Safety Testing with Broadstar 0.17G, Broadstar 0.25G, and Broadstar 0.25G VC1604 (flumioxazin)**

Note: Table entries are sorted by crop Latin name. Only those trials with research reports received by 2/3/2016 are listed below.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
19951	Abelia (Abelia sp.) A. x grandiflora 'John Creech'	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	No injury after single application of 0.25, 0.5 and 1.0 lb ai per acre, but the highest rate did exhibit slight injury after the second application.
19951	Abelia (Abelia sp.) A. x grandiflora 'Sherwoodii'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	Slight transient injury at all rates (0.25, 0.5, and 1.0 lb ai per acre).
19951	Abelia (Abelia sp.) A. grandiflora	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No significant injury at 0.25, 0.5 or 1.0 lb ai per acre; excellent weed control.
27076	Abelia (Abelia sp.) 'Edward Goucher'	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27076	Abelia (Abelia sp.) A. zanderi 'Little Richard'	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27076	Abelia (Abelia sp.) A. grandiflora	BroadStar 0.25G VC1604	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.375, 0.75 and 1.5 lb ai per acre.
27076	Abelia (Abelia sp.) A. grandiflora 'Edward Goucher'	BroadStar 0.25G VC1604	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19869	Fir (Abies sp.) A. koreana	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27079	Fir (Abies sp.) A. fraseri	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27079	Fir (Abies sp.) A. balsamea	BroadStar 0.25G VC1604	Field Container	Freiberger	NJ	2008	Directed	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27079	Fir (Abies sp.) A. fraseri	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants saleable.
27079	Fir (Abies sp.) Fir Idaho Grand	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2009	Over the top	One application only; no significant injury at 0.375, 0.75 and 1.5 lb ai per acre.
19954	Maple, Amur (Acer ginnala)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
20012	Maple, Japanese (Acer palmatum)	BroadStar 0.17G	Field In-Ground	Anderson	OH	2002	Broadcast to soil	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
19955	Maple, Japanese (Acer palmatum) 'Bloodgood'	BroadStar 0.25G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre; good efficacy for hairy bittercress, yellow woodsorrel, hairy willowweed and dandelion.
19955	Maple, Japanese (Acer palmatum) 'Atropurpureum'	BroadStar 0.25G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27084	Maple, Japanese (Acer palmatum) 'Atropurpureum'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
27084	Maple, Japanese (Acer palmatum) 'Atropurpureum'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27084	Maple, Japanese (Acer palmatum) Maple Japanese	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2009	Over the top	One application only; no injury at 0.375, 0.75 and 1.5 lb ai per acre.
27084	Maple, Japanese (Acer palmatum)	BroadStar 0.25G VC1604	Field Container	Reding	OH	2009	Over the top	No injury and no significant difference in growth or marketability with 0.375, 0.75 and 1.5 lb ai per acre.
27088	Maple, Red (Acer rubrum) 'Summer'	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.375, 0.75, and 1.5 lb ai per acre with two applications.
27088	Maple, Red (Acer rubrum)	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	Slight injury with complete recovery at 0.375, 0.75 and 1.5 lb ai per acre; no growth reduction.
27088	Maple, Red (Acer rubrum)	BroadStar 0.25G VC1604	Field Container	Reding	OH	2009	Over the top	No injury and no significant difference in growth or marketability with 0.375, 0.75 and 1.5 lb ai per acre.
19870	Maple (Acer sp.) A. pennsylvanicum	BroadStar 0.25G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19870	Maple (Acer sp.) A. rubrum	BroadStar 0.25G	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.97, 1.84 and 3.88 lb ai per acre with single application.
19884	Maple (Acer sp.) A. rubrum	BroadStar 0.25G	Field In-Ground	Hart	NJ	2001	Ground broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19884	Maple (Acer sp.) A. rubrum	BroadStar 0.25G	Field In-Ground	Hitcher	NJ	2001	Ground broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
27093	Maple (Acer sp.) A. saccharum	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27093	Maple (Acer sp.) A. palmatum	BroadStar 0.25G VC1604	Field Container	Ahrens/Mervosh	CT	2009	Broadcast	Minor crop injury and no reduction in growth with 0.375, 0.75, 1.5 lb ai per acre.
27093	Maple (Acer sp.) A. saccharinum	BroadStar 0.25G VC1604	Field Container	Derr	VA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27093	Maple (Acer sp.) A. ginnala	BroadStar 0.25G VC1604	Field Container	Reding	OH	2009	Over the top	No injury and no significant difference in growth or marketability with 0.375, 0.75 and 1.5 lb ai per acre.
19952	Yarrow (Achillea millefolium) 'Moonshine'	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	Injury observed at 0.17, 0.34, and 0.68 with some recovery seen at the two lower rates.
19952	Yarrow (Achillea millefolium) 'Red Beauty'	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	Fort Collins: Moderate injury to mortality occurred increasing with rate (0.25, 0.5, 1.0 lb ai per acre).
28469	Lily-Of-The-Nile (Agapanthus sp.) A. africanus 'Peter Pan'	BroadStar 0.25G VC1604	Field Container	Uber	CA	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
28469	Lily-Of-The-Nile (Agapanthus sp.) A. sp.	BroadStar 0.25G VC1604	Field Container	Derr	VA	2010	Over the top	Three to five percent crop injury (tip burn) which decreased over time (32 and 46 DAT and 3 DAT2. Weed control (chamberbitter, tassleflower, S. crabgrass, annual sedge) increased with increasing rates.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
28469	Lily-Of-The-Nile (Agapanthus sp.)	BroadStar 0.25G VC1604	Field Container	Wilén	CA	2010	Over the top	No crop injury or reduction in growth index with one and two applications of 150, 300 and 600 lb per acre. Some brown streaking was noted with 300 lb rate 2 WAT but plant grew out of it by 4WAT.
22935	Mugwort, White (Artemisia lactiflora) 'Guizho'	BroadStar 0.25G	Field Container	Klett	CO	2002		No visual phytotoxicity at 0.25 and 0.5 lb ai per acre; good weed control.
22935	Mugwort, White (Artemisia lactiflora) 'Guizho'	BroadStar 0.25G	Field Container	Klett	CO	2002		No visual phytotoxicity at 0.25 and 0.5 lb ai per acre; good weed control.
22935	Mugwort, White (Artemisia lactiflora) A. schmidtiana	BroadStar 0.25G	Field Container	Boydston	WA	2003	Broadcast	No injury after single application at all rates (0.25, 0.5, 1.0 lb ai per acre), but plants were beginning to go dormant at the second application so data is inconclusive.
19961	Fern, Japanese Painted (Athyrium goeringianum) 'Pictum'	BroadStar 0.25G	Field Container	Anderson	OH	2001	Broadcast	Minor to moderate injury with all treatments (0.17, 0.34 or 0.68 lb ai per acre), but plants were not marketable; excellent control of yellow woodsorrel and hairy willowweed.
19963	Barberry (Berberis sp.) B. thunbergii 'William Penn'	BroadStar 0.17G	Field Container	Hart	NJ	2000	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19963	Barberry (Berberis sp.) B. gladwynensis	BroadStar 0.17G	Field Container	Hart	NJ	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19963	Barberry (Berberis sp.) B. thunbergii 'Atropurpurea'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19963	Barberry (Berberis sp.) B. thunbergii 'Rosie Glow'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	Significant injury increasing with rate when applied at bud break, but no injury occurred with applications to mature foliage (0.25, 0.5 and 1.0 lb ai per acre).
19963	Barberry (Berberis sp.) 'Rosy Glow'	BroadStar 0.17G	Field Container	Derr	VA	2002		No visible injury or growth suppression at 0.25, 0.5 or 1.0 lb ai per acre; good to excellent spurge control and large crabgrass control increased with rate.
19963	Barberry (Berberis sp.) B. thunbergii var. atropurpurea (Rose Glow)	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No phytotoxicity observed at 0.25, 0.5 or 1.0 lb ai per acre; good to excellent weed control.
26669	Barberry (Berberis sp.) B. thunbergii 'Rose Glow'	BroadStar 0.25G	Field Container	Altland	OR	2003	Broadcast	No visible injury or growth suppression at 0.25, 0.5 or 1.0 lb ai per acre.
26669	Barberry (Berberis sp.)	BroadStar 0.25G	Field Container	Hart	NJ	2003	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
27100	Barberry (Berberis sp.) B. thunbergii atropurpureum 'Crimson Pygmy'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27100	Barberry (Berberis sp.) B. thunbergii 'Crimson Pigmy'	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2008	Over the top	Phytotoxicity data inconclusive, no significant growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
27100	Barberry (Berberis sp.) B. thunbergii 'Amber Glow'	BroadStar 0.25G VC1604	Field Container	Uber	CA	2008	Over the top	Although plants suffered environmental stress, data showed no or less injury and taller plants than untreated at 0.375, 0.75 and 1.5 lb ai per acre.
27100	Barberry (Berberis sp.) B. thunbergii 'Crimson Pygmy'	BroadStar 0.25G VC1604	Field Container	Williams	IL	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19874	Butterfly Bush (Buddleia davidii) 'Lochinch'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19874	Butterfly Bush (Buddleia davidii)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19874	Butterfly Bush (Buddleia davidii)	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	Minor but transient injury at 0.5 and 1.0 lb ai per acre; excellent weed control.
19874	Butterfly Bush (Buddleia davidii) 'Black Knight'	BroadStar 0.17G	Field Container	Neal	NC	2002	Over the top	Very slight to moderate injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre) with no injury from newly emerged leaves.
19888	Butterfly Bush (Buddleia davidii) 'Lochinch'	BroadStar 0.17G	Field In-Ground	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
27103	Butterfly Bush (Buddleia davidii) 'Pink Delight'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27103	Butterfly Bush (Buddleia davidii)	BroadStar 0.25G VC1604	Field Container	Derr	VA	2008	Over the top	No significant injury at 0.375, 0.75, and 1.5 lb ai per acre.
27103	Butterfly Bush (Buddleia davidii) 'Nanho Blue'	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2008	Over the top	No significant injury and growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19964	Boxwood (Buxus sp.) 'Green Velvet'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19964	Boxwood (Buxus sp.) B. microphylla	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	No injury at 0.25, 0.34, 0.5 and 1.0 lb ai per acre.
19964	Boxwood (Buxus sp.) B. microphylla var. japonica	BroadStar 0.17G	Field Container	Derr	VA	2002	Broadcast	No visible injury or growth suppression at 0.25, 0.5 or 1.0 lb ai per acre; good to excellent control of spurge, large crabgrass control increased with rate.
19964	Boxwood (Buxus sp.) B. microphylla	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	Minor but transient injury with 0.5 and 1.0 lb ai per acre; some control of spurge, but impact was lost by 90 DAT.
19964	Boxwood (Buxus sp.) B. microphylla	BroadStar 0.17G	Field Container	Neal	NC	2002	Over the top	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19964	Boxwood (Buxus sp.) 'Winter Gem'	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	Fort Collins: No injury or growth suppression at 0.25, 0.5 or 1.0 lb ai per acre.
20021	Boxwood (Buxus sp.) B. microphylla koreana	BroadStar 0.17G	Field In-Ground	Beste	MD	2000	Broadcast	No injury with 0.17, 0.34 or 0.68 lb ai per acre; only 0.68 lb ai per acre provided excellent control of chickweed.
20021	Boxwood (Buxus sp.) 'Velvet Green'	BroadStar 0.17G	Field In-Ground	Anderson	OH	2002	Broadcast to soil surface	No injury with 0.25, 0.5 or 1.0 lb ai per acre.

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27106	Boxwood (Buxus sp.) B. 'Green Mountain'	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No injury but slight growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27106	Boxwood (Buxus sp.) B. 'Wintergem'	BroadStar 0.25G VC1604	Field Container	Trader	MS	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19966	Heather (Calluna sp.) C. vulgaris 'H.E.Beale'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
25021	Camellia (Camellia sp.) 'Bessie Battle'	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
27111	Camellia (Camellia sp.) C. sasanqua 'Pink Charm'	BroadStar 0.25G VC1604	Field Container	Trader	MS	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27111	Camellia (Camellia sp.) C. japonica	BroadStar 0.25G VC1604	Field Container	Wade	SC	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27111	Camellia (Camellia sp.) C. vernalis 'Yuletide'	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27111	Camellia (Camellia sp.) C. japonica	BroadStar 0.25G VC1604	Field Container	Wade	GA	2009	Over the top	No injury or significant growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27796	Sedge, Grassland (Carex divulsa)	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2009	Over the top	One application only. No significant injury at 0.375, 0.75 and 1.5 lb ai per acre; root dry weight significantly reduced at all rates.
27796	Sedge, Grassland (Carex divulsa) C. oshimensis 'Evergold'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2010	Over the top	Slight injury at 0.375 and 0.75, moderate at 1.5 lb ai per acre; no growth reduction; plants at 1X and 2X saleable.
19762	Sedge (Carex sp.) C. buchananii	BroadStar 0.25G	Field Container	Klett	CO	2003	Soil	Grand Junction: no injury at 0.25, 0.5 and 1.0 lb ai per acre.
19762	Sedge (Carex sp.) C buchananiix	BroadStar 0.25G	Field Container	Boydston	WA	2004	Over the top	No injury at 150, 300 and 600 lb prod per acre; all plants marketable.
24814	Sedge (Carex sp.) C. buchananii	BroadStar 0.25G	Field Container	Boydston	WA	2004	Broadcast	No injury at 0.375, 0.75, and 1.5 lb ai per acre; great control of liverwort, dandelion, northern willow herb, and prickly lettuce.
29256	Caryopteris (Caryopteris x clandonensis ) 'Sunshine Blue'	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375 and 0.75, slight at 1.5 lb ai per acre.
28729	Ceanothus, maritime (Ceanothus maritimus)	BroadStar 0.25G VC1604	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all treated plants saleable.
28729	Ceanothus, maritime (Ceanothus maritimus) C. maritimus 'Dark Star'	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2010	Over the top	Only one application at 150, 300, 600 lb per acre was applied which resulted in minor to significant crop 4 WAT injury which decreased with increasing rates. Trial should be repeated with a different Ceanothus cultivar or established 3 gal container plant
28729	Ceanothus, maritime (Ceanothus maritimus)	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2011	Over the top	No injury or significant growth reduction with 0.375, 0.75 and 1.5 lb ai per acre applied twice.
29235	Ceanothus sp. (Ceanothus sp.) 'Concha'	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2009	Over the top	One application only. No significant injury at 0.375, 0.75 and 1.5 lb ai per acre; root and shoot dry weights significantly reduced at all rates.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
29235	Ceanothus sp. (Ceanothus sp.) C. americanus	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2011	Broadcast	Leaf spotting observed from two sequential applications at 0.375, 0.75, 1.5 lb ai per acre. Unacceptable injury ratings 2WAT with 4X but all plants marketable.
28733	Ceanothus (Ceanothus x pallida) 'Marie Simon'	BroadStar 0.25G VC1604	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all treated plants saleable.
28733	Ceanothus (Ceanothus x pallida)	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2011	Over the top	No injury with 0.375 and 0.75, slight with 1.5 lb ai per acre, applied twice; high growth reduction at 4X.
26145	Cedar (Cedrus deodara)	BroadStar 0.25G	Field Container	Altland	OR	2003	Broadcast	No visible injury at 0.25, 0.5, and 1.0 lb ai per acre.
19971	Snow-In-Summer (Cerastium tomentosum)	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	Fort Collins: No injury at 0.25 lb ai per acre, but moderate injury to mortality with 0.5 and 1.0 lb ai per acre.
23642	False cypress (Chamaecyparis obtusa) 'Templehof'	BroadStar 0.25G	Field Container	Altland	OR	2003	Broadcast	No injury or growth reduction with two applications of 0.25, 0.5, and 1.0 lb ai per acre.
27816	Chrysanthemum, Garden (Chrysanthemum/Dendranthema sp.) 'Sheffield Pink'	BroadStar 0.25G	Field Container	Czarnota	GA	2007	Over the top	No significant injury at 0.25 lb ai per acre.
27117	Clematis (Clematis sp.)	BroadStar 0.25G VC1604	Field Container	Derr	VA	2008	Over the top	No significant injury at 0.375, 0.75, and 1.5 lb ai per acre.
27117	Clematis (Clematis sp.) C. integrifolia	BroadStar 0.25G VC1604	Field Container	Klett	CO	2008	Over the top	Trial 1: No injury at 0.375, 0.75 and 1.5 lb ai per acre; no growth reduction.
27117	Clematis (Clematis sp.) C. integrifolia	BroadStar 0.25G VC1604	Field Container	Klett	CO	2008	Over the top	Trial 2: No injury at 0.375, 0.75 and 1.5 lb ai per acre; no growth reduction.
27117	Clematis (Clematis sp.) 'Josephine' and 'Nellie Mosier'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants saleable.
19972	Summersweet (Clethra alnifolia)	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
20029	Summersweet (Clethra alnifolia)	BroadStar 0.17G	Field In- Ground	Beste/Frank (ARS)	MD	2005	Over the top	Slight injury at 0.25 and 0.5 lb ai per acre and moderate injury at 1.0 lb ai per acre after first application onto new foliage, but no significant injury after second application and no impact on flower spike number or plant growth.
26670	Summersweet (Clethra alnifolia) C. japonica	BroadStar 0.25G	Field Container	Gilliam	AL	2003	Ground	Some injury appeared over time with 0.375, 0.75 and 1.5 lb ai per acre, however a number of plants died in the untreated controls so interpretation of phytotoxicity impact is confounding; good weed control.
26670	Summersweet (Clethra alnifolia) 'Hummingbird'	BroadStar 0.25G	Field Container	Hart	NJ	2003	Broadcast	Slight injury at 0.25 and 0.5 lb ai per acre; moderate at 1.0 lb ai per acre.
27122	Summersweet (Clethra alnifolia)	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2010	Broadcast	Injury with one application at 0.374, 0.75, 1.5 lb ai per acre but injury unrelated to treatment was present. Reduced growth with 1x and 4x.

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27122	Summersweet (Clethra alnifolia)	BroadStar 0.25G VC1604	Field Container	Reding	OH	2010	Broadcast	No crop injury with 0.37, 0.75, 1.5 lb ai per acre.
19973	Cleyera (Cleyera japonica)	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	Slight injury but commercially acceptable at all rates (0.17, 0.34, and 0.68 lb ai per acre); excellent weed control.
19973	Cleyera (Cleyera japonica)	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	Slight to moderate injury increasing with rate (0.25, 0.5 and 1.0 lb ai per acre) with only the highest rate demonstrating slight injury at 90 DAT, but after second application all treatments resulted in marked but transient injury; good weed control.
19866	Dogwood, Flowering (Cornus florida)	BroadStar 0.17G	Field Container	Anderson	OH	2002	Broadcast to soil	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
27127	Dogwood, Flowering (Cornus florida)	BroadStar 0.25G VC1604	Field Container	Ahrens/Mervosh	CT	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre after 1st, slight after 2nd application.
27127	Dogwood, Flowering (Cornus florida)	BroadStar 0.25G VC1604	Field Container	Ahrens/Mervosh	CT	2009	Broadcast	Moderate crop injury with 2x and 4x but no reduction in growth after two applications at 0.375, 0.75, 1.5 lb ai per acre.
27127	Dogwood, Flowering (Cornus florida)	BroadStar 0.25G VC1604	Field Container	Reding	OH	2009	Over the top	No injury and no significant difference in growth or marketability with 0.375, 0.75 and 1.5 lb ai per acre.
19974	Dogwood, Red Osier (Cornus sericea)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19764	Pampas Grass (Cortaderia sp.) C. selloana 'Rosea'	BroadStar 0.25G	Field Container	Ahrens/Mervosh	CT	2003	Over the top	Very slight injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre).
19764	Pampas Grass (Cortaderia sp.) C. selloana	BroadStar 0.25G	Field Container	Gilliam	AL	2004	Ground	Very slight transient injury at 0.5 and 1.0 lb ai per acre with no injury at 0.25 lb ai per acre; great weed control.
19764	Pampas Grass (Cortaderia sp.) C. selloana 'Hoffman No. 5'	BroadStar 0.25G	Field Container	Beste/Frank (ARS)	MD	2005	Broadcast	Moderate to significant injury increasing with rate (0.375, 0.75, 1.5 lb ai per acre) but plants recovered and were marketable at the end of the experiment.
19823	Pampas Grass (Cortaderia sp.) C. selloana	BroadStar 0.25G	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground directed broadcast spray	Transient, moderate injury increasing with rate (0.375, 0.75, 1.5 lb ai per acre) with significant growth reduction; excellent weed control.
19976	Cotoneaster (Cotoneaster sp.) 'Striebs Findling'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19976	Cotoneaster (Cotoneaster sp.) C. lucidus	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19976	Cotoneaster (Cotoneaster sp.) C. dammeri 'Coral Beauty'	BroadStar 0.17G	Field Container	Neal	NC	2002	Over the top	No injury at 0.25 lb ai per acre, but slight to moderate injury was observed with 0.5 and 1.0 lb ai per acre with plants recovering by the end of the study.



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27132	Cotoneaster (Cotoneaster sp.) C. horizontalis 'Perpusillus'	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2008	Over the top	Phytotoxicity data inconclusive due to heat stress, no growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27132	Cotoneaster (Cotoneaster sp.) C. glaucophyllus	BroadStar 0.25G VC1604	Field Container	Uber	CA	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27137	Hawthorn (Crataegus sp.) C. coccinoid	BroadStar 0.25G VC1604	Field Container	Freiberger	NJ	2009	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre applied once at 2nd applic timing.
27137	Hawthorn (Crataegus sp.)	BroadStar 0.25G VC1604	Field Container	Reding	OH	2010	Broadcast	No crop injury with 0.37, 0.75, 1.5 lb ai per acre but significant reduction in height with 1x and 4x compared to untreated. All plants were marketable.
27137	Hawthorn (Crataegus sp.) C. monogyna	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2011	Broadcast	Leaf spotting observed from two sequential applications at 0.375, 0.75, 1.5 lb ai per acre. All plants marketable.
27142	Japanese Cedar (Cryptomeria japonica) 'Yoshino'	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.375, 0.75 and 1.5 lb ai per acre.
27142	Japanese Cedar (Cryptomeria japonica) 'Black Dragon'	BroadStar 0.25G VC1604	Field Container	Neal	NC	2009	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27142	Japanese Cedar (Cryptomeria japonica) 'Yoshino'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2010	Over the top	No crop injury or reduction in height x width with one application at 0.374, 0.75, 1.5 lb ai per acre. Pots treated with 4x were devoid of weeds.
25297	Mexican Heather, False Heather, Elfin Herb (Cuphea hyssopifolia)	BroadStar 0.25G	Field In-Ground	Chen	LA	2005		Severe injury and mortality over time with all rates (0.375, 0.75, 1.5 lb ai per acre).
19908	Cypress (Cupressus sp.)	BroadStar 0.17G	Field Container	Hitchner	NJ	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19978	Broom (Cytisus sp.) C. purgans	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	Grand Junction: No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19980	Daphne (Daphne sp.) D. odora 'Aureo-marginata'	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	The only injury observed was where granules adhered to the foliage with no injury apparent after 4 weeks (0.25 and 0.5 lb ai per acre).
19765	Hardy Ice Plant, Yellow Ice Plant (Delosperma nubigenum) D. alba	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19766	Hair Grass (Deschampsia sp.) 'Goldehaedge'	BroadStar 0.25G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19979	Pride-of-Rochester (Deutzia sp.) 'Nikko'	BroadStar 0.25G	Field Container	Anderson	OH	2001	Broadcast	Slight to significant injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre).
20007	Russian Olive (Elaeagnus angustifolia)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
28709	California fuschia (Epilobium canum)	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2009	Over the top	One application only. No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19982	Heath (Erica sp.) E. cinerea 'Purple Beauty'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.

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20156	Winged Burning Bush (Euonymus alatus)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27147	Winged Burning Bush (Euonymus alatus) E. alatus 'Compactus'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27147	Winged Burning Bush (Euonymus alatus) E. fortunei 'Coloratus'	BroadStar 0.25G VC1604	Field Container	Williams	IL	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19773	Blue Fescue (Festuca glauca)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19773	Blue Fescue (Festuca glauca) 'Elijah Blue'	BroadStar 0.17G	Field Container	Klett	CO	2003		Grand Junction: No injury at 0.25, 0.5 and 1.0 lb ai per acre.
26672	Blue Fescue (Festuca glauca) 'Elijah Blue'	BroadStar 0.25G	Field Container	Ahrens/Mervosh	CT	2003	Over the top	No injury at 0.25 lb ai per acre and very slight at 0.5 and 1.0 lb ai per acre; excellent control of large crabgrass and common groundsel.
19984	Golden Bells (Forsythia sp.) F. suspensa	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19984	Golden Bells (Forsythia sp.) F. x intermedia	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No injury at 0.25, 0.5 or 1.0 lb ai per acre; some control of weeds in this trial as measured by percent cover.
28258	Golden Bells (Forsythia sp.) F. x intermedia 'Golden Bell'	BroadStar 0.25G VC1604	Field Container	Mickelbart	IN	2008	Over the top	No injury at 0.375, 0.75, and 1.5 lb ai per acre with single application 3 weeks after transplanting.
19871	Ash (Fraxinus sp.) F. americana	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19912	Ash (Fraxinus sp.) F. pennsylvanica	BroadStar 0.25G	Field In- Ground	Hitnher	NJ	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19985	Jasmine, Cape, Common Gardenia (Gardenia sp.)	BroadStar 0.25G	Field Container	Gilliam	AL	2003	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19985	Jasmine, Cape, Common Gardenia (Gardenia sp.) G. jasminoides 'Klines Hardy'	BroadStar 0.25G	Field Container	Gilliam	AL	2003	Ground	No to very slight injury was observed (0.375, 0.75, 1.5 lb ai per acre); excellent weed control.
19775	Treasure Flower (Gazania sp.) 'Sunshine Improved Mix'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19987	Carolinia Jessamine; Evening Trumpet Flower (Gelsemium sp.) G. sempervirens	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	Injury (brown spots on upper leaf surfaces) only observed at 1.0 lb ai per acre; good to great control of oxalis.
19872	Honey Locust (Gleditsia sp.) G. tricanthos	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27153	Honey Locust (Gleditsia sp.) G. internis	BroadStar 0.25G VC1604	Field Container	Freiberger	NJ	2009		No injury at 0.375, 0.75 and 1.5 lb ai per acre applied once at 2nd applic timing.
27153	Honey Locust (Gleditsia sp.) Gleditsia triacanthos	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2009	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27153	Honey Locust (Gleditsia sp.) G. tricanthos	BroadStar 0.25G VC1604	Field Container	Reding	OH	2010	Broadcast	No injury with 0.37, 0.75, 1.5 lb ai per acre.

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19776	Baby's Breath ( <i>Gypsophila elegans</i> )	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19776	Baby's Breath ( <i>Gypsophila elegans</i> ) 'Gypsy'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19835	Baby's Breath ( <i>Gypsophila elegans</i> )	BroadStar 0.17G	Field In-Ground	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19777	Hakone Grass, Japanese Forest Grass ( <i>Hakonechloa</i> sp.) 'Aureola'	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	No injury at 0.25 or 0.5 lb ai per acre, but 1.0 lb ai per acre reduced growth.
19779	English Ivy ( <i>Hedera helix</i> L. ssp. <i>Helix</i> )	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19779	English Ivy ( <i>Hedera helix</i> L. ssp. <i>Helix</i> )	BroadStar 0.17G	Field Container	Derr	VA	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
19779	English Ivy ( <i>Hedera helix</i> L. ssp. <i>Helix</i> )	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No significant injury at 0.25, 0.5, and 1.0 lb ai per acre; weed control increased with rate.
19779	English Ivy ( <i>Hedera helix</i> L. ssp. <i>Helix</i> ) <i>H. colchica dentata</i>	BroadStar 0.17G	Field Container	Hitnher	NJ	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
28036	Hellebore, Christmas rose, Lenten Rose ( <i>Helleborus niger</i> ) <i>H. orientalis</i>	BroadStar 0.25G	Field Container	Czarnota	GA	2004	Over the top	No injury at 0.375 lb ai per acre through 4 weeks after treatment, but very slight injury appeared 8 and 12 weeks after treatments.
19780	Daylily ( <i>Hemerocallis</i> sp.) 'Stella d'Oro'	BroadStar 0.17G	Field Container	Beste	MD	2000	Broadcast	Slight, transient chlorosis at 0.17, 0.34, and 0.68 lb ai per acre.
19780	Daylily ( <i>Hemerocallis</i> sp.) 'Red Cadet'	BroadStar 0.17G	Field Container	Hart	NJ	2000	Broadcast	Severe leaf burning and growth reductions after single application of 0.17, 0.34, and 0.68 lb ai per acre.
19780	Daylily ( <i>Hemerocallis</i> sp.) 'Stella d'Oro'	BroadStar 0.17G	Field Container	Derr	VA	2001	Over the top	Slight transient injury at 0.17, 0.34, and 0.68 lb ai per acre; great pre-emergent control of yellow woodsorrel.
19780	Daylily ( <i>Hemerocallis</i> sp.)	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	Slight to moderate injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre), but by 90 DAT the injury was not significantly different than untreated; excellent control of spurge.
19780	Daylily ( <i>Hemerocallis</i> sp.) 'Campfire Embers'	BroadStar 0.17G	Field Container	Linderman	OR	2001		No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19780	Daylily ( <i>Hemerocallis</i> sp.)	BroadStar 0.17G	Field Container	Fraelich	GA	2002	Broadcast	No phyto at 0.25 lb ai per acre, and very slight phyto at 0.5 and 1.0 lb ai per acre.
19780	Daylily ( <i>Hemerocallis</i> sp.) 'Janice Brown'	BroadStar 0.17G	Field Container	Hitnher	NJ	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19780	Daylily ( <i>Hemerocallis</i> sp.) 'Ming Toy'	BroadStar 0.17G	Field Container	Knight	MS	2002	Ground	Moderate injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre) with some minimal recovery.
28741	Toyon, Christmas Berry ( <i>Heteromeles arbutifolia</i> )	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2009	Over the top	One application only. Acceptable injury at 0.375, 0.75 and 1.5 lb ai per acre; root and shoot dry weights not reduced.

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19781	Hosta (Hosta sp.) H. fortunei 'Francee'	BroadStar 0.17G	Field Container	Derr	VA	2001	Over the top	Moderate to significant injury increasing with rate (0.17, 0.34, and 0.58 lb ai per acre); good to excellent control of spotted prostrate spurge.
19781	Hosta (Hosta sp.) H. plantaginea 'Albo Marginata'	BroadStar 0.17G	Field Container	Hart	NJ	2001	Broadcast	Significant leaf burning and growth reductions occurred at 0.17, 0.34, and 0.68 lb ai per acre.
19781	Hosta (Hosta sp.) H. nigrescens 'Eliator'	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	Significant injury occurred with all rates (0.25, 0.5 and 1 lb ai per acre), with only the 0.25 lb ai per acre recovering by 90 DAT; good weed control.
20155	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	BroadStar 0.17G	Field Container	Fraelich	GA	2002	Broadcast	No injury at 0.25 and 0.5 lb ai per acre, slight at 1.0 lb ai per acre.
20155	Hydrangea (Hydrangea sp.) 'Sister Teresa'	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	Significant injury even mortality with 0.5 and 1.0 lb ai per acre; good weed control.
20155	Hydrangea (Hydrangea sp.) H. arborescens 'Annabelle'	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	Fort Collins: Moderate chlorosis to necrosis increasing in severity with rate (0.25, 0.5, 1.0 lb ai per acre).
20154	Hydrangea (Hydrangea sp.) H. quercifolia	BroadStar 0.25G	Field Container	Hart	NJ	2003	Ground	Slight injury at 0.25 lb ai per acre with severe injury at 1.0 lb ai per acre.
20154	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	BroadStar 0.25G	Field Container	Czarnota	GA	2007	Over the top	10-45 % injury at 0.25 lb ai per acre.
27157	Hydrangea (Hydrangea sp.)	BroadStar 0.25G VC1604	Field Container	Derr	VA	2008	Over the top	No significant injury at 0.375 and 0.75, unacceptable at 1.5 lb ai per acre.
27157	Hydrangea (Hydrangea sp.) H. macrophylla 'Nikko Blue'	BroadStar 0.25G VC1604	Field Container	Fraelich	GA	2008	Over the top	No injury or growth reduction at 150, 300 and 600 lb per acre; all plants marketable.
27157	Hydrangea (Hydrangea sp.)	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2008	Over the top	Unacceptable injury and growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27157	Hydrangea (Hydrangea sp.) H. paniculata 'PeeGee'	BroadStar 0.25G VC1604	Field Container	Mickelbart	IN	2008	Over the top	No injury at 0.375, 0.75, and 1.5 lb ai per acre with single application 3 weeks after transplanting.
19783	Candytuft (Iberis sp.) 'Iceber Superior'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19783	Candytuft (Iberis sp.) I. pygmae	BroadStar 0.17G	Field Container	Anderson	OH	2002	Broadcast to media surface	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
19989	Holly (Ilex sp.) I. crenata 'Honey Bee'	BroadStar 0.17G	Field Container	Hart	NJ	2000	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19989	Holly (Ilex sp.) I. x meserveae 'Blue Prince' & 'Blue Princess'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34 and 0.68 lb ai per acre.
19989	Holly (Ilex sp.) I. crenata 'Compacta'	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	No injury at 0.17, 0.34 and 0.68 lb ai per acre.
19989	Holly (Ilex sp.) I. x meserveae 'Blue Prince'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	No injury with single application prior to bud break, but slight injury (foliar spotting) increasing with rate (0.25, 0.5 and 1.0 lb ai per acre) after second application onto new foliage.

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19989	Holly (Ilex sp.) I. crenata compacta	BroadStar 0.17G	Field Container	Derr	VA	2002	Broadcast	No injury with 0.25, 0.5 or 1.0 lb ai per acre; excellent spurge control and large crabgrass control increased with rate.
19989	Holly (Ilex sp.) I. crenata compacta	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No injury with 0.25 and 0.5 lb ai per acre and slight transient with 1.0 lb ai per acre; good weed control.
19989	Holly (Ilex sp.) 'Berry Heavy/Southern Giant'	BroadStar 0.17G	Field Container	Hitchner	NJ	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19989	Holly (Ilex sp.) I. x meserveae 'Blue Girl'	BroadStar 0.17G	Field Container	Hitchner	NJ	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19989	Holly (Ilex sp.) I. cornuta 'Dwarf Buford'	BroadStar 0.17G	Field Container	Neal	NC	2002	Over the top	No injury with 0.25, 0.5, and 1.0 lb ai per acre.
20046	Holly (Ilex sp.) I. x meserveae 'Blue Girl' 'Blue Boy'	BroadStar 0.17G	Field In-Ground	Ahrens/Mervosh	CT	2000	Broadcast	Slight to moderate injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre) with recovery occurring in 6 weeks to an acceptable level at the two lower rates; moderate suppression of mugwort.
20046	Holly (Ilex sp.) I. crenata 'Compacta'	BroadStar 0.17G	Field In-Ground	Beste	MD	2000	Broadcast	Slight injury at 0.34 and 0.68 lb ai per acre, but none at 0.17 lb ai per acre; morningglory, annual chickweed, knawl, maretail and barnyardgrass were controlled at all rates.
20046	Holly (Ilex sp.) I. crenata 'Green Lustre'	BroadStar 0.17G	Field In-Ground	Beste	MD	2000	Broadcast	Unacceptable injury at 0.17, 0.34, and 0.68 lb ai per acre; no control of yellow nutsedge and limited control of barnyardgrass.
20046	Holly (Ilex sp.) I. glabra 'Compacta'	BroadStar 0.17G	Field In-Ground	Beste	MD	2000	Broadcast	Slight but acceptable injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre); excellent control of chickweed, prostrate spurge and maretail, but marginal control of ivyleaf morningglory, yellow nutsedge, Eclipta, smooth crabgrass, grasses and Poa
27818	Holly (Ilex sp.) 'Conaf'	BroadStar 0.25G	Field Container	Czarnota	GA	2007	Over the top	No injury at 0.25 lb ai per acre.
27160	Holly (Ilex sp.) I. vomitoria	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27160	Holly (Ilex sp.) I. crenata 'Convexa'	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27160	Holly (Ilex sp.) I. glabra 'Densa'	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27160	Holly (Ilex sp.) I. cornuta 'Needlepoint'	BroadStar 0.25G VC1604	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.375, 0.75 and 1.5 lb ai per acre.
19784	Jasmine, Jessamine (Jasminum sp.) J. nudiflorum	BroadStar 0.17G	Field Container	Knight	MS	2002	Ground	Significant damage at all rates (0.25, 0.5, 1.0 lb ai per acre).
19864	Juniper (Juniperus sp.) J. horizontalis 'Bar Harbor'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	No injury at 0.17, 0.34, or 0.68 lb ai per acre.

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19864	Juniper (Juniperus sp.) J. squamata 'Blue Star'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	No injury with 0.17, 0.34 or 0.68 lb ai per acre.
19864	Juniper (Juniperus sp.) J. conferta 'Blue Pacific'	BroadStar 0.17G	Field Container	Beste	MD	2000	Broadcast	No injury at 0.17, 0.34, or 0.68 lb ai per acre.
19864	Juniper (Juniperus sp.) J. horizontalis 'Bar Harbor'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	No injury at 0.17, 0.34, or 0.68 lb ai per acre with second year applications on same plants.
19864	Juniper (Juniperus sp.) J. squamata 'Blue Star'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre with second year applications on same plants; excellent weed control.
19864	Juniper (Juniperus sp.) J. rigida	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19864	Juniper (Juniperus sp.) J. horizontalis 'Wiltonii'	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	No injury at 0.25, 0.34, 0.5 and 1.0 lb ai per acre.
19864	Juniper (Juniperus sp.) J. communis 'Effusa'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
19864	Juniper (Juniperus sp.) J. squamata parsoni	BroadStar 0.17G	Field Container	Fraelich	GA	2002	Broadcast	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
19864	Juniper (Juniperus sp.) J. conferta 'Blue Pacific'	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No injury at 0.25, 0.5 or 1.0 lb ai per acre; good weed control.
19864	Juniper (Juniperus sp.) J. conferta 'Blue Pacific'	BroadStar 0.17G	Field Container	Neal	NC	2002	Over the top	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
19875	Juniper (Juniperus sp.) J. conferta 'Blue Pacific'	BroadStar 0.25G	Field Container	Gilliam	AL	2003	Ground	No injury at 0.375, 0.75, and 1.5 lb ai per acre; great weed control.
27163	Juniper (Juniperus sp.) J. andorra	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2008	Over the top	1 application only; no injury at 0.375, 0.75 and 1.5 lb ai per acre.
27163	Juniper (Juniperus sp.) J. chinensis 'Sea Green'	BroadStar 0.25G VC1604	Field Container	Mickelbart	IN	2008	Over the top	No injury at 0.375, 0.75, and 1.5 lb ai per acre with single application 3 weeks after transplanting.
27163	Juniper (Juniperus sp.) J. communis 'Gold Totem Pole	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27163	Juniper (Juniperus sp.) J. conferta	BroadStar 0.25G VC1604	Field Container	Trader	MS	2008	Over the top	No significant injury at 0.375 and 0.75, slight at 1.5 lb ai per acre; no growth reduction
19893	Crape Myrtle (Lagerstroemia indica) 'Tuscarora'	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	Slight injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre), but not apparent at 90DAT; excellent weed control.
19893	Crape Myrtle (Lagerstroemia indica) 'Tuscarora'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
25694	Crape Myrtle (Lagerstroemia indica) 'Tuscarora'	BroadStar 0.25G	Field Container	Gilliam	AL	2003	Ground	No injury at 0.375, 0.75, or 1.5 lb ai per acre; excellent weed control.
25694	Crape Myrtle (Lagerstroemia indica) 'Zuni'	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
27166	Crape Myrtle (Lagerstroemia indica)	BroadStar 0.25G VC1604	Field Container	Derr	VA	2008	Over the top	No significant injury at 0.375, 0.75, and 1.5 lb ai per acre.
27166	Crape Myrtle (Lagerstroemia indica)	BroadStar 0.25G VC1604	Field Container	Fraelich	GA	2008	Over the top	No injury or growth reduction at 150, 300 and 600 lb per acre; all plants marketable.

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27166	Crape Myrtle ( <i>Lagerstroemia indica</i> ) 'Acoma'	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre with two applications.
27166	Crape Myrtle ( <i>Lagerstroemia indica</i> ) 'Natchez'	BroadStar 0.25G VC1604	Field Container	Wade	SC	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27819	Shrub Verbena ( <i>Lantana</i> sp.) 'New Gold'	BroadStar 0.25G	Field Container	Czarnota	GA	2007	Over the top	Virtually no injury at 0.25 lb ai per acre.
24983	Shrub Verbena ( <i>Lantana</i> sp.) 'New Gold'	BroadStar 0.25G	Field In-Ground	Chen	LA	2005	Broadcast	Slight injury at 0.375 and 0.75 lb ai per acre, high at 1.5 lb ai per acre.
27171	Lavender ( <i>Lavandula</i> sp.) L. <i>angustifolia</i> 'Munstead'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27171	Lavender ( <i>Lavandula</i> sp.) L. <i>angustifolia</i> 'Hidcote'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all treated plants saleable.
27171	Lavender ( <i>Lavandula</i> sp.) L. <i>angustifolia</i> 'Munstead'	BroadStar 0.25G VC1604	Field Container	Neal	NC	2009	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27171	Lavender ( <i>Lavandula</i> sp.) L. <i>angustifolia</i> 'Munstead'	BroadStar 0.25G VC1604	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27176	Fetterbush, Drooping Leucothoe ( <i>Leucothoe</i> sp.) L. <i>fontanesiana</i> 'Rainbow'	BroadStar 0.25G VC1604	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all treated plants saleable.
25023	Privet ( <i>Ligustrum</i> sp.)	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	No significant injury at 0.25, 0.5 and 1.0 lb ai per acre.
28472	Privet ( <i>Ligustrum</i> sp.) L. <i>lucidum</i>	BroadStar 0.25G VC1604	Field Container	Uber	CA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre after 1st, moderate after 2nd application; growth reduction at 2X and 4X.
19788	Lilyturf, Big Blue;Giant ( <i>Liriope muscari</i> ) 'Big Blue'	BroadStar 0.17G	Field Container	Beste	MD	2000	Broadcast	No injury observed with 0.17, 0.34, or 0.68 lb ai per acre.
19788	Lilyturf, Big Blue;Giant ( <i>Liriope muscari</i> ) L. <i>spicata</i> 'Big Blue'	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	Minor, but transient, with 0.17, 0.34, 0.68 lb ai per acre.
19788	Lilyturf, Big Blue;Giant ( <i>Liriope muscari</i> ) 'Variegata'	BroadStar 0.17G	Field Container	Anderson	OH	2002	Broadcast to soil surface	No injury with 0.25, 0.5, and 1.0 lb ai per acre.
19788	Lilyturf, Big Blue;Giant ( <i>Liriope muscari</i> ) 'Big Blue'	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No injury observed with 0.25, 0.5 and 1.0 lb ai per acre; good weed control.
19891	Lilyturf, Creeping ( <i>Liriope</i> sp.) L. <i>muscari</i> 'Variegata'	BroadStar 0.17G	Field Container	Derr	VA	2001	Over the top	Slight injury at all rates (0.17, 0.34, 0.68 lb ai per acre), but no impact on fresh weight or number of flower spikes.
19891	Lilyturf, Creeping ( <i>Liriope</i> sp.) 'Big Blue'	BroadStar 0.17G	Field Container	Fraelich	GA	2002	Broadcast	No injury at 0.25 and 0.5 lb ai per acre, slight at 1.0 lb ai per acre.
19891	Lilyturf, Creeping ( <i>Liriope</i> sp.) L. <i>muscari</i> 'Variegata'	BroadStar 0.17G	Field Container	Neal	NC	2002	Over the top	Moderate injury as exhibited by necrotic spots increasing with rate (0.25, 0.5, 1.0 lb ai per acre); foliage emerging after treatment was not visibly affected, but plants treated with 1.0 lb ai per acre were stunted.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
19789	Lilyturf, Creeping (Liriope sp.) L. spicata	BroadStar 0.25G	Field Container	Gilliam	AL	2003	Ground	Very slight, transient injury was observed at all rates (0.375, 0.75, 1.5 lb ai per acre); excellent weed control.
19789	Lilyturf, Creeping (Liriope sp.)	BroadStar 0.25G	Field Container	Gilliam	AL	2004	Ground	Minor injury at 0.25, 0.5 and 1.0 lb ai per acre.
19848	Lilyturf, Creeping (Liriope sp.) 'Big Blue'	BroadStar 0.25G	Field In- Ground	Chen	LA	2005	Broadcast	Moderate injury (0.375, 0.75, 1.5 lb ai per acre).
19990	Honeysuckle (Lonicera sp.) L. japonica	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No phytotoxicity was observed at 0.25, 0.5 and 1.0 lb ai per acre; good weed control.
19990	Honeysuckle (Lonicera sp.) L. tartarica 'Arnold Red'	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	Grand Junction: All rates (0.25, 0.5, 1.0 lb ai per acre) caused veinal chlorosis and leaf cupping.
24751	Loropetalum (Loropetalum sp.) L. chinense 'Ruby'	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
24751	Loropetalum (Loropetalum sp.) L. chinense rubrum	BroadStar 0.25G	Field Container	Czarnota	GA	2007	Over the top	Virtually no injury at 0.25 lb ai per acre.
27179	Loropetalum (Loropetalum sp.) L. chinense rubrum	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27179	Loropetalum (Loropetalum sp.) L. chinense rubrum	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.375, 0.75 and 1.5 lb ai per acre.
27179	Loropetalum (Loropetalum sp.)	BroadStar 0.25G VC1604	Field Container	Derr	VA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27179	Loropetalum (Loropetalum sp.) 'Purple Diamond'	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27179	Loropetalum (Loropetalum sp.)	BroadStar 0.25G VC1604	Field Container	Neal	NC	2009	Over the top	No significant injury at 0.375 and 0.75, slight at 1.5 lb ai per acre.
27182	Magnolia (Magnolia sp.) M. stellata 'Royal Star'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27182	Magnolia (Magnolia sp.) 'Waterlily'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury at 0.375, 0.75 and 1.5 lb ai per acre; reduced growth and marketability only with 4X.
27182	Magnolia (Magnolia sp.) M. virginiana	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27182	Magnolia (Magnolia sp.)	BroadStar 0.25G VC1604	Field Container	Reding	OH	2009	Over the top	No injury and no significant difference in growth or marketability with 0.375, 0.75 and 1.5 lb ai per acre.
27182	Magnolia (Magnolia sp.) M. grandiflora 'Alta'	BroadStar 0.25G VC1604	Field Container	Wade	SC	2009	Over the top	No injury or significant growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19790	Oregon Grape (Mahonia aquifolium)	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
27187	Apple & Crabapple (Non- Bearing) (Malus sp.) 'M.domestica'	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2009	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.



PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
27187	Apple & Crabapple (Non-Bearing) (Malus sp.)	BroadStar 0.25G VC1604	Field Container	Reding	OH	2009	Over the top	No injury and no significant difference in growth or marketability with 0.375, 0.75 and 1.5 lb ai per acre.
28713	Mexican deergrass (Muhlenbergia dubia)	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2009	Over the top	One application only. No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19992	Wax Myrtle (Myrica cerifera)	BroadStar 0.25G	Field Container	Gilliam	AL	2003	Ground	No injury at 0.375 lb ai per acre and very slight injury with 0.75 and 1.5 lb ai per acre; excellent weed control.
23662	Bayberry (Myrica pensylvanica)	BroadStar 0.17G	Field Container	Hart	NJ	2001	Broadcast	No injury at 0.17, 0.34 and 0.68 lb ai per acre.
26668	Bayberry (Myrica pensylvanica)	BroadStar 0.25G	Field Container	Hart	NJ	2003	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19993	Heavenly Bamboo (Nandina domestica) 'Firepower'	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	No injury after single application, however after the second application slight to moderate injury occurred at all rates (0.25, 0.34, 0.5, and 1.0 lb ai per acre).
20050	Heavenly Bamboo (Nandina domestica)	BroadStar 0.25G	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground broadcast	Moderate to significant injury and decreased growth increasing with rate (0.375, 0.75, 1.5 lb ai per acre) but plants exhibited minimal visible phytotoxicity at trial's end.
27190	Heavenly Bamboo (Nandina domestica) 'Firepower'	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre with two applications.
27190	Heavenly Bamboo (Nandina domestica)	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27190	Heavenly Bamboo (Nandina domestica) N. domestica	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2009	Over the top	Crop injury observed (approx 15-30%) by 4WAT with 0.375, and 1.5 lb ai (1x and 4x) but no significant reduction in height and width parameters were observed with any rate. Crop injury described as leaf distortion and chlorosis and red to purple leaflet ve
27190	Heavenly Bamboo (Nandina domestica)	BroadStar 0.25G VC1604	Field Container	Uber	CA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27195	Catnip (Nepeta cataria) 'Psfike'	BroadStar 0.25G VC1604	Field Container	Klett	CO	2008	Over the top	Trial 1: No injury at 0.375, 0.75 and 1.5 lb ai per acre; no growth reduction.
27195	Catnip (Nepeta cataria) 'Psfike'	BroadStar 0.25G VC1604	Field Container	Klett	CO	2008	Over the top	Trial 2: No injury at 0.375, 0.75 and 1.5 lb ai per acre; no growth reduction.
27195	Catnip (Nepeta cataria) N. cataria	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2009	Over the top	Significant crop injury (approx 15-35%) with 0.375, 0.75, and 1.5 lb ai at 30 DAT and plant canopy 23, 17, and 38% smaller, respectively, than untreated.
27200	Catmint (Nepeta x faasseni)	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2008	Over the top	Unacceptable injury and growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27200	Catmint (Nepeta x faasseni) 'Walkers Low'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all treated plants saleable.

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27200	Catmint (Nepeta x faasseni)	BroadStar 0.25G VC1604	Field Container	Wilén	CA	2012	Over the top	Slight, acceptable injury with 150, 300 and 600 lb per acre after 1st applic 3 days after transplanting, unacceptable injury at the high rate after 2nd applic; growth reduction at all rates.
19792	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonicus	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	None to minor injury increasing with rate (0.25, 0.5 and 1.0 lb ai per acre) with the 0.5 rate exhibiting transient phytotoxicity; good to excellent weed control.
19851	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonicus	BroadStar 0.25G	Field Container	Fain	MS	2003	Broadcast	Slight injury at all rates (0.25, 0.5, 1.0 lb ai per acre): excellent weed control.
29247	Mondo Grass, Lilyturf, Ker-Gawl (Ophiopogon sp.) O. japonicas	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
24960	Hopflower Oregano (Origanum libanoticum)	BroadStar 0.17G	Field Container	Klett	CO	2002	Ground	No injury at 0.25 and 0.5 lb ai per acre; excellent weed control.
24960	Hopflower Oregano (Origanum libanoticum)	BroadStar 0.17G	Field Container	Klett	CO	2002	Ground	No injury at 0.25 and 0.5 lb ai per acre; good to excellent weed control.
29255	Holly Olive;False (Osmanthus heterophyllus) Holly Olive, False	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375 and 0.75, slight at 1.5 lb ai per acre.
19793	African Daisy (Osteospermum sp.) 'Gaiety Orange'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19794	Japanese Spurge (Pachysandra terminalis) 'Green Sheen'	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
29085	Peony (Paeonia sp.) P. lactiflora 'Eliza Lundy'	BroadStar 0.25G VC1604	Field Container	Grunwald	OR	2010	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all treated plants saleable.
29085	Peony (Paeonia sp.) P. lactiflora 'Edulis Superba'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2011	Broadcast	No crop injury or reduction in growth with two applications at 0.375, 0.75, 1.5 lb ai per acre.
19795	Fountain Grass (Pennisetum setaceum) 'Hameln'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19854	Fountain Grass (Pennisetum setaceum) 'Hamelin'	BroadStar 0.17G	Field In-Ground	Anderson	OH	2002	Broadcast to media surface	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19796	Ribbon-Grass, Gardeners-Garters (Phalaris arundinacea) 'Feesey's Form'	BroadStar 0.17G	Field Container	Anderson	OH	2002	Broadcast to media surface	Moderate to severe chlorosis and necrosis increasing with rate (0.25, 0.5 and 1.0 lb ai per acre).
19796	Ribbon-Grass, Gardeners-Garters (Phalaris arundinacea) 'Picta'	BroadStar 0.17G	Field Container	Klett	CO	2003	Soil	No injury at 0.25 and 0.5 lb ai per acre and only slight reduction in plant size with 1.0 lb ai per acre.
19855	Ribbon-Grass, Gardeners-Garters (Phalaris arundinacea)	BroadStar 0.25G	Field Container	Boydston	WA	2003	Broadcast	Minor to severe necrosis increasing with rate (0.375, 0.75, 1.5 lb ai per acre).
28737	Mock Orange (Philadelphus sp.) P. viginalis 'Snow Dwarf'	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2009	Over the top	No significant injury at 0.375 and 0.75, moderate at 1.5 lb ai per acre.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
24987	Phlox (Phlox sp.) 'Candy Strip'	BroadStar 0.25G	Field In-Ground	Chen	LA	2005	Broadcast	Minor to moderate injury after first application increasing with rate (0.375, 0.75, 1.5 lb ai per acre) but severe injury and mortality occurred after second at all rates.
28476	Photinia (Photinia sp.) P. fraseri	BroadStar 0.25G VC1604	Field Container	Uber	CA	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19867	Spruce (Picea sp.) P. omorika	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19881	Spruce (Picea sp.) P. abies 'Nidiformis'	BroadStar 0.25G	Field Container	Altland	OR	2003	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19881	Spruce (Picea sp.) P. glauca conica	BroadStar 0.25G	Field Container	Altland	OR	2003	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
27206	Spruce (Picea sp.) P. omorika	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2008	Over the top	1 application only; no injury at 0.375, 0.75 and 1.5 lb ai per acre.
27206	Spruce (Picea sp.) P. glauca	BroadStar 0.25G VC1604	Field Container	Freiberger	NJ	2009	Over the top	Virtually no injury at 0.375, 0.75 and 1.5 lb ai per acre applied once at 2nd applic timing.
27206	Spruce (Picea sp.) P. glauca 'Conica'	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19997	Andromeda (Pieris sp.) P. japonica 'Flamingo'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19997	Andromeda (Pieris sp.) P. japonica v yakushmanum 'Brouwer's Beauty'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19997	Andromeda (Pieris sp.) P. japonica 'Valley Valentine'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	Single application prior to bud break caused slight injury at only the highest rate of 1.0 lb ai per acre; no visible injury occurred after the second application at any rate, but 1.0 lb ai per acre did cause stunting.
20054	Andromeda (Pieris sp.) 'Dorothy Wycoff'	BroadStar 0.25G	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground broadcast	No significant injury.
27211	Andromeda (Pieris sp.) P. japonica 'Dorothy Wycoff'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27211	Andromeda (Pieris sp.) P. japonica 'Mountain Fire'	BroadStar 0.25G VC1604	Field Container	Trader	MS	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19998	Pine, Mugo & Mugho (Pinus mugo ssp. Mugo)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19928	Pine, Mugo & Mugho (Pinus mugo ssp. Mugo)	BroadStar 0.17G	Field In-Ground	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
26673	Pine, Mugo & Mugho (Pinus mugo ssp. Mugo) 'pumilo'	BroadStar 0.25G	Field Container	Altland	OR	2003	Broadcast	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
23644	Pine, Austrian (Pinus nigra)	BroadStar 0.25G	Field Container	Altland	OR	2003	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
19929	Pine, Austrian (Pinus nigra)	BroadStar 0.25G	Field In-Ground	Beste/Frank (ARS)	MD	2005	Granular Broadcast	Slight injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre), but all plants marketable at end of the study; good weed control.
19868	Pine (Pinus sp.) P. bungeana	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27216	Pine (Pinus sp.) P. mugo	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2008	Over the top	1 application only; no injury at 0.375, 0.75 and 1.5 lb ai per acre.
27216	Pine (Pinus sp.) P. taeda	BroadStar 0.25G VC1604	Field Container	Wade	SC	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27216	Pine (Pinus sp.) P. taeda	BroadStar 0.25G VC1604	Field Container	Fraelich	GA	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27216	Pine (Pinus sp.) Pine Mungo	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2009	Over the top	One application only; no injury at 0.375, 0.75 and 1.5 lb ai per acre.
19999	Pittosporum, Japanese (Pittosporum tobira) 'Wheeler's Dwarf'	BroadStar 0.17G	Field Container	Neal	NC	2002	Over the top	No significant injury with 0.25 lb ai per acre, but injury to new growth was observed at 0.5 and 1.0 lb ai per acre. Researcher noted that if applications occur when tender new growth is not present it is unlikely for phytotoxicity to be observed.
20001	Yew, Southern (Podocarpus macrophyllus)	BroadStar 0.25G	Field Container	Gilliam	AL	2004	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
20003	Cinquefoil (Potentilla sp.) P. fruticosa 'Gold Finger'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre; excellent efficacy.
20003	Cinquefoil (Potentilla sp.) P. fruticosa 'Gold Finger'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	No injury with 0.17 and 0.34 lb ai per acre after the second years applications, but visible injury and reduced vigor was observed with the 0.68 lb ai per acre rate; excellent weed control.
20003	Cinquefoil (Potentilla sp.) 'Pink Beauty'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
20003	Cinquefoil (Potentilla sp.) P. tabernaemontani 'Verna'	BroadStar 0.17G	Field Container	Anderson	OH	2002	Broadcast to soil surface	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
27221	Cinquefoil (Potentilla sp.) P. fruticosa 'Monsidh'	BroadStar 0.25G VC1604	Field Container	Klett	CO	2008	Over the top	Trial 1: No injury at 0.375, 0.75 and 1.5 lb ai per acre; no growth reduction.
27221	Cinquefoil (Potentilla sp.) P. fruticosa 'Monsidh'	BroadStar 0.25G VC1604	Field Container	Klett	CO	2008	Over the top	Trial 2: No injury at 0.375, 0.75 and 1.5 lb ai per acre; no growth reduction.
27221	Cinquefoil (Potentilla sp.) P. fruticosa 'Goldfinger'	BroadStar 0.25G VC1604	Field Container	Uber	CA	2008	Over the top	No injury or significant growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27221	Cinquefoil (Potentilla sp.) P. verna	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2009	Over the top	No significant injury at 0.375 and 0.75, slight at 1.5 lb ai per acre; all 1X and 2X, and most 4X treated plants saleable.
27221	Cinquefoil (Potentilla sp.) P. fruticosa 'Abbotswood'	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2009	Over the top	Slight phytotoxicity (approx 10 - 20% 30 DAT) from two applications at 0.375, 0.75, 1.5 lb aia and significant growth suppression (width and volume) suggests this product not safe for Potentilla.

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20004	Almond (Non-Bearing) ( <i>Prunus dulcis</i> ) P. d. amara	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19797	Cherry (Non-Bearing) ( <i>Prunus</i> sp.) P. maritima	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19939	Cherry (Non-Bearing) ( <i>Prunus</i> sp.) P. x cistena	BroadStar 0.17G	Field In-Ground	Anderson	OH	2002	Broadcast to soil surface	No injury at 0.25, 0.5 or 1.0 lb ai per acre.
19896	Fir, Douglas ( <i>Pseudotsuga menziesii</i> )	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19896	Fir, Douglas ( <i>Pseudotsuga menziesii</i> )	BroadStar 0.17G	Field Container	Anderson	OH	2002	Broadcast to soil surface	No injury at 0.25, 0.5 or 1.0 lb ai per acre.
19943	Oak, Northern Red ( <i>Quercus rubra</i> )	BroadStar 0.17G	Field In-Ground	Hitchner	NJ	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19943	Oak, Northern Red ( <i>Quercus rubra</i> )	BroadStar 0.17G	Field In-Ground	Hitchner	NJ	2001	Ground	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27227	Oak ( <i>Quercus</i> sp.) Q. alba	BroadStar 0.25G VC1604	Field Container	Freiberger	NJ	2008	Directed	Very slight injury at 0.375, 0.75 and 1.5 lb ai per acre.
27227	Oak ( <i>Quercus</i> sp.) Q. rubra	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27227	Oak ( <i>Quercus</i> sp.)	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2009	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27232	Indian Hawthorn ( <i>Raphiolepis indica</i> ) R. umbellata 'Eleanor Taber'	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375 and 0.75, slight at 1.5 lb ai per acre.
27232	Indian Hawthorn ( <i>Raphiolepis indica</i> )	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre with two applications.
27232	Indian Hawthorn ( <i>Raphiolepis indica</i> )	BroadStar 0.25G VC1604	Field Container	Lieth	CA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre; growth reduction data inconclusive.
19745	Azalea ( <i>Rhododendron</i> sp.) 'Delaware Vally White'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	Slight to moderate transient injury with 0.17, 0.34, and 0.68 lb ai per acre.
19744	Rhododendron ( <i>Rhododendron</i> sp.) R. catawbiense 'Roseum Elegans'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	Slight injury at 0.17, 0.34, and 0.68 but at a commercially acceptable level.
19745	Azalea ( <i>Rhododendron</i> sp.) R. obtusum 'Tradition'	BroadStar 0.17G	Field Container	Beste	MD	2000	Broadcast	Moderate transient injury with 0.34 and 0.68 lb ai per acre and very slight injury with 0.17 lb ai per acre.
19745	Azalea ( <i>Rhododendron</i> sp.) 'Delaware Valley White'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	Moderate transient injury with 0.17 and 0.34 lb ai per acre with the second year's application and injury was commercially unacceptable at 0.68 lb ai per acre; excellent weed control.
19744	Rhododendron ( <i>Rhododendron</i> sp.) R. catawbiense 'Roseum Elegans'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	Slight injury increasing with rate (0.17, 0.34, and 0.68 lb ai per acre), but commercially acceptable at the two lower rates; excellent weed control.

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19745	Azalea (Rhododendron sp.) R. eriocarpum 'Gumpo Pink'	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	No injury at 0.17 lb ai per acre with slight transient injury at 0.34 and 0.68 lb ai per acre; excellent weed control.
19745	Azalea (Rhododendron sp.)	BroadStar 0.17G	Field Container	Hitcher	NJ	2001	Broadcast	No injury at 0.17 lb ai per acre, and slight contact injury with 0.34 and 0.68 lb ai per acre which was not apparent at 30DAT.
19745	Azalea (Rhododendron sp.) 'Klondyke'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19744	Rhododendron (Rhododendron sp.) 'Firestorm'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19745	Azalea (Rhododendron sp.) 'Girard Rose'	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	Slight contact injury increasing with rate (0.25, 0.34, 0.5, 1.0 lb ai per acre), but new growth was not impacted.
19745	Azalea (Rhododendron sp.) 'Stewartsonia'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	Slight visible injury across all rates with slight stunting increasing with rate (0.25, 0.5 and 1.0 lb ai per acre).
19744	Rhododendron (Rhododendron sp.) 'Blue Peter'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	No injury at 0.25 lb ai per acre, but moderate to severe injury with 0.5 and 1.0 lb ai per acre.
19745	Azalea (Rhododendron sp.) 'Formosa'	BroadStar 0.17G	Field Container	Derr	VA	2002	Broadcast	Little to no visible injury or growth suppression with 0.25, 0.5 and 1.0 lb ai per acre; excellent spurge control and large crabgrass control increased with rate.
19745	Azalea (Rhododendron sp.) 'Fashion'	BroadStar 0.17G	Field Container	Fraelich	GA	2002	Broadcast	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
19745	Azalea (Rhododendron sp.) 'Renee Mitchell'	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	Minor injury (brown spots on upper leaf surfaces) at 0.25, 0.5 and 1.0 lb ai per acre, but it became unapparent by 90DAT.
19804	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense	BroadStar 0.17G	Field In-Ground	Beste	MD	2000	Broadcast	Slight to moderate necrotic injury which persisted through the winter; smooth and large crabgrass and ivyleaf morningglory were managed at all rates, but yellow nutsedge and garlic were not controlled.
19804	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense	BroadStar 0.17G	Field In-Ground	Beste	MD	2001	Broadcast	Slight, transient injury at all rates (0.17, 0.34, and 0.68 lb ai per acre) applied for a second year; smooth and large crabgrass and ivyleaf morningglory were managed at all rates, but yellow nutsedge and garlic were not controlled.
25487	Azalea (Rhododendron sp.) 'Formosa'	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
25487	Azalea (Rhododendron sp.) 'Hino'	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	None at 0.25 lb ai per acre, minor at 0.5 and 1.0 lb ai per acre, but plants grew out of it through the season.
25487	Azalea (Rhododendron sp.) 'White Glacier'	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.

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25487	Azalea (Rhododendron sp.) 'White Gumpo'	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
27235	Azalea, & Rhododendron (Rhododendron sp.) R. catawbiense 'Chinoides'	BroadStar 0.25G VC1604	Field Container	Ahrens/Mervosh	CT	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre after 1st, slight after 2nd application.
27235	Azalea, & Rhododendron (Rhododendron sp.) 'Fasticata'	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27235	Azalea, & Rhododendron (Rhododendron sp.) 'Midnight Flare'	BroadStar 0.25G VC1604	Field Container	Trader	MS	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27235	Azalea, & Rhododendron (Rhododendron sp.) 'Girard's Hot Shot'	BroadStar 0.25G VC1604	Field Container	Wade	SC	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27235	Azalea, & Rhododendron (Rhododendron sp.) 'Fashion'	BroadStar 0.25G VC1604	Field Container	Neal	NC	2009	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
19746	Sumac (Rhus sp.)	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
28717	Evergreen currant (Ribes viburnifolium)	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2009	Over the top	One application only. No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27828	Rose (Rosa sp.) 'Nearly Wild'	BroadStar 0.25G	Field Container	Czarnota	GA	2007	Over the top	No significant injury at 0.25 lb ai per acre.
27238	Rose (Rosa sp.) 'Raspberry Sunblaze'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2008	Over the top	No injury or growth and flower number reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27238	Rose (Rosa sp.) 'Nearly Wild'	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27238	Rose (Rosa sp.)	BroadStar 0.25G VC1604	Field Container	Derr	VA	2008	Over the top	No significant injury at 0.375, 0.75, and 1.5 lb ai per acre.
27238	Rose (Rosa sp.) R. woodsii	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2008	Over the top	1 application only; very slight injury at 0.375, moderate at 0.75 and 1.5 lb ai per acre.
27238	Rose (Rosa sp.) 'Red Cascade'	BroadStar 0.25G VC1604	Field Container	Wade	SC	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
19748	Rosemary (Rosmarinus officinalis) 'Athens Blues Spires'	BroadStar 0.25G	Field Container	Linderman	OR	2002	Broadcast	No injury at 0.17, 0.34 and 0.68 lb ai per acre.
25302	Mexican Petunia (Ruellia carolinensis) R. brittoniana 'Katie'	BroadStar 0.25G	Field In-Ground	Chen	LA	2005	Broadcast	Slight to moderate injury after first application increasing with rate (0.375, 0.75, 1.5 lb ai per acre) but severe injury with mortality after second application.
29242	Palmetto Palm (Sabal minor) Palmetto Palm	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
22937	Sage (Salvia daghestanica)	BroadStar 0.17G	Field Container	Klett	CO	2002	Hand broadcast to soil	No visible injury at 0.25 and 0.5 lb ai per acre; excellent pre-emergent weed control.
22937	Sage (Salvia daghestanica)	BroadStar 0.17G	Field Container	Klett	CO	2002	Hand broadcast to soil	No visible injury at 0.25 and 0.5 lb ai per acre; excellent pre-emergent weed control.

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19798	Sage, Ramona (Salvia sylvestris)	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	No injury at 0.17 and 0.34 lb ai per acre and moderate, transient injury at 0.68 lb ai per acre; excellent weed control.
19857	Sage, Ramona (Salvia sylvestris) 'Blue Hill' & 'Snow Hill'	BroadStar 0.25G	Field Container	Boydston	WA	2003	Broadcast	No visible injury after single application with 0.375, 0.75, and 1.5 lb ai per acre.
27241	Sage, Ramona (Salvia sylvestris) S. 'May Night'	BroadStar 0.25G VC1604	Field Container	Williams	IL	2008	Over the top	Virtually no injury at 0.375, 0.75 and 1.5 lb ai per acre; all rates reduced plant growth
27241	Sage, Ramona (Salvia sylvestris)	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27241	Sage, Ramona (Salvia sylvestris) S. nemorosa 'East Friesland'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2010	Over the top	No injury or growth and flower number reduction at 0.375, 0.75 and 1.5 lb ai per acre; all treated plants saleable.
27241	Sage, Ramona (Salvia sylvestris) 'Blue Hill'	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2010	Over the top	Slight to moderate injury at 0.375, 0.75, 1.5 lb ai per acre after 1st applic, almost complete recovery after 2nd applic.
22938	Skullcap (Scutellaria racemosa)	BroadStar 0.17G	Field Container	Klett	CO	2002		No visible injury at 0.25 and 0.5 lb ai per acre; excellent pre-emergent weed control.
22938	Skullcap (Scutellaria racemosa)	BroadStar 0.17G	Field Container	Klett	CO	2002		No visible injury at 0.25 and 0.5 lb ai per acre; excellent pre-emergent weed control.
28726	Stonecrop (Sedum sp.) S. x spectabile 'Autumn Joy'	BroadStar 0.25G VC1604	Field Container	Williams	IL	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
28726	Stonecrop (Sedum sp.) S. spurium 'Red Carpet'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants saleable.
28726	Stonecrop (Sedum sp.) S. ellacombianum	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2010	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants saleable.
28726	Stonecrop (Sedum sp.) S. reflexum 'Blue Spruce'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2010	Over the top	Minor injury at 0.375, moderate at 0.75 and 1.5 lb ai per acre; all plants at 1X rate saleable.
28726	Stonecrop (Sedum sp.) S. stefco	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2010	Over the top	Minor to high injury increasing with rates (0.375, 0.75 and 1.5 lb ai per acre); plants treated with 2X and 4X rates not saleable.
28726	Stonecrop (Sedum sp.)	BroadStar 0.25G VC1604	Field Container	Derr	VA	2010	Over the top	Three to five percent crop injury (tip burn) which decreased over time (32 and 46 DAT and 3 DAT2. Weed control (chamberbitter, tassleflower, S. crabgrass, annual sedge) increased with increasing rates.
28726	Stonecrop (Sedum sp.) S. spurium 'John Creech'	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2010	Over the top	Moderate crop injury with two application at 0.375, 0.75, 1.5 lb ai per acre.
19750	Bridal-Wreath (Spiraea sp.) S. nipponica 'Snowmound'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	Slight commercially acceptable injury after single application, but vigor was significantly reduced after second application increasing with rate (0.17, 0.34, 0.68 lb ai per acre).



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19750	Bridal-Wreath (Spiraea sp.) S. nipponica 'Snowmound'	BroadStar 0.17G	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	Slight visible injury at 0.17, 0.34, and 0.68 lb ai per acre, but vigor was significantly reduced at the 0.68 lb ai per acre rate; excellent weed control.
19750	Bridal-Wreath (Spiraea sp.) S. x vanhouttei	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19750	Bridal-Wreath (Spiraea sp.) S. x japonica 'Little Princess'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19750	Bridal-Wreath (Spiraea sp.) S. x vanhouttei	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	Slight to moderate injury increasing with rate and with second application (0.25, 0.5 and 1.0 lb ai per acre).
19750	Bridal-Wreath (Spiraea sp.) S. cantoniensis 'Lanceolata'	BroadStar 0.17G	Field Container	Gilliam	AL	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre; good weed control.
19809	Bridal-Wreath (Spiraea sp.) S. x vanhouttei	BroadStar 0.17G	Field In-Ground	Anderson	OH	2002	Broadcast to soil	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
26671	Bridal-Wreath (Spiraea sp.) S. nipponica 'Snowmound'	BroadStar 0.25G	Field Container	Ahrens/Mervosh	CT	2003	Over the top	Slight to moderate injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre); excellent efficacy for large crabgrass and common groundsel.
27245	Bridal-Wreath (Spiraea sp.) S. japonica 'Magic Carpet'	BroadStar 0.25G VC1604	Field Container	Ahrens/Mervosh	CT	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre after 1st, very slight after 2nd application.
27245	Bridal-Wreath (Spiraea sp.) 'Reeves'	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre with two applications.
27245	Bridal-Wreath (Spiraea sp.) S. thunbergii	BroadStar 0.25G VC1604	Field Container	Mickelbart	IN	2008	Over the top	No injury at 0.375, 0.75, and 1.5 lb ai per acre with single application 3 weeks after transplanting.
27245	Bridal-Wreath (Spiraea sp.) S. japonica 'Dolchica'	BroadStar 0.25G VC1604	Field Container	Trader	MS	2008	Over the top	Moderate to high injury at 0.375, 0.75 and 1.5 lb ai per acre.
27282	Camellia, Mountain (Stewartia sp.) S. pseudocamelia	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2011	Over the top	No crop injury with two applications at 0.38, 0.75, 1.5 lb ai per acre.
19751	Lilac (Syringa sp.) S. josikaea	BroadStar 0.25G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27250	Lilac (Syringa sp.) S. microphylla 'Superba'	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2008	Over the top	No significant injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27250	Lilac (Syringa sp.) S. patula 'Miss Kim'	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2008	Over the top	1 application only; no injury at 0.375 and 0.75, very slight at 1.5 lb ai per acre.
27250	Lilac (Syringa sp.) S. reticulata 'Ivory Silk'	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27250	Lilac (Syringa sp.) S. patula 'Miss Kim'	BroadStar 0.25G VC1604	Field Container	Williams	IL	2008	Over the top	Virtually no injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19752	Yew (Taxus sp.) T. x media 'Hicksii'	BroadStar 0.17G	Field Container	Anderson	OH	2002	Broadcast to soil	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
19811	Yew (Taxus sp.) T. cuspidata	BroadStar 0.17G	Field In-Ground	Ahrens/Mervosh	CT	2000	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre; good to great efficacy on large crabgrass and common ragweed.

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19811	Yew (Taxus sp.) T. x media 'Hicksii'	BroadStar 0.17G	Field In-Ground	Anderson	OH	2002	Broadcast to soil surface	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
27253	Yew (Taxus sp.) T. x media 'Runyun'	BroadStar 0.25G VC1604	Field Container	Mathers (OSU)	OH	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27253	Yew (Taxus sp.) T. baccata	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No significant injury at 0.375, slight at 0.75 and 1.5 lb ai per acre; no growth reduction.
27253	Yew (Taxus sp.) T. x media 'Densiformis'	BroadStar 0.25G VC1604	Field Container	Williams	IL	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
19754	Ternstroemia (Ternstroemia sp.)	BroadStar 0.25G	Field Container	Gilliam	AL	2005	Ground	Significant spotting initially at all rates (0.25, 0.5 and 1.0 lb ai per acre), but plants grew out of it through the season.
27258	Ternstroemia (Ternstroemia sp.) 'Leann'	BroadStar 0.25G VC1604	Field Container	Gilliam	AL	2009	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
28721	Dwarf germander (Teucrium chamaedrys)	BroadStar 0.25G VC1604	Field Container	Wilen	CA	2009	Over the top	One application only. Very slight injury at 0.375, 0.75 and 1.5 lb ai per acre; root and shoot dry weights not significantly reduced.
19755	Arborvitae (Thuja sp.) T. occidentalis 'Peabody'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19755	Arborvitae (Thuja sp.) T. occidentalis	BroadStar 0.17G	Field Container	Hart	NJ	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19755	Arborvitae (Thuja sp.) T. plicata atrovirens	BroadStar 0.17G	Field Container	Hart	NJ	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19755	Arborvitae (Thuja sp.) T. occidentalis	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19755	Arborvitae (Thuja sp.) T. occidentalis 'Emerald'	BroadStar 0.17G	Field Container	Neal	NC	2001	Broadcast	No injury at 0.25, 0.34, 0.5 and 1.0 lb ai per acre.
19755	Arborvitae (Thuja sp.) T. occidentalis 'Smaragd'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
19814	Arborvitae (Thuja sp.) T. occidentalis 'Peabody'	BroadStar 0.17G	Field In-Ground	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
27261	Arborvitae (Thuja sp.) T. occidentalis 'Emerald Green'	BroadStar 0.25G VC1604	Field Container	Ahrens/Mervosh	CT	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre after 1st, very slight after 2nd application.
27261	Arborvitae (Thuja sp.) T. occidentalis 'Degroot's Spire'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27261	Arborvitae (Thuja sp.) T. plicata 'Green Giant'	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27261	Arborvitae (Thuja sp.) T. occidentalis 'Smaragd'	BroadStar 0.25G VC1604	Field Container	Harvey	WA	2008	Over the top	Single application only; no injury at 0.375 and 0.75, slight transient injury at 1.5 lb ai per acre.
19800	Jasmine, Asian (Trachelospermum asiaticum)	BroadStar 0.25G	Field Container	Gilliam	AL	2004	Ground	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19897	Hemlock (Tsuga sp.) T. mertensiana	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19801	Blueberry (Non-Bearing) (Vaccinium sp.) V. corym 'North Country'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.

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19801	Blueberry (Non-Bearing) (Vaccinium sp.) V. ashei 'Climax'	BroadStar 0.17G	Field Container	Gilliam	AL	2001	Broadcast	Slight to moderate injury increasing with rate (0.17, 0.34, and 0.68 lb ai per acre); excellent weed control.
19801	Blueberry (Non-Bearing) (Vaccinium sp.) 'Blue Crop'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19802	Vervain (Verbena sp.) V. canadensis	BroadStar 0.25G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19802	Vervain (Verbena sp.) 'Quartz White'	BroadStar 0.25G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19861	Vervain (Verbena sp.) V. canadensis 'Homestead Purple'	BroadStar 0.25G	Field In-Ground	Chen	LA	2005	Broadcast	No significant injury at 0.375 and 0.75 lb ai per acre, slight at 1.5 lb ai per acre.
26623	Speedwell, Brooklime (Veronica sp.) 'Lilac Karina'	BroadStar 0.17G	Field Container	Hitchner	NJ	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
19756	Arrowwood (Viburnum sp.) V. dentatum 'Chicago Lustre'	BroadStar 0.17G	Field Container	Anderson	OH	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19756	Arrowwood (Viburnum sp.) V. plicatum var tomentosum 'Mariesii'	BroadStar 0.17G	Field Container	Neal	NC	2001	Over the top	No injury from first application when little new growth was present, however after the second application contact foliar burn was observed on new foliage, but plants recovered.
19756	Arrowwood (Viburnum sp.) V. x bodnantense 'Pink Dawn'	BroadStar 0.17G	Field Container	Altland	OR	2002	Broadcast	No injury at 0.25, 0.5, and 1.0 lb ai per acre; excellent oxalis control.
27270	Arrowwood (Viburnum sp.) 'Northern Burgundy'	BroadStar 0.25G VC1604	Field Container	Boydston	WA	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; all plants marketable.
27270	Arrowwood (Viburnum sp.) V. plicatum tomentosum 'Shasta'	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27270	Arrowwood (Viburnum sp.) V. tinus	BroadStar 0.25G VC1604	Field Container	Czarnota	GA	2008	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
27270	Arrowwood (Viburnum sp.) V. x 'Juddi'	BroadStar 0.25G VC1604	Field Container	Mickelbart	IN	2008	Over the top	No injury at 0.375, 0.75, and 1.5 lb ai per acre with single application 3 weeks after transplanting.
27270	Arrowwood (Viburnum sp.) V. x burkwoodii	BroadStar 0.25G VC1604	Field Container	Senesac	NY	2008	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
27270	Arrowwood (Viburnum sp.) V. tinus 'Compactum'	BroadStar 0.25G VC1604	Field Container	Neal	NC	2009	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre.
19803	Periwinkle (Vinca sp.) V. minor 'Variegata'	BroadStar 0.17G	Field Container	Derr	VA	2001	Over the top	Slight to moderate injury increasing with rate (0.17, 0.34, and 0.68 lb ai per acre).
19803	Periwinkle (Vinca sp.) 'Sante Fe'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19757	Weigela (Weigela sp.) 'Pink Princess'	BroadStar 0.17G	Field Container	Linderman	OR	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19759	Adams-Needle (Yucca filamentosa) Y. smalliana 'White Edge'	BroadStar 0.17G	Field Container	Hitchner	NJ	2002	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre.
27287	Japanese Zelkova (Zelkova serrata)	BroadStar 0.25G VC1604	Field Container	Freiberger	NJ	2009	Over the top	No injury at 0.375, 0.75 and 1.5 lb ai per acre applied once at 2nd applic timing.

PR #	Crop	Product	ProductionSite	Researcher	State	Year	ApplicationType	Results
27287	Japanese Zelkova (Zelkova serrata)	BroadStar 0.25G VC1604	Field Container	Beste/Frank (ARS)	MD	2011	Over the top	No injury or growth reduction with 0.375, 0.75 and 1.5 lb ai per acre applied twice; no effect on marketability.

**Table 22. Detailed Summary of Crop Safety Testing with SureGuard 51WDG (flumioxazin)**

Note: Table entries are sorted by crop Latin name. Only those trials with research reports received by 2/3/2016 are listed below.

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
23948	Fir, Balsam ( <i>Abies balsamea</i> )	Field In-Ground	Ahrens/Mervosh	CT	2001	Over the top	No injury at 0.34 or 0.68 lb ai per acre; no control of established fleabane ( <i>Erigeron</i> spp.) and cheat ( <i>Bromus secalinus</i> ).
23651	Fir, Balsam ( <i>Abies balsamea</i> )	Field Container	Altland	OR	2003	Over the top	Plants were of poor quality, however applications on actively growing plant material did cause minor to moderate injury at all rates (0.25, 0.5, 1.0 lb ai per acre).
23948	Fir, Balsam ( <i>Abies balsamea</i> ) A. balsamea var. phanerolepsis	Field In-Ground	Ahrens/Mervosh	CT	2001	Over the top	No injury at 0.34 or 0.68 lb ai per acre; no control of established fleabane ( <i>Erigeron</i> spp.) and cheat ( <i>Bromus secalinus</i> ).
23948	Fir, Balsam ( <i>Abies balsamea</i> ) A. balsamea var. phanerolepsis	Field In-Ground	Ahrens/Mervosh	CT	2001	Over the top	No specific injury at 0.17, 0.34 or 0.68 lb ai per acre, some mortality but not related to treatment; 70 - 80 % control of weeds in transplant beds.
20428	Fir, Fraser ( <i>Abies fraseri</i> )	Field In-Ground	Ahrens/Mervosh	CT	2001	Over the top	No injury at 0.25 or 0.5 lb ai per acre; excellent control of asiatic dayflower ( <i>commelina communis</i> ).
20428	Fir, Fraser ( <i>Abies fraseri</i> )	Field In-Ground	Ahrens/Mervosh	CT	2001	Over the top	No injury at 0.25, 0.34 or 0.68 lb ai per acre when applied the second year on the same plants; good red sorrel and smooth bedstraw control in July but not in September.
20428	Fir, Fraser ( <i>Abies fraseri</i> )	Field In-Ground	Ahrens/Mervosh	CT	2001	Over the top	No injury at 0.25, 0.375, and 0.68 lb ai per acre; excellent control of crabgrass and ragweed, fair control of horseweed.
20428	Fir, Fraser ( <i>Abies fraseri</i> )	Field In-Ground	Ahrens/Mervosh	CT	2001	Over the top	No injury at 0.34 or 0.68 lb ai per acre; no control of established fleabane ( <i>Erigeron</i> spp.) and cheat ( <i>Bromus secalinus</i> ).
23650	Fir, Grand; Giant Fir ( <i>Abies grandis</i> )	Field Container	Altland	OR	2003	Over the top	Poor quality plants, however applications in the middle of the season did contribute to poorer quality than untreated (0.25, 0.5, and 1.0 lb ai per acre).
23654	Fir, Alpine; Subalpine Fir ( <i>Abies lasiocarpa</i> ) 'Arizona'	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
20418	Fir ( <i>Abies</i> sp.) A. bornmuelleriana	Field Container	Altland	OR	2003	Over the top	No injury after single application (0.25, 0.5, and 1.0 lb ai per acre), but after the second application injury was slight and sporadic.
19883	Fir ( <i>Abies</i> sp.) A. fraseri	Field In-Ground	Ahrens/Mervosh	VT	2000	Broadcast	Applications prior to bud break caused no injury, but applications after budbreak caused severe phytotoxicity on new growth with no injury to mature foliage; suppression but poor control of perennial grasses.

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
19883	Fir (Abies sp.) A. fraseri	Field In-Ground	Ahrens/Mervosh	CT	2000	Broadcast	Moderate to severe injury on actively growing foliage; little impact on emerged common ragweed and horseweed, but effective pre-emergent control of large crabgrass.
20418	Fir (Abies sp.) A. procera	Field Container	Altland	OR	2003	Over the top	Poor quality plants led to confounding results for dormant applications, but there was clear evidence of moderate injury increasing with rate (0.25, 0.5, and 1.0 lb ai per acre) for applications onto actively growing plants.
25324	Maple, Red (Acer rubrum)	Field Container	Altland	OR	2006	Over the top	Moderate transient injury (bud blackening), no growth reduction at all rates (0.25, 0.5, 1.0 lb ai per acre).
25324	Maple, Red (Acer rubrum)	Field Container	Senesac	NY	2006	Over the top	No injury at 0.375, 0.75, and 1.5 lb ai per acre.
20429	Maple (Acer sp.) A. rubrum	Field In-Ground	Hart	NJ	2001	Directed	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
20429	Maple (Acer sp.) A. rubrum	Field In-Ground	Kuhns	PA	2003	Directed	No injury at 0.25, 0.5 or 1.0 lb ai per acre; excellent control at all rates.
20484	Yarrow (Achillea millefolium) 'Moonshine'	Field Container	Boydston	WA	2003	Broadcast	Slight delay of regrowth, but by 10 WAT no visible difference between untreated at all rates (0.25, 0.5, and 1.0 lb ai per acre).
20494	Barberry (Berberis sp.) B. thunbergii 'Rosie Glow'	Field Container	Altland	OR	2002	Over the top	Significant damage some mortality with all rates (0.25, 0.5, 1.0 lb ai per acre) applied at bud break, but after the second application on mature foliage only the high rate caused damage.
20494	Barberry (Berberis sp.) 'Rosy Glow'	Field Container	Derr	VA	2002	Over the top	Slight to significant injury increasing with rate (0.25, 0.5 and 1.0 lb ai per acre); excellent control of spotted spurge and large crabgrass.
30143	Japanese Barberry (Berberis thunbergii) B. thunbergii 'Crimson Pygmy'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Lincoln: Severe (68%) crop injury compared to untreated with 12 oz/A + 0.25% NIS.
30143	Japanese Barberry (Berberis thunbergii) 'Orange Rocket'	Greenhouse	Mathers (OSU)	OH	2013	Over the top	Decker: Acceptable injury when applied dormant at 4 oz per acre, unacceptable when applied during active plant growth.
20440	Birch, River (Betula nigra) 'Heritage' and 'Duratree'	Field In-Ground	Kuhns	PA	2003	Directed	No visible injury with directed spray for any rate (0.25, 0.5 and 1.0 lb ai per acre); some control of a number of weeds except common ragweed and giant foxtail.
20432	Butterfly Bush (Buddleia davidii) 'Lochinich'	Field In-Ground	Anderson	OH	2002	Directed	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
30142	Boxwood, Japanese (Buxus microphylla) B. microphylla 'Green velvet'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Unacceptable crop injury with 12 oz/A + 0.25% NIS.

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
30142	Boxwood, Japanese (Buxus microphylla) 'Wintergem'	Greenhouse	Mathers (OSU)	OH	2013	Over the top	Decker: Acceptable injury when applied dormant at 4 oz per acre, unacceptable when applied during active plant growth.
20495	Boxwood (Buxus sp.) B. microphylla japonica	Field Container	Fraelich	GA	2001	Over the top	Very slight injury only observed with 0.68 lb ai per acre, but these plants and the ones treated with 0.17 and 0.34 lb ai per acre were fully marketable.
20495	Boxwood (Buxus sp.) B. microphylla var. japonica	Field Container	Derr	VA	2002	Over the top	Slight to moderate injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre); excellent control of spotted spurge and large crabgrass.
19905	Sedge (Carex sp.) C. buchananii	Field Container	Boydston	WA	2003	Broadcast	No data available due to winter kill of all plants including untreated; excellent control of moss, pigweed, kochia, and bittercress, but no control of green foxtail and liverwort.
23646	Cedar (Cedrus deodara)	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
19496	Sand Heath, Rosemary (Ceratiola ericoides)	Field Container	Anderson	OH	2002	Directed	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
23641	False cypress (Chamaecyparis obtusa) C. pisifera 'Fifilera Aurea'	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
23641	False cypress (Chamaecyparis obtusa) 'Templehof'	Field Container	Altland	OR	2003		No injury at 0.25, 0.5, and 1.0 lb ai per acre.
20552	Summersweet (Clethra alnifolia)	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground	No significant injury at 0.25, 0.5 and 1.0 lb ai per acre.
20502	Summersweet (Clethra alnifolia) 'Ruby Spice'	Field Container	Beste/Frank (ARS)	MD	2005	Broadcast	No injury at 0.25 lb ai per acre, significant injury at 0.5 and 1.0 lb ai per acre but plants recovered
20503	Cleyera (Cleyera japonica)	Field Container	Gilliam	AL	2001	Over the top	Moderate, but transient, injury at all rates (0.17, 0.34 and 0.68 lb ai per acre); excellent weed control.
20389	Pampas Grass (Cortaderia sp.) C. selloana	Field In-Ground	Beste/Frank (ARS)	MD	2005	Directed	No significant injury after the first application (0.25, 0.5, 1.0 lb ai per acre) with slight transient injury after the second; great to excellent weed control (see report for detailed list of weed species).
19876	Pampas Grass (Cortaderia sp.) C. selloana 'Hoffman No. 5'	Field Container	Beste/Frank (ARS)	MD	2005	Broadcast	Moderate to significant injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre) with plants recovering over time due to sloughing off of older leaves, but plants at the highest rate did exhibit reduced growth.
19876	Pampas Grass (Cortaderia sp.) C. selloana 'Rosea'	Field Container	Ahrens/Mervosh	CT	2003	Over the top	Significant unacceptable injury at 0.25, 0.5 and 1.0 lb ai per acre; excellent control of large crabgrass and common groundsel.
20505	Smoke Tree, European (Cotinus coggygria)	Field Container	Anderson	OH	2002	Directed	No injury with 0.25, 0.5 or 1.0 lb ai per acre.

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
20506	Cotoneaster (Cotoneaster sp.) C. dammeri 'Skoigshomen'	Field Container	Beste/Frank (ARS)	MD	2006	Over the top	Moderate to significant phytotoxicity increasing with rate (0.375, 0.75, 1.5 lb ai per acre), and stunting was also observed.
20509	Pride-of-Rochester (Deutzia sp.) 'Nikko'	Field Container	Anderson	OH	2002	Directed	Significant necrosis with all rates (0.25, 0.5, 1.0 lb ai per acre).
25327	Purple Coneflower (Echinacea sp.)	Field Container	Boydston	WA	2006	Over the top	5 of 24 plants survived winter due to severe cold; surviving 1X and 4X treated plants indicated crop safety.
20580	Winged Burning Bush (Euonymus alatus) 'Compactus'	Field Container	Senesac	NY	2006	Over the top	No injury at 0.375 and 0.75 lb ai per acre, slight at 1.5 lb ai per acre.
30146	Winged Burning Bush (Euonymus alatus) E. 'White album'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Zelenka: Moderate but significantly different crop injury with 12 oz/A + 0.255 NIS. Plants unable to recover.
30146	Winged Burning Bush (Euonymus alatus) 'Unforgettable Fire'	Greenhouse	Mathers (OSU)	MI	2012	Over the top	Data not reliable because of high injury to untreated check; excellent liverwort control.
19877	Blue Fescue (Festuca glauca)	Field Container	Boydston	WA	2003	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre; excellent control of kochia, but little impact on annual grasses.
19877	Blue Fescue (Festuca glauca) 'Elijah Blue'	Field Container	Ahrens/Mervosh	CT	2003	Over the top	No injury at 0.25 lb ai per acre and very slight injury at 0.5 and 1.0 lb ai per acre; excellent control of large crabgrass and common groundsel.
20514	Golden Bells (Forsythia sp.) 'Show Off Sugar Baby'	Field Container	Mathers (OSU)	MI	2013	Over the top	Spring Meadows: Acceptable injury when applied dormant at 4 oz per acre, unacceptable when applied during active plant growth; excellent liverwort control.
26667	Ash (Fraxinus sp.) F. pennsylvanica	Field In-Ground	Hitchner	NJ	2001	Broadcast	No injury at 0.17, 0.34 or 0.68 lb ai per acre.
20058	English Ivy (Hedera helix L. ssp. Helix)	Field Container	Boydston	WA	2006	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; plants did not survive severe winter.
25332	Hellebore, Christmas rose, Lenten Rose (Helleborus niger) H. orientalis	Field Container	Senesac	NY	2006	Over the top	Unacceptable injury at all rates (0.375, 0.75, 1.5 lb ai per acre).
25332	Hellebore, Christmas rose, Lenten Rose (Helleborus niger) 'Pink Lady'	Field Container	Boydston	WA	2006	Over the top	Moderate to high injury (necrotic spots on green leaves) at 0.375, 0.75 and 1.5 lb ai per acre; most plants did not survive severe winter.
19911	Daylily (Hemerocallis sp.)	Field Container	Fraelich	GA	2001	Over the top	No injury at 0.17 lb ai per acre, but slight injury and stunting was observed with 0.34 and 0.68 lb ai per acre.
19911	Daylily (Hemerocallis sp.)	Field Container	Gilliam	AL	2001	Broadcast	Significant transient injury at all rates (0.17, 0.34, 0.68 lb ai per acre); excellent spurge control.
19911	Daylily (Hemerocallis sp.) 'Stella d'Oro'	Field Container	Neal	NC	2001	Over the top	Severe injury at 0.34 lb ai per acre.



PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
30810	Rosemallow (Hibiscus sp.) 'Blue Satin'	Field Container	Mathers (OSU)	MI	2013	Over the top	Spring Meadows: Acceptable injury when applied dormant at 4 oz per acre, unacceptable when applied during active plant growth; excellent liverwort control.
19921	Hosta (Hosta sp.)	Field Container	Boydston	WA	2003	Broadcast	No injury at 0.25, 0.5 and 1.0 lb ai per acre; excellent control of bittercress, common chickweed, barnyard grass, and kochia.
30916	Hosta (Hosta sp.) 'Blue Hawaii'	Greenhouse	Derr	VA	2013	Over the top	Unacceptable injury with 4 and 12 oz per acre w/ or w/o irrigation.
20579	Hydrangea, French (Hydrangea macrophylla) H. quercifolia 'Alice'	Field Container	Senesac	NY	2006	Over the top	Slight injury at 0.375 lb ai per acre and unacceptable at 0.75 and 1.5 lb ai per acre.
20579	Hydrangea, French (Hydrangea macrophylla) 'Nikko Blue'	Field Container	Lieth	CA	2006	Over the top	Severe injury at 0.375, 0.75 and 1.5 lb ai per acre.
30141	Hydrangea (Hydrangea sp.) H. 'Invincibelle amorences'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Spring Meadow: Severe crop injury observed from 4 WAT (94%) through 4 WAT2 (88%) with 12 oz/A + 0.25% NIS. No ratings taken first two weeks due to dormancy.
30141	Hydrangea (Hydrangea sp.) H. paniculata 'Limelight'	Greenhouse	Mathers (OSU)	OH	2013	Over the top	Spring Meadows: Acceptable injury when applied dormant at 4 oz per acre, unacceptable when applied during active plant growth; excellent liverwort control.
30141	Hydrangea (Hydrangea sp.) 'Invicibelle Spirit'	Greenhouse	Mathers (OSU)	MI	2012	Over the top	Severe injury with 4 oz per acre applied twice; excellent liverwort control.
20351	Candytuft (Iberis sp.) 'Alexander's White'	Field Container	Boydston	WA	2003	Broadcast	No visible injury, but single application decreased plant growth and number of flowers at all rates (0.25, 0.5, 1.0 lb ai per acre); excellent pre-emergent control of common lambsquarter and kochia but little control of barnyardgrass and green foxtail.
20518	Holly (Ilex sp.) I. crenata compacta	Field Container	Derr	VA	2002	Over the top	Slight but transient injury increasing with rate (0.25, 0.5 and 1.0 lb ai per acre); excellent control of spotted spurge and large crabgrass.
20518	Holly (Ilex sp.) I. crenata 'Compacta'	Field Container	Gilliam	AL	2001	Over the top	Significant injury at all rates (0.17, 0.34, 0.68 lb ai per acre) exhibited by leaf drop and discoloration; excellent weed control.
30917	Holly (Ilex sp.) I. verticillata 'Winter Red'	Greenhouse	Mathers (OSU)	MI	2012	Over the top	Severe injury with 4 oz per acre applied twice; excellent liverwort control.
20566	Holly (Ilex sp.) I. x meserveae 'Blue Girl' 'Blue Boy'	Field In-Ground	Ahrens/Mervosh	CT	2000	Broadcast	Unacceptable injury at 0.17 and 0.34 lb ai per acre; excellent control of common chickweed, annual bluegrass, and knawel.
20518	Holly (Ilex sp.) I. x meserveae 'Blue Prince'	Field Container	Altland	OR	2002	Over the top	Significant injury at all rates (0.25, 0.5, 1.0 lb ai per acre) with applications prior to bud break and onto mature foliage.

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
20518	Holly (Ilex sp.) I. x meserveae 'Blue Princess'	Field Container	Altland	OR	2006	Over the top	Leaves turned purple and bronze at all rates (0.375, 0.75, 1.5 lb ai per acre) and growth was reduced.
25425	Holly, Dwarf Yaupon (Ilex vomitoria 'nana') I. x meserveae 'Blue Princess'	Field Container	Altland	OR	2006	Over the top	Minor injury at all rates (0.375, 0.5, 1.5 lb ai per acre); however, foliage exhibited significant purpling and bronzing and less new growth occurred in the spring.
30144	Holly, Blue (Ilex x meserveae) I. meserveae 'China Girl'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Linclon: Unacceptable crop injury compared to untreated with 12 oz/a + 0.25% NIS.
30148	Juniper, Creeping or Trailing (Juniperus horizontalis) J. horizontalis 'Hughes Gold'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Zelenka: Initial crop injury (20%) 1 WAT but plants recovered with no injury observed in later evaluations from 12 oz/A + 0.25% NIS.
20413	Juniper (Juniperus sp.) J. communis 'Effusa'	Field Container	Altland	OR	2002	Over the top	No injury with 0.25, 0.5 or 1.0 lb ai per acre.
20413	Juniper (Juniperus sp.) J. horizontalis 'Bar Harbor'	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	No injury with 0.17 and 0.34 lb ai per acre; excellent weed control.
20413	Juniper (Juniperus sp.) J. horizontalis 'Bar Harbor'	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	No injury with 0.17 and 0.34 lb ai per acre; good weed control.
20413	Juniper (Juniperus sp.) J. squamata 'Blue Star'	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	No injury with 0.17 and 0.34 lb ai per acre; excellent weed control.
20413	Juniper (Juniperus sp.) J. squamata 'Blue Star'	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	No injury with 0.17 and 0.34 lb ai per acre; good weed control.
20413	Juniper (Juniperus sp.) J. squamata 'Blue Star'	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
20452	Cedar, Red (Juniperus virginiana) 'Emerald Sentinel'	Field In-Ground	Hart	NJ	2003	Directed	No injury with dormant applications, but minor transient tip burn was observed at all rates (0.25, 0.5 and 1.0 lb ai per acre) after second application to new growth.
20434	Crape Myrtle (Lagerstroemia indica) 'Tuscarora'	Field Container	Gilliam	AL	2001	Broadcast	Moderate to significant injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre); excellent weed control.
25328	Lily, Easter (Lilium longiflorum) 'Nellie White'	Field Container	Lieth	CA	2006	Over the top	No injury or growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
20356	Lilyturf, Big Blue;Giant (Liriope muscari) L. spicata 'Big Blue'	Field Container	Gilliam	AL	2001	Broadcast	Minor to moderate, transient injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre); excellent weed control.
20433	Lilyturf, Creeping (Liriope sp.) L. muscari 'Blue Boy'	Field Container	Beste/Frank (ARS)	MD	2005	Over the top	Extensive injury increasing with rate (0.025, 0.5, 1.0 lb ai per acre).
20357	Lilyturf, Creeping (Liriope sp.) L. spicata	Field Container	Beste/Frank (ARS)	MD	2005	Over the top	Extensive injury and some stunting at all rates (0.25, 0.5, 1.0 lb ai per acre).
20522	Heavenly Bamboo (Nandina domestica)	Field Container	Beste/Frank (ARS)	MD	2005	Over the top	Significant phyto but plants recovered and were marketable at all rates (0.25, 0.5, 1.0 lb ai per acre).
20569	Heavenly Bamboo (Nandina domestica) 'Fire Power'	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground directed shielded & banded spray	No significant injury (0.25, 0.5, 1.0 lb ai per acre).

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
31879	Fern, Royal ( <i>Osmunda regalis</i> )	Greenhouse	Derr	VA	2013	Over the top	Low injury but poor liverwort control with 4 oz per acre w/ irrigation; unacceptable injury at 4 oz w/o, or 12 oz w/ or w/o, irrig.
20363	Fountain Grass ( <i>Pennisetum setaceum</i> ) 'Hamelin'	Field Container	Boydston	WA	2003	Broadcast	Moderate to significant injury increasing with rate (0.25, 0.5 and 1.0 lb ai per acre); excellent control of common chickweed, kochia and barnyardgrass.
20406	Fountain Grass ( <i>Pennisetum setaceum</i> ) 'Tall Tails'	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground directed shielded & banded spray	Significant, transient injury but plants marketable at 0.25 and 0.5 lb ai per acre
20364	Ribbon-Grass, Gardeners-Garters ( <i>Phalaris arundinacea</i> ) 'Feesey's Form'	Field Container	Anderson	OH	2002	Directed	Moderate to severe chlorosis and necrosis increasing with rate (0.25, 0.5, and 1.0 lb ai per acre).
20416	Spruce ( <i>Picea</i> sp.) <i>P. abies</i> 'Nidiformis'	Field Container	Altland	OR	2003	Over the top	Young and actively growing plants are susceptible to damage at all rates (0.25, 0.5, 1.0 lb ai per acre).
20416	Spruce ( <i>Picea</i> sp.) <i>P. glauca</i>	Field Container	Altland	OR	2003	Over the top	Young and actively growing plants are susceptible to damage at all rates (0.25, 0.5, 1.0 lb ai per acre).
20571	Andromeda ( <i>Pieris</i> sp.)	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground directed shielded & banded spray	No significant injury (0.25, 0.5, 1.0 lb ai per acre).
20526	Andromeda ( <i>Pieris</i> sp.) <i>P. japonica</i> 'Valley Valentine'	Field Container	Altland	OR	2002	Over the top	Slight to severe injury including mortality increasing with rate after single application (0.25, 0.5, 1.0 lb ai per acre).
20527	Pine, Mugo & Mugho ( <i>Pinus mugo</i> ssp. <i>Mugo</i> ) 'pumilo'	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
23643	Pine, Austrian ( <i>Pinus nigra</i> )	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
20462	Pine, Austrian ( <i>Pinus nigra</i> )	Field In-Ground	Beste/Frank (ARS)	MD	2005	Ground directed broadcast spray	Virtually no injury at all rates (0.25, 0.5, 1.0 lb ai per acre).
20417	Pine ( <i>Pinus</i> sp.) <i>P. eliottii</i>	Field Container	Fraelich	GA	2001	Over the top	No injury at 0.17, 0.34 and 0.68 lb ai per acre.
23653	Pine, Jap. Black ( <i>Pinus thunbergiana</i> )	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre.
20529	Leadwort, Cape ( <i>Plumbago auriculata</i> ) <i>Ceratostigma plumbaginoides</i>	Field Container	Senesac	NY	2006	Over the top	No data due to limited plant survival.
20532	Cinquefoil ( <i>Potentilla</i> sp.) <i>P. fruticosa</i> 'Gold Finger'	Field Container	Ahrens/Mervosh	CT	2000	Over the top	Moderate injury with 0.17 and 0.34 lb ai per acre after single application with less injury exhibited after second application; excellent weed control.
20532	Cinquefoil ( <i>Potentilla</i> sp.) <i>P. fruticosa</i> 'Gold Finger'	Field Container	Ahrens/Mervosh	CT	2001	Over the top	Significant unacceptable injury with 0.17 and 0.34 lb ai per acre applied to actively growing cinquifoil.
23649	Fir, Douglas ( <i>Pseudotsuga menziesii</i> )	Field Container	Altland	OR	2003	Over the top	Plants were of poor quality; no conclusions can be made from this trial.
25461	Oak, Northern Red ( <i>Quercus rubra</i> )	Field Container	Altland	OR	2006	Over the top	No injury or growth reduction at any rate (0.375, 0.75, 1.5 lb ai per acre).

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
20475	Oak, Northern Red (Quercus rubra)	Field In-Ground	Beste/Frank (ARS)	MD	2006	Over the top	Unacceptable injury and growth reduction at 0.375, 0.75 and 1.5 lb ai per acre.
20475	Oak, Northern Red (Quercus rubra)	Field In-Ground	Hitchner	NJ	2001	Broadcast	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
19461	Azalea (Rhododendron sp.) 'Delaware Valley White'	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	Unacceptable injury to actively grower azalea with 0.17 and 0.34 lb ai per acre; excellent weed control.
19461	Azalea (Rhododendron sp.) 'Delaware Valley White'	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	Unacceptable injury to actively growing azalea eith 0.17 and 0.34 lb ai per acre; good weed control.
19461	Azalea (Rhododendron sp.) 'Elsie Lee'	Field Container	Anderson	OH	2002	Directed	No injury at 0.25, 0.5 or 1.0 lb ai per acre.
19461	Azalea (Rhododendron sp.) 'Formosa'	Field Container	Derr	VA	2002	Over the top	Severe injury at all rates with complete mortality at 1.0 lb ai per acre; excellent control of spotted spurge and large crabgrass.
19461	Azalea (Rhododendron sp.) R. eriocarpum 'Gumpo Pink'	Field Container	Gilliam	AL	2001	Over the top	Minor to moderate transient injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre); excellent weed control.
19461	Azalea (Rhododendron sp.) 'Stewartsonia'	Field Container	Altland	OR	2002	Over the top	Moderate to severe injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre).
19490	Rhododendron (Rhododendron sp.) 'Blue Peter'	Field Container	Altland	OR	2002	Over the top	Significant unacceptable injury at all rates (0.25, 0.5, and 1.0 lb ai per acre).
19490	Rhododendron (Rhododendron sp.) R. catawbiense 'Roseum Elegans'	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	Significant unacceptable injury with 0.17 and 0.34 lb ai per acre; excellent weed control.
19490	Rhododendron (Rhododendron sp.) R. catawbiense 'Roseum Elegans'	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	Significant unacceptable injury with both rates (0.17 and 0.34 lb ai per acre) with over the top applications on actively growing Rhododendrons.
25326	Rose (Rosa sp.) 'Nearly Wild'	Field Container	Lieth	CA	2006	Over the top	Moderate injury and growth reduction at all rates.
25326	Rose (Rosa sp.) 'Oranges & Lemons'	Field Container	Mathers (OSU)	OH	2006	Over the top	Significant damage increasing with rate (0.375, 0.75, 1.5 lb ai per acre).
25326	Rose (Rosa sp.) R. virginiana	Field Container	Senesac	NY	2006	Over the top	Very slight injury with complete recovery.
25335	Coneflower, Orange (Rudbeckia fulgida speciosa)	Field Container	Boydston	WA	2006	Over the top	No injury 9 days posttreatment at 0.375, 0.75 and 1.5 lb ai per acre; plants did not survive severe winter.
25335	Coneflower, Orange (Rudbeckia fulgida speciosa) 'Goldstrum'	Field Container	Senesac	NY	2006	Over the top	Slight injury increasing with rate (0.375, 0.75, 1.5 lb ai per acre), but plants were marketable.
25335	Coneflower, Orange (Rudbeckia fulgida speciosa) 'Viettas Little Suzie'	Field Container	Mathers (OSU)	OH	2006	Over the top	Significant injury increasing with rate (0.375, 0.75, 1.5 lb ai per acre) with mortality occurring in all treatments by 4 weeks after the second treatment.
20366	Sage, Ramona (Salvia sylvestris)	Field Container	Gilliam	AL	2001	Ground	Mortality occurred with all rates (0.17, 0.34, and 0.68 lb ai per acre); excellent weed control.

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
23655	Giant Sequoia;Redwood (Sequoiadendron giganteum)	Field Container	Altland	OR	2003	Over the top	No injury at 0.25, 0.5, and 1.0 lb ai per acre with a single application, but the second application during active growth did cause slight and sporadic injury.
19337	Bridal-Wreath (Spiraea sp.) S. nipponica 'Snowmound'	Field Container	Ahrens/Mervosh	CT	2000	Broadcast	Moderate injury with over the top applications of 0.17 and 0.34 lb ai per acre.
19337	Bridal-Wreath (Spiraea sp.) S. nipponica 'Snowmound'	Field Container	Ahrens/Mervosh	CT	2001	Broadcast	Moderate injury with over the top applications of 0.17 and 0.34 lb ai per acre on second year application of same plants; good weed control.
19337	Bridal-Wreath (Spiraea sp.) S. x vanhouttei	Field Container	Altland	OR	2002	Over the top	Slight to moderate injury increasing with rate (0.25, 0.5, 1.0 lb ai per acre).
30140	Lilac (Syringa sp.) 'Miss Kim'	Greenhouse	Mathers (OSU)	MI	2012	Over the top	Severe injury with 4 oz per acre applied twice; excellent liverwort control.
19338	Lilac (Syringa sp.) 'Miss Kim'	Field Container	Mathers (OSU)	MI	2013	Over the top	Northland Farms: Acceptable injury when applied dormant at 4 oz per acre, mediocre liverwort control.
30140	Lilac (Syringa sp.) S. meyeri 'Paliban'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Spring Meadow: Moderate (41-60%) crop injury with 12 oz/A + 0.25% NIS. Many plants in experiment including controls had unacceptable injury not related to treatments. No ratings taken first two weeks due to dormancy.
30140	Lilac (Syringa sp.) S. meyeri 'Paliban'	Greenhouse	Mathers (OSU)	MI	2013	Over the top	Northland Farms: Virtually no injury when applied dormant at 4 oz per acre, mediocre liverwort control.
20378	Yew (Taxus sp.) T. cuspidata	Field In- Ground	Ahrens/Mervosh	CT	2000	Broadcast	No injury at 0.17 and 0.34 lb ai per acre; great efficacy for large crabgrass and common ragweed.
20381	Arborvitae (Thuja sp.) 'Green Giant'	Field In- Ground	Hart	NJ	2003	Directed	No injury with dormant applications and with second application at 0.25 and 0.5 lb ai per acre, but minor transient injury was observed after the second application of 1.0 lb ai per acre.
20296	Arborvitae (Thuja sp.) 'Smaragd'	Field Container	Altland	OR	2003		No injury at 0.25, 0.5, and 1.0 lb ai per acre.
20296	Arborvitae (Thuja sp.) T. occidentalis 'Smaragd'	Field Container	Altland	OR	2002		No injury at 0.25, 0.5, and 1.0 lb ai per acre.
30145	Arborvitae (Thuja sp.) T. 'Techny'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Lincoln: No crop injury with 12 oz/A + 0.25% NIS.
20368	Jasmine, Asian (Trachelospermum asiaticum) 'Green'	Field Container	Fraelich	GA	2001	Over the top	No injury at 0.17, 0.34, and 0.68 lb ai per acre.
20369	Blueberry (Non-Bearing) (Vaccinium sp.) V. ashei 'Climax'	Field Container	Gilliam	AL	2001	Ground	Moderate to severe injury increasing with rate (0.17, 0.34, 0.68 lb ai per acre); excellent weed control.
20370	Vervain (Verbena sp.) 'Homestead Purple'	Field Container	Anderson	OH	2002	Directed	No injury at 0.25, 0.5, and 1.0 lb ai per acre.

PR #	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
25455	Viburnum, arrowwood (Viburnum dentatum) 'Autumn Jazz'	Field Container	Altland	OR	2006	Over the top	Moderate injury at all rates (0.375, 0.75, 1.5 lb ai per acre).
25455	Viburnum, arrowwood (Viburnum dentatum) V. dentatum 'Chicago Lustre'	Field Container	Beste/Frank (ARS)	MD	2006	Over the top	Moderate to significant injury at all rates (0.375, 0.75, 1.5 lb ai per acre); plants visibly recovered, however there was significant growth reductions.
25454	Viburnum juddii (Viburnum juddii) V. carlesii	Field Container	Altland	OR	2006	Over the top	High injury at 0.375, 0.75, and 1.5 lb ai per acre.
25454	Viburnum juddii (Viburnum juddii) V. nudum 'Winterthur'	Field Container	Senesac	NY	2006	Over the top	Slight injury at 0.375 lb ai per acre and moderate injury at 0.75 and 1.5 lb ai per acre.
20297	Arrowwood (Viburnum sp.) V. carlesii	Field Container	Altland	OR	2006	Over the top	Moderate to significant injury increasing with rate (0.375, 0.75, 1.5 lb ai per acre).
30147	Arrowwood (Viburnum sp.) V. dentatum 'Blue Muffin'	Greenhouse	Mathers (OSU)	MI	2013	Over the top	Spring Meadows: Acceptable injury when applied dormant at 4 oz per acre, unacceptable when applied during active plant growth; excellent liverwort control.
30147	Arrowwood (Viburnum sp.) V. dentatum 'Double Pink'	Greenhouse	Mathers (OSU)	MI	2010	Over the top	Zelenka: Initial crop injury (33%) 1 WAT but plants recovered with no injury observed in later evaluations from 12 oz/A + 0.25% NIS.
20297	Arrowwood (Viburnum sp.) V. plicatum var tomentosum 'Mariesii'	Field Container	Neal	NC	2001	Over the top	Significant injury at 0.34 lb ai per acre with little recovery.
30147	Arrowwood (Viburnum sp.) V. rhytidophyllum 'Cree'	Greenhouse	Mathers (OSU)	MI	2012	Over the top	Data not reliable because of high injury to untreated check; excellent liverwort control.
20297	Arrowwood (Viburnum sp.) V. x bodnantense 'Pink Dawn'	Field Container	Altland	OR	2002	Over the top	Significant injury at 0.25, 0.5, and 1.0 lb ai per acre; excellent oxalis control.
25456	Craneberry-bush (Viburnum trilobum) 'Compactum'	Field Container	Senesac	NY	2006	Over the top	No injury at 0.375, 0.75, and 1.0 lb ai per acre.
20371	Periwinkle (Vinca sp.)	Field Container	Boydston	WA	2006	Over the top	No injury but significant growth reduction at 0.375, 0.75 and 1.5 lb ai per acre; plants saleable.
20371	Periwinkle (Vinca sp.) V. minor	Field Container	Senesac	NY	2006	Over the top	Slight injury at 0.375 lb ai per acre, moderate at 0.75 and 1.5 lb ai per acre.
20371	Periwinkle (Vinca sp.) V. minor 'Bowles'	Field Container	Boydston	WA	2003	Broadcast	Slight delay in growth and flowering at 0.5 and 1.0 lb ai per acre, but by 10 WAT no differences were noted; excellent control of kochia with little control of grass weeds.

## Label Suggestions

Based on the current data available, the following crop genera or species may be added for over-the-top applications to the list of plants already on the Broadstar 0.25G label.

*Artemisia lactiflora*  
*Carex buchananii*  
*Cryptomeria japonica*  
*Festuca ovina glauca*  
*Gleditsia triacanthos*  
*Gypsophila elegans*

*Lavandula angustifolia*  
*Loropetalum sp.*  
*Verbena sp.*

IR-4 suggests adding the following crops or cultivars to the list of sensitive ornamental species already on the BroadStar 0.25G label.

*Achillea millefolium*  
*Athyrium georingianum*  
*Cerastium tomentosum*  
*Cuphea hyssopifolia*  
*Hosta sp.*  
*Jasminum nudiflorum*  
*Liriope sp.*  
*Nepeta x faasseni*  
*Phalaris arundinacea*  
*Phlox sp.*  
*Ruellia brittoniana*  
*Sedum spurium*  
*Spirea nipponica* 'Snowmound'

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