



[Environmental Horticulture Program Research Summaries](#)

## **IR-4 Environmental Horticulture Program Bentazon Crop Safety**

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## **Abstract**

Basagran T/O has been registered for a number of years as a directed application and as an over-the-top application on limited plant species. However, growers have expressed the need to have additional plants added for over-the-top applications. Data collected throughout the history of the IR-4 Environmental Horticulture Program are presented here to support specific Basagran T/O applications over the top of certain ornamental horticulture plants. The rates chosen for this research were 1.0, 2.0 and 4.0 pounds active ingredient per acre (lb ai per A) as the 1X, 2X and 4X rates. In addition, early studies compared single versus two consecutive applications of 1.0 lb ai per A or 2.0 lb ai per A followed with 1 lb ai per A. Throughout the years, 83 different crop species were examined for over the top applications. Of these, 21 exhibited no or minimal transient injury after application at all three rates. Twenty-eight crops require further research because of unclear results. Twelve crops exhibited no phytotoxicity at 1.0 lb ai per acre, but did have some injury at the higher rates or with repeat applications. Twenty-three species exhibited phytotoxicity at even the 1.0 lb ai per acre rate.

## Introduction

Basagran T/O (bentazon) has been registered for a number of years with directed and over-the-top applications on limited plant species. However, growers have expressed the need to have additional plants added for over-the-top applications. IR-4 studied over the top applications in 2018 and 2019 to further expand this label.

## Materials and Methods

Single applications were made with Basagran T/O (bentazon) or two applications were made approximately 30 days apart. The application rates were 1.0, 2.0, and 4.0 lb ai per A, plus a water treated control. A minimum of four plants (replicate treatments) were required with many researchers exceeding this minimum. Phytotoxicity was recorded on varying scales. Some researchers recorded on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill). Some researchers used a scale of 1 to 10 with 10 being no phytotoxicity and 1 being complete kill. Other researchers estimated percent foliage affected with 100% meaning kill. For more detailed materials and methods, please see individual research reports posted on the IR-4 website. For IR-4 2018 and 2019 testing, the following protocols were used: 18-019 and 19-013. Please visit <http://ir4.rutgers.edu/ornamental/OrnamentalDrafts.cfm> to view and download these protocols

Several trials were conducted using directed applications instead of over the top. These trials are included in the summary table (Table 5) but are not summarized in the following results section.

Basagran T/O was supplied to researchers (See list of researchers in Appendix 2) by American Cyanamid, BASF or TopPro depending upon when the research was conducted.

## Results and Summary

### *Efficacy*

Several researchers also examined efficacy in addition to crop safety. In this set of research trials, Basagran T/O managed several weed species well: common chickweed, common lambsquarters, common purslane, common sowthistle, and pigweed. The performance for oxalis and yellow nutsedge was variable depending upon researcher, but most reports favored good control. Several weeds were not managed with Basagran T/O applications: annual grass, black willow, brassica, carpetweed, Carolina geranium, crabgrass, cudweed, eclipta, groundsel, mares tail, Pennsylvania bittercress, pine, prostrate spurge, ragweed, spurge, and trifolium.

### *Phytotoxicity*

Based on the type and nature of injury seen with Basagran applications in the research conducted from 1977 through 2019, 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) injury was seen but additional research is warranted to clarify response, 3) no or minimal transitory injury seen at the 1X rate, but the 2X and/or 4X rates did cause significant phytotoxicity, 4) significant injury sufficient to recommend growers not utilize this product.

In general, Basagran exhibited no or minimal negative impact on a range of plant species (Table 1). Twenty-one plant genera or species fell into this category. Some minimal injury may be acceptable for growers if applications are made several weeks to months in advance of crop sale particularly for woody ornamental crops. There were twenty-eight species of plants for which the results were unclear and are suggested as candidates for further research (Table 2). Twelve crop species, exhibited no or little injury at the 1.0 lb ai per acre rate, but significant phytotoxicity occurred at the 4.0 lb ai per acre rate or with repeat applications (Table 3). It may be prudent to either conduct additional trials or place language on the label indicating applications of Basagran are considered safe at the 1.0 lb ai per acre rate but any higher rate or multiple applications may cause unacceptable injury.

There were twenty-three crops in this research that exhibited damage sufficient to recommend growers not utilize Basagran T/O as an over-the-top treatment for pre-emergent weed control (Table 4).

Please see Table 5 for a list of research on Basagran T/O and the summary of the received results.

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

<i>Antirrhinum majus</i> (Field Container)	<i>Hemerocallis</i> sp. <sup>1</sup> (See Norcini)
<i>Berberis thunbergii</i> <sup>1</sup>	<i>Hosta fortunei</i> <sup>1</sup>
<i>Brassica oleracea</i> 'Color Up'	<i>Jasminum</i> sp. <sup>1</sup>
<i>Buddleia davidii</i> <sup>1</sup>	<i>Koelreuteria bipinnata</i> <sup>1</sup>
<i>Buxus</i> sp.	<i>Liriope</i> sp.
<i>Caryopteris</i> sp. (See Fretz)	<i>Malus</i> sp. <sup>1</sup>
<i>Cynodon dactylon</i>	<i>Petunia</i> sp.
<i>Euonymus fortunei</i> <sup>1</sup>	<i>Raphiolepis indica</i> <sup>1</sup>
<i>Euonymus japonicus</i> <sup>1</sup>	<i>Taxodium distichum</i> <sup>1</sup>
<i>Hedera canariensis</i>	<i>Taxus</i> sp.
<i>Hedera helix</i> L. ssp. <i>Helix</i>	

<sup>1</sup> Already registered for Basagran T&O

**Table 2. List of Bentazon treated crops where more research is needed to clarify response**

<i>Antirrhinum majus</i> (Field In-Ground)	<i>Ophiopogon jaburan</i>
<i>Aster novi-belgii</i>	<i>Panicum virgatum</i>
<i>Cornus florida</i>	<i>Phlox</i> sp.
<i>Cornus kousa</i>	<i>Photinia</i> sp. (See Derr)
<i>Cornus sericea</i>	<i>Quercus</i> sp.
<i>Cornus sibericus</i>	<i>Rosa</i> sp.
<i>Crataegus</i> sp.	<i>Salvia splendens</i>
<i>Festuca glauca</i>	<i>Sedum kamtschaticus</i>
<i>Gladiolus</i> sp.	<i>Sedum spurium</i>
<i>Heuchera</i> sp. <sup>1</sup>	<i>Tsuga canadensis</i>
<i>Hydrangea</i> sp.	<i>Tulipa</i> sp.
<i>Ligustrum</i> sp.	<i>Verbena</i> sp.
<i>Lilium</i> sp.	<i>Viburnum</i> sp. (response may be dependent on species)
<i>Monarda didyma</i>	
( <i>Narcissus</i> sp.)	

<sup>1</sup> Already registered for Basagran T&O

**Table 3. List of Bentazon treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X or 4X rate did cause significant phytotoxicity**

<i>Centaurea gymnocarpa</i>	<i>Pittosporum tobira</i> <sup>1</sup>
<i>Cotoneaster</i> sp. <sup>1</sup> (single application recommended)	<i>Podocarpus macrophyllus</i>
<i>Gardenia</i> sp. <sup>1</sup>	<i>Rhododendron</i> sp. (response may be dependent on cultivar)
<i>Ilex</i> sp. <sup>1</sup> (single application recommended)	<i>Tagetes</i> sp. <sup>1</sup> (single application recommended)
<i>Lagerstroemia indica</i> <sup>1</sup> (See Beste)	<i>Viola</i> sp. (single application recommended)
<i>Myrica cerifera</i> <sup>1</sup>	
<i>Pinus</i> sp. <sup>1</sup> (single application recommended)	

<sup>1</sup> Already registered for Basagran T&O

**Table 4. List of Bentazon treated crops exhibiting significant injury.**

<i>Astilbe x arendsii</i>	<i>Hylotelephium telephium</i>
<i>Betula pendula</i>	<i>Impatiens sp.</i>
<i>Betula platyphylla</i>	<i>Juniperus sp.</i>
<i>Brassica oleracea</i> 'Nagoya Garnish White'	<i>Kniphofia sp.)</i>
<i>Carissa grandiflora</i>	<i>Ophiopogon planiscapus</i>
<i>Cercis Canadensis</i>	<i>Pennisetum setaceum</i>
<i>Dianthus deltoides</i>	<i>Sedum acre</i>
<i>Dicentra sp.</i>	<i>Sedum rupestre</i>
<i>Echinacea purpurea</i>	<i>Trachelospermum asiaticum</i>
<i>Euonymus alatus</i> <sup>1</sup>	<i>Weigela sp.</i>
<i>Forsythia sp.</i>	<i>Zinnia sp.</i>
<i>Gazania linearis</i>	



**Table 5. Detailed Summary Crop Safety Testing with Basagran T/O**

Notes: Table entries are sorted by crop Latin name. All data received by 12/6/2019 are included.

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
10837	Basagran Herbicide	Garden Snapdragon ( <i>Antirrhinum majus</i> )	Field Container	Schreiber	OH	1991	Foliar	No injury at 1 and 2 lb ai per acre.
10846	Basagran Herbicide	Garden Snapdragon ( <i>Antirrhinum majus</i> ) 'Scarlet'	Field In-Ground	Senesac	NY	1991	Over the top	No injury with single application; significant phytotoxicity with two applications of 1 lb ai per acre.
10837	Basagran Herbicide	Garden Snapdragon ( <i>Antirrhinum majus</i> ) 'Tahiti'	Field Container	Linderman	OR	1991	Foliar	No injury at 1 and 2 lb ai per acre.
20647	Basagran Herbicide	Sagebrush ( <i>Artemisia</i> sp.) Powis Castle	Field In-Ground	Boydston	WA	2004	foliar	No injury
33422	Basagran T&O Herbicide	False Goat's Beard ( <i>Astilbe</i> sp.) <i>Astilbe x arendsii</i> 'Erica'	Field Container	Senesac	NY	2019	Over the top	Severe injury with 32, 64 and 128 fl oz per acre applied twice.
25195	Basagran Herbicide	Japanese Barberry ( <i>Berberis thunbergii</i> )	Field Container	Senesac	NY	1990	Over the top	No visible injury, but there was a reduction in vigor and fresh weight.
05605	Basagran Herbicide	Birch ( <i>Betula</i> sp.) <i>B. pendula</i>	Field In-Ground	Linderman	OR	1994		No significant injury
05605	Basagran Herbicide	Birch ( <i>Betula</i> sp.) <i>B. pendula</i>	Field In-Ground	Senesac	NY	1990	Over the top	About 30% control of yellow nutsedge Significant injury
05605	Basagran Herbicide	Birch ( <i>Betula</i> sp.) <i>B. platyphylla</i> 'japonica'	Field In-Ground	Schreiber	OH	1990		Significant injury
10835	Basagran Herbicide	Ornamental Cabbage/Kale ( <i>Brassica oleracea</i> )	Field Container	Schreiber	OH	1991	Foliar	No injury.
10835	Basagran Herbicide	Ornamental Cabbage/Kale ( <i>Brassica oleracea</i> ) <i>B. oleracea</i> 'Colorup'	Field Container	Linderman	OR	1991	Foliar	No injury.
10835	Basagran Herbicide	Ornamental Cabbage/Kale ( <i>Brassica oleracea</i> ) <i>B. oleracea</i> 'Nagoya Garnish White'	Field Container	Senesac	NY	1993	Foliar	Significant injury at 1 and 2 lb ai per acre. Symptoms included discoloration and stunting.
10821	Basagran Herbicide	Ornamental Cabbage/Kale ( <i>Brassica oleracea</i> ) 'Color Up'	Field In-Ground	Linderman	OR	1994	Foliar	No injury.
10835	Basagran Herbicide	Ornamental Cabbage/Kale ( <i>Brassica oleracea</i> ) 'Color Up'	Field Container	Linderman	OR	1994	Foliar	No injury.
13063	Basagran SG	Ornamental Cabbage/Kale ( <i>Brassica oleracea</i> ) Kale 'Nagoya Garnish White'	Field Container	Senesac	NY	1993	Over the top	Severe injury and growth reduction at 1, 2 and 4 lb ai per acre.
25319	Basagran Herbicide	Butterfly Bush ( <i>Buddleia davidii</i> ) 'Black Knight'	Field Container	Derr	VA	2005	foliar	No injury
25321	Basagran Herbicide	Boxwood ( <i>Buxus</i> sp.)	Field Container	Derr	VA	2005	Foliar	No injury
01233	Basagran Herbicide	Boxwood ( <i>Buxus</i> sp.) <i>B. japonica</i> 'Little Gem'	Field In-Ground	Talbert	AR	1990	Foliar	Multiple applications required for good yellow nutsedge control

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
01233	Basagran Herbicide	Boxwood ( <i>Buxus sp.</i> ) <i>B. microphylla</i>	Field In-Ground	Linderman	OR	1994	Over the top	No significant injury
25434	Basagran Herbicide	Natal Plum, <i>Amatungulu</i> ( <i>Carissa macrocarpa</i> ) Emerald Blanket	Field Container	Norcini	FL	1991	Foliar	Stunting of vegetative growth increasing with rate.
26133	Basagran Herbicide	<i>Caryopteris</i> ( <i>Caryopteris sp.</i> ) <i>C. X clandonensis</i> 'Blue Mist'	Field Container	Fretz	OH	1977	Over the top	Excessive damage increasing with rate (0.75, 1.5, 3, and 6 lb ai per acre)
05561	Basagran Herbicide	<i>Caryopteris</i> ( <i>Caryopteris sp.</i> ) <i>C. X clandonensis</i> 'Longwood Blue'	Field In-Ground	Buriff	OH	1997	Directed	No injury.
05561	Basagran Herbicide	<i>Caryopteris</i> ( <i>Caryopteris sp.</i> ) <i>C. X clandonensis</i> 'longwood blue'	Field In-Ground	Linderman	OR	1994	Over the top	No significant injury
10832	Basagran Herbicide	Dusty-Miller, Velvet Centaurea ( <i>Centaurea cineraia</i> )	Field Container	Schreiber	OH	1991	Foliar	No injury.
10832	Basagran Herbicide	Dusty-Miller, Velvet Centaurea ( <i>Centaurea cineraia</i> )	Field Container	Talbert	AR	1995		Slight injury.
10832	Basagran Herbicide	Dusty-Miller, Velvet Centaurea ( <i>Centaurea cineraia</i> ) <i>C. cineraria</i>	Field Container	Linderman	OR	1991	Foliar	No injury.
10832	Basagran Herbicide	Dusty-Miller, Velvet Centaurea ( <i>Centaurea cineraia</i> ) 'Diamond'	Field Container	Buriff	OH	1995	Over the top	Extensive injury observed; however some dead plants had <i>Pythium</i> isolated from them so the level of phytotoxicity rated is suspect
10818	Basagran Herbicide	Dusty-Miller, Velvet Centaurea ( <i>Centaurea cineraia</i> ) 'Silverdust'	Field In-Ground	Norcini	FL	1993	Over the top	Applications at 1.0 lb ai per acre had minimal impact; 2 application of 2.0 lb ai per acre resulted in almost complete mortality
00402	Basagran Herbicide	American Redbud, Eastern Redbud ( <i>Cercis canadensis</i> )	Field In-Ground	Buriff	OH	1995	Directed	No injury.
00402	Basagran Herbicide	American Redbud, Eastern Redbud ( <i>Cercis canadensis</i> )	Field In-Ground	Buriff	OH	1996	Directed	No injury.
12303	Basagran Herbicide	American Redbud, Eastern Redbud ( <i>Cercis canadensis</i> )	Field Container	Fraelich	GA	1999	Broadcast	No significant injury
12303	Basagran Herbicide	American Redbud, Eastern Redbud ( <i>Cercis canadensis</i> ) <i>C. canadensis</i>	Field Container	Buriff	OH	1997	Over the top	No injury.
25202	Basagran Herbicide	Dogwood, Tatarian ( <i>Cornus alba sibiricus</i> )	Field Container	Linderman	OR	1990	Foliar	First application showed no phytotoxicity; second application caused leaf necrosis followed by leaf death.
05562	Basagran Herbicide	Dogwood, Flowering ( <i>Cornus florida</i> )	Field In-Ground	Buriff	OH	1995	Directed	No significant injury
00552	Basagran Herbicide	Dogwood, Flowering ( <i>Cornus florida</i> )	Field Container	Glaze	GA	1992	Over the top	No significant injury; Weed control was fair
00552	Basagran Herbicide	Dogwood, Flowering ( <i>Cornus florida</i> )	Field Container	Schreiber	OH	1991	Foliar	Moderate phytotoxicity to mortality increasing with rate.
25197	Basagran Herbicide	Dogwood, Kousa ( <i>Cornus kousa</i> )	Field Container	Senesac	NY	1991	Over the top	Some injury with two applications of 1 lb ai per acre, but no reduction in vigor or fresh weight.
26134	Basagran Herbicide	Dogwood, Red Osier ( <i>Cornus sericea</i> )	Field Container	Fretz	OH	1977	Over the top	Excessive damage increasing with rate (0.75, 1.5, 3, and 6 lb ai per acre)

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
33412	Basagran T&O Herbicide	Pampas Grass, Uruguayan (Cortaderia selloana) 'Rosea'	Field Container	Senesac	NY	2018	Over the top	Minor injury with 32 and 64, moderate with 128 fl oz per acre applied twice; no stunting.
26144	Basagran Herbicide	Cotoneaster, Cranberry (Cotoneaster apiculatus) C. apiculata	Greenhouse	Schreiber	OH	1990		Control plants had significant damage; cannot make determination of phyto from this study
26144	Basagran Herbicide	Cotoneaster, Cranberry (Cotoneaster apiculatus) C. apiculata	Greenhouse	Schreiber	OH	1990	Foliar	DUPLICATE???? Control plants had significant damage; cannot make determination of phyto from this study
00550	Basagran Herbicide	Cotoneaster (Cotoneaster sp.) C. dammeri 'Royal Beauty'	Field Container	Fretz	OH	1977	Over the top	Excessive damage increasing with rate (0.75, 1.5, 3, and 6 lb ai per acre)
07818	Basagran Herbicide	Cotoneaster (Cotoneaster sp.) C. horizontalis 'Rock Spray'	Field In-Ground	Talbert	AR	1990	Foliar	15 - 40% control of yellow nutsedge; No damage with single application, some with second application
00550	Basagran Herbicide	Cotoneaster (Cotoneaster sp.) C. horizontalis 'Rock Spray'	Field Container	Talbert	AR	1990	Foliar	No damage with single or multiple applications
00550	Basagran Herbicide	Cotoneaster (Cotoneaster sp.) C. microphylla	Field Container	Linderman	OR	1990	Foliar	Single application had no apparent effect; second application severely damaged plants, some to mortality
00550	Basagran Herbicide	Cotoneaster (Cotoneaster sp.) Moonglo	Field Container	Senesac	NY	1990	Over the top	No visible injury, but slight reduction in vigor and fresh weight.
05619	Basagran Herbicide	Hawthorn (Crataegus sp.) C. phaenopyrum	Field In-Ground	Linderman	OR	1994	Foliar	No injury
12305	Basagran Herbicide	Hawthorn (Crataegus sp.) C. phaenopyrum 'Medic'	Field Container	Buriff	OH	1997	Over the top	No injury.
12305	Basagran Herbicide	Hawthorn (Crataegus sp.) malus	Field Container	Fraelich	GA	1997	Broadcast	Phytotoxicity increased as rate increased; 1 lb ai per acre exhibited slight injury and mortality occurred at 4 lb ai per acre.
00001	Basagran Herbicide	Bermudagrass (Cynodon dactylon)	Turf	King	AR	1977	Foliar	Minor transient
33425	Basagran T&O Herbicide	Maiden Pink (Dianthus deltoides) 'Flashing Light'	Field Container	Senesac	NY	2019	Over the top	Moderate injury with 32, severe with 64 and 128 fl oz per acre applied twice.
20664	Basagran Herbicide	Bleeding Heart (Dicentra sp.)	Field Container	Boydston	WA	2004	foliar	Moderate to severe injury increasing with rate (1, 2, 4 lb ai per acre).
20640	Basagran Herbicide	Bleeding Heart (Dicentra sp.)	Field In-Ground	Williams	IL	2003		Minimal injury increasing with rate (1, 2, and 4 lb ai per acre).
20664	Basagran Herbicide	Bleeding Heart (Dicentra sp.) D. spectabilis	Field Container	Williams	IL	2003	foliar	Minimal injury
33424	Basagran T&O Herbicide	Eastern Purple Coneflower (Echinacea purpurea) 'Magnus'	Field Container	Aulakh	CT	2018	Over the top	Minor to severe injury and growth reduction with 32, 64 and 128 fl oz per acre applied twice.
25435	Basagran Herbicide	Burning Bush (Euonymus alatus) 'Compacta'	Field Container	Senesac	NY	1991	Over the top	Significant reduction in vigor and fresh weight.
25320	Basagran Herbicide	Spindletree (Euonymus sp.) E. fortunei	Field Container	Derr	VA	2005		No injury
02474	Basagran Herbicide	Spindletree (Euonymus sp.) E. fortunei 'Coloratus'	Field In-Ground	Williams	IL	2003	Over the top	No injury at 1, 2, and 4 lb ai per acre.

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
02474	Basagran Herbicide	Spindletree (Euonymus sp.) E. japonicus	Field In-Ground	Derr	VA	1993	Foliar	Slight injury observed.
02474	Basagran Herbicide	Spindletree (Euonymus sp.) E. japonicus 'Colerata'	Field In-Ground	Williams	IL	1995	Broadcast	No phytotoxicity.
25320	Basagran Herbicide	Spindletree (Euonymus sp.) Euonymus fortunei 'Coloratus'	Field Container	Williams	IL	2003	foliar	No injury
02474	Basagran Herbicide	Spindletree (Euonymus sp.) Euonymus sp.	Field In-Ground	Talbert	AR	1979	Foliar	No phytotoxicity at 2.2 kg per hectare; minimal at 4.5 kg per hectare; minor at 9.0 kg per hectare Excellent efficacy for pigweed
33420	Basagran T&O Herbicide	Field Fescue (Festuca glauca)	Field Container	Cochran (IA)	IA	2018	Over the top	No significant injury with 32 and 64, moderate with 128 oz per acre applied twice; moderate growth reduction with 2X and 4X.
33420	Basagran T&O Herbicide	Field Fescue (Festuca glauca) 'Elijah Blue'	Field Container	Senesac	NY	2019	Over the top	No injury or stunting with 32, 64 and 128 fl oz per acre applied twice.
02471	Basagran Herbicide	Forsythia (Forsythia sp.)	Field In-Ground	Ahrens	CT	1977	Over the top	Significant injury increasing with rate
10839	Basagran Herbicide	Gardenia (Gardenia sp.)	Field Container	Glaze	GA	1993	Broadcast	No injury. All plant marketable at the end of the experiment. Trifolium control was poor, brassica control increased with the number of applications.
10839	Basagran Herbicide	Gardenia (Gardenia sp.) gardenium	Field Container	Fraelich	GA	1996	Broadcast	Slight injury at 1 and 2 lb ai per acre; some mortality at 4 lb ai per acre.
33429	Basagran T&O Herbicide	Gladiolus (Gladiolus sp.)	Field Container	Miller	WA	2018	Over the top	No injury after 1st application, severe injury after 2nd application with 1, 2 and 4 qt per acre.
10814	Basagran Herbicide	Algerian Ivy, Canary Ivy (Hedera canariensis)	Field In-Ground	Linderman	OR	1994	Foliar	No injury.
10830	Basagran Herbicide	Daylily (Hemerocallis sp.)	Field Container	Linderman	OR	1991	Foliar	No injury.
10830	Basagran Herbicide	Daylily (Hemerocallis sp.)	Field Container	Schreiber	OH	1991	Foliar	No injury.
21435	Basagran Herbicide	Daylily (Hemerocallis sp.) 'Aztec Gold'	Greenhouse	Norcini	FL	1991	Foliar	Leaf tip chlorosis and necrosis; younger plants recovered by the end of the experiment, older plants did not.
10816	Basagran Herbicide	Daylily (Hemerocallis sp.) 'Hyperion'	Field In-Ground	Linderman	OR	1994	Over the top	No significant injury
10830	Basagran Herbicide	Daylily (Hemerocallis sp.) 'Signal'	Field Container	Senesac	NY	1991	Over the top	Significant reduction in fresh weight and vigor.
10816	Basagran Herbicide	Daylily (Hemerocallis sp.) Stella de Oro	Field In-Ground	Williams	IL	2003	Foliar	No injury at 1, 2, and 4 lb ai per acre.
10816	Basagran Herbicide	Daylily (Hemerocallis sp.) 'Stella De Oro'	Field In-Ground	Buriff	OH	1995	Over the top	No significant injury
10830	Basagran Herbicide	Daylily (Hemerocallis sp.) 'Stella de Oro'	Field Container	Williams	IL	2005	Over the top	No injury at 1, 2, and 4 lb ai per acre.

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
20638	Basagran Herbicide	Alumroot (Heuchera sp.)	Field In-Ground	Simmons	SC	2005	foliar	No injury
20638	Basagran Herbicide	Alumroot (Heuchera sp.) Heucher x brizoides 'Firefly'	Field In-Ground	Boydston	WA	2004	foliar	High injury
25193	Basagran Herbicide	Lily, Plantain (Hosta fortunei) August Moon	Field Container	Senesac	NY	1990	Over the top	No visible injury, but there was a reduction in vigor and fresh weight.
25193	Basagran Herbicide	Lily, Plantain (Hosta fortunei) Brigham Blue	Field Container	Senesac	NY	1990	Over the top	No visible injury, but there was a reduction in vigor and fresh weight.
25193	Basagran Herbicide	Lily, Plantain (Hosta fortunei) 'White Beauty'	Field Container	Senesac	NY	1990	Over the top	No visible injury, but there was a reduction in vigor and fresh weight.
25318	Basagran T&O Herbicide	Hydrangea (Hydrangea sp.)	Field Container	Derr	VA	2005	Over the top	Very low injury
25318	Basagran T&O Herbicide	Hydrangea (Hydrangea sp.) H. macrophylla	Field Container	Uber	CA	2018	Over the top	Severe injury with 1, 2 and 4 lb ai per acre + MSO applied twice.
33913	Basagran T&O Herbicide	Witch's Moneybags (Hylotelephium telephium)	Field Container	Derr	VA	2018	Over the top	Moderate to severe crop injury (shoot weight reduction) increasing with rates (32, 64 and 128 fl oz per acre + MSO) applied twice.
00048	Basagran Herbicide	Holly (Ilex sp.) compacta	Field Container	Derr	VA	1990	Over the top	Slight injury.
00048	Basagran Herbicide	Holly (Ilex sp.) crenata 'Helleri'	Field Container	Beste (ARS)	MD	1991	Broadcast	Poor control of Pennsylvania bittercress, yellow woodsorrel, and prostrate spurge
00048	Basagran Herbicide	Holly (Ilex sp.) I. cornuta bufordii	Field Container	Glaze	GA	1990	Broadcast	Slight differences in plant growth, but plants were marketable.
00048	Basagran Herbicide	Holly (Ilex sp.) I. cornuta 'Dwarf Buford'	Field Container	Talbert	AR	1990	Foliar	Single application caused no damage; second application caused transient discoloration
00093	Basagran Herbicide	Holly (Ilex sp.) I. cornuta 'Dwarf Buford'	Field In-Ground	Talbert	AR	1990	Foliar	Single application did no damage; second application caused transient phytotoxicity
00048	Basagran Herbicide	Holly (Ilex sp.) I. crenata 'Convexa'	Field Container	Linderman	OR	1990	Foliar	No injury
00093	Basagran Herbicide	Holly (Ilex sp.) I. crenata 'Helleri'	Field In-Ground	Beste (ARS)	MD	1990	Broadcast	No significant visible phytotoxicity. Excellent control of yellow nutsedge
00048	Basagran Herbicide	Holly (Ilex sp.) I. crenata 'Helleri'	Field Container	Beste (ARS)	MD	1990	Broadcast	Significant foliar injury. Poor control of prostrate spurge, woodsorrel and bittercress
10833	Basagran Herbicide	Impatiens; Touch-me-not (Impatiens sp.)	Field Container	Schreiber	OH	1991	Foliar	No injury.
10833	Basagran Herbicide	Impatiens; Touch-me-not (Impatiens sp.)	Field Container	Talbert	AR	1994	Foliar	
10819	Basagran Herbicide	Impatiens; Touch-me-not (Impatiens sp.) 'Accent Carmine'	Field In-Ground	Senesac	NY	1991		Moderate to significant phytotoxicity increasing with rate
10833	Basagran Herbicide	Impatiens; Touch-me-not (Impatiens sp.) I. wallerana 'Southeast Salmon Blush'	Field Container	Norcini	FL	1993	Foliar	In both newly transplanted and established plants, significant injury occurred with both 1 and 2 lb ai per acre

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
10833	Basagran Herbicide	Impatiens; Touch-me-not (Impatiens sp.) 'Little Gem'	Field Container	Linderman	OR	1991	Foliar	Substantial reduction in bloom production and growth
10829	Basagran Herbicide	Jasmine (Jasminum sp.)	Field Container	Fraelich	GA	1999	Broadcast	No observable injury.
10829	Basagran Herbicide	Jasmine (Jasminum sp.)	Field Container	Norcini	FL	1993		
10829	Basagran Herbicide	Jasmine (Jasminum sp.) P. macrophyllus	Field Container	Fraelich	GA	1996	Broadcast	Slight phytotoxicity at all tested rates.
00126	Basagran Herbicide	Juniper (Juniperus sp.)	Field In-Ground	Ahrens	CT	1977	Over the top	Significant injury increasing with rate
00126	Basagran Herbicide	Juniper (Juniperus sp.)	Field In-Ground	Ahrens	CT	1978	Over the top	Significant injury increasing with rate
00125	Basagran Herbicide	Juniper (Juniperus sp.) Andorra	Field Container	Derr	VA	1990	Over the top	Severe injury at 1 lb ai per acre.
00126	Basagran Herbicide	Juniper (Juniperus sp.) J. chinensis 'Hetzi'	Field In-Ground	Williams	IL	1977	Directed	No injury noted; acceptable nutsedge control
00125	Basagran Herbicide	Juniper (Juniperus sp.) J. conferta 'Shore'	Field Container	Talbert	AR	1990	Ground	No injury with single or two applications
00125	Basagran Herbicide	Juniper (Juniperus sp.) J. horizontalis moench 'plumosa'	Field Container	Glaze	GA	1990	Over the top	Uniform slight injury across rates.
00125	Basagran Herbicide	Juniper (Juniperus sp.) J. horizontalis 'Bar Harbor'	Field Container	Linderman	OR	1990	Over the top	Mortality seen in two applications of 1lb ai per acre. Some damage in later ratings with single application
00125	Basagran Herbicide	Juniper (Juniperus sp.) J. horizontalis 'Bar Harbor'	Field Container	Norcini	FL	1991	Over the top	Some mortality at 1 and 2 lb ai per acre.
00125	Basagran Herbicide	Juniper (Juniperus sp.) J. horizontalis 'Plumosa'	Field Container	Fretz	OH	1977	Over the top	Excessive damage increasing with rate (0.75, 1.5, 3, and 6 lb ai per acre)
20653	Basagran Herbicide	Poker Plant (Kniphofia sp.) Flamenco	Field In-Ground	Boydston	WA	2004	foliar	Treated plants not saleable
05560	Basagran Herbicide	Golden-Rain Tree (Koelreuteria bipinnata)	Field In-Ground	Linderman	OR	1994	Foliar	No injury
05378	Basagran Herbicide	Crape Myrtle (Lagerstroemia indica)	Field Container	Glaze	GA	1990	Broadcast	Generally tolerant. Ineffective control of mares tail, cudweed, brassica species, annual grass, and ragweed.
05378	Basagran Herbicide	Crape Myrtle (Lagerstroemia indica)	Field Container	Linderman	OR	1990	Foliar	First application resulted in no injury; second application caused light necrosis in center of leaves.
05559	Basagran Herbicide	Crape Myrtle (Lagerstroemia indica)	Field In-Ground	Linderman	OR	1994	Over the top	No significant injury
05378	Basagran Herbicide	Crape Myrtle (Lagerstroemia indica) 'Centennial Spirit'	Field Container	Talbert	AR	1990	Ground	Transient yellowing
05559	Basagran Herbicide	Crape Myrtle (Lagerstroemia indica) 'Natchez'	Field In-Ground	Derr	VA	1994	Over the top	Some injury but plants recovered Excellent control of yellow nutsedge
05378	Basagran Herbicide	Crape Myrtle (Lagerstroemia indica) 'Pecos'	Field Container	Talbert	AR	1990	Ground	Transient yellowing

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05378	Basagran Herbicide	Crape Myrtle ( <i>Lagerstroemia indica</i> ) 'Rubra'	Field Container	Beste (ARS)	MD	1990	Foliar	Significant growth reduction and foliar injury up to 2 months after treatment. No control of bittercress, carpetweed, prostrate spurge, groundsel
05378	Basagran Herbicide	Crape Myrtle ( <i>Lagerstroemia indica</i> ) 'Tuscarora'	Field Container	Talbert	AR	1990	Ground	Transient yellowing
05378	Basagran Herbicide	Crape Myrtle ( <i>Lagerstroemia indica</i> ) 'Tuskegee'	Field Container	Talbert	AR	1990	Ground	Transient yellowing
20660	Basagran Herbicide	Lavender ( <i>Lavandula</i> sp.) Provence	Field In-Ground	Boydston	WA	2004	foliar	No injury at 1 and 2 lb ai per acre; minor injury at 4 lb ai per acre; plants saleable
00558	Basagran Herbicide	Privet ( <i>Ligustrum</i> sp.)	Field In-Ground	Glaze	GA	1979		Wrong report posted (Ronstar).
10844	Basagran Herbicide	Privet ( <i>Ligustrum</i> sp.) L. amurense	Field Container	Schreiber	OH	1991	Foliar	Slight injury at 1 and 2 lb ai per acre.
02466	Basagran Herbicide	Privet ( <i>Ligustrum</i> sp.) L. obtusifolium 'Regelianum'	Field Container	Fretz	OH	1977	Over the top	Excessive damage increasing with rate (0.75, 1.5, 3, and 6 lb ai per acre)
10844	Basagran Herbicide	Privet ( <i>Ligustrum</i> sp.) L. sinense	Field Container	Glaze	GA	1992	Broadcast	No injury. Two applications did not control cudweed nor brassica species.
00558	Basagran Herbicide	Privet ( <i>Ligustrum</i> sp.) L. x ibolium	Field In-Ground	Buriff	OH	1995	Directed	No injury.
33432	Basagran T&O Herbicide	Lily ( <i>Lilium</i> sp.) 'Litouwen'	Field Container	Miller	WA	2018	Over the top	No injury after 1st application, severe injury after 2nd application with 1, 2 and 4 qt per acre.
26143	Basagran Herbicide	Lilyturf ( <i>Liriope</i> sp.) L. muscari 'Evergreen Giant'	Greenhouse	Norcini	FL	1991	Foliar	Minimal chlorosis with both younger and older plants; younger plants were more tolerant.
10831	Basagran Herbicide	Lilyturf ( <i>Liriope</i> sp.) L. muscari variegata	Field Container	Glaze	GA	1992	Broadcast	No visible injury. Poor control of cudweed and brassica species.
10831	Basagran Herbicide	Lilyturf ( <i>Liriope</i> sp.) L. muscari variegata	Field Container	Glaze	GA	1993	Broadcast	No significant injury. Trifolium control was poor and brassica control increased with number of applications.
12304	Basagran Herbicide	Apple ( <i>Malus</i> sp.) crategus	Field Container	Fraelich	GA	1997	Broadcast	Slight phytotoxicity after first application; no phytotoxicity after second.
26146	Basagran Herbicide	Bee Balm, Scarlet ( <i>Monarda didyma</i> )	Field Container	Williams	IL	2003		Minimal injury increasing with rate (1, 2, and 4 lb ai per acre).
20641	Basagran Herbicide	Bee Balm, Scarlet ( <i>Monarda didyma</i> )	Field In-Ground	Williams	IL	2003	Over the top	Very slight injury at 1 and 2, slight to moderate at 4 lb ai per acre.
20641	Basagran Herbicide	Bee Balm, Scarlet ( <i>Monarda didyma</i> ) Raspberry Wine	Field In-Ground	Boydston	WA	2004	foliar	Slight injury
10841	Basagran Herbicide	Wax Myrtle ( <i>Myrica cerifera</i> )	Field Container	Fraelich	GA	1997	Broadcast	Slight to moderate phytotoxicity increasing with rate, but all plants were marketable.
10841	Basagran Herbicide	Wax Myrtle ( <i>Myrica cerifera</i> )	Field Container	Fraelich	GA	1999	Broadcast	Slight phytotoxicity at all rates, but at end of experiment visible injury only occurred at 4 lb ai per acre.

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10841	Basagran Herbicide	Wax Myrtle ( <i>Myrica cerifera</i> )	Field Container	Glaze	GA	1992	Broadcast	No phytotoxicity. Little control of cudweed and brassica species.
10841	Basagran Herbicide	Wax Myrtle ( <i>Myrica cerifera</i> )	Field Container	Glaze	GA	1993	Broadcast	No significant injury. Trifolium control was poor and the brassica control increased with number of applications.
33430	Basagran T&O Herbicide	Daffodil ( <i>Narcissus</i> sp.) 'Flower Carpet'	Field Container	Miller	WA	2018	Over the top	No injury or growth reduction with 1, 2 and 4 lb ai per acre applied once; second application not made due to severe winter injury.
25189	Basagran Herbicide	Aztec Grass, Lillyturf ( <i>Ophiopogon jaburan</i> )	Greenhouse	Norcini	FL	1991	Foliar	Injury (tip chlorosis and necrosis) was rate dependent, exhibited faster on younger plants, but was less severe on younger plants.
33414	Basagran T&O Herbicide	Mondo Grass; Lillyturf; Ker-Gawl ( <i>Ophiopogon</i> sp.) <i>O. planiscapus</i> 'Nigrescens'	Field Container	Senesac	NY	2019	Over the top	Severe injury with 32, 64 and 128 fl oz per acre applied twice.
33417	Basagran T&O Herbicide	Switch Grass ( <i>Panicum virgatum</i> )	Field Container	Senesac	NY	2019	Over the top	Minor injury and no stunting with 32 and 64, moderate with 128 fl oz per acre applied twice.
33419	Basagran T&O Herbicide	Crimson Fountain Grass ( <i>Pennisetum setaceum</i> ) 'Fireworks'	Field Container	Senesac	NY	2019	Over the top	Minor to severe injury increasing with rates (32, 64 and 128 fl oz per acre) applied twice.
10836	Basagran Herbicide	Petunia ( <i>Petunia</i> sp.)	Field Container	Schreiber	OH	1991	Foliar	No injury
10836	Basagran Herbicide	Petunia ( <i>Petunia</i> sp.)	Field Container	Schreiber	OH	1992	Foliar	No injury.
10822	Basagran Herbicide	Petunia ( <i>Petunia</i> sp.) 'Madness Plum'	Field In-Ground	Senesac	NY	1991	Over the top	No damage with single application
10836	Basagran Herbicide	Petunia ( <i>Petunia</i> sp.) 'Ultra White'	Field Container	Linderman	OR	1991	Foliar	No injury at 1 and 2 lb ai per acre.
20633	Basagran Herbicide	Phlox, Fall ( <i>Phlox paniculata</i> ) Orange Perfection	Field In-Ground	Boydston	WA	2004	foliar	Slight, moderate and high injury at 1X, 2X and 4X rates
10845	Basagran Herbicide	Chokeberry ( <i>Photinia</i> sp.) <i>P. serrulata</i>	Field Container	Glaze	GA	1992	Broadcast	No injury. Fair control of cudweed and brassica species.
01591	Basagran Herbicide	Chokeberry ( <i>Photinia</i> sp.) <i>P. x fraseri</i>	Field In-Ground	Derr	VA	1993	Foliar	Bentazon plus crop oil caused severe injury. Good yellow nutsedge control.
01591	Basagran Herbicide	Chokeberry ( <i>Photinia</i> sp.) <i>P. x fraseri</i>	Field In-Ground	Linderman	OR	1994	Foliar	No injury.
00227	Basagran Herbicide	Pine ( <i>Pinus</i> sp.) <i>P. mugo</i> 'Mugo'	Field Container	Linderman	OR	1990		No phyto with single application; two applications at 1 lb ai per acre caused significant damage
02464	Basagran Herbicide	Pine ( <i>Pinus</i> sp.) <i>P. strobus</i>	Field In-Ground	Ahrens	CT	1977		No damage at 1 or 2 lb ai per acre
00227	Basagran Herbicide	Pine ( <i>Pinus</i> sp.) <i>P. strobus</i>	Field Container	Derr	VA	1990	Over the top	Moderate injury increasing with subsequent applications.
00227	Basagran Herbicide	Pine ( <i>Pinus</i> sp.) <i>P. strobus</i>	Field Container	Glaze	GA	1990	Broadcast	Slight phytotoxicity.



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00227	Basagran Herbicide	Pine (Pinus sp.) P. strobus	Field Container	Schreiber	OH	1991	Foliar	No injury.
10842	Basagran Herbicide	Japanese Mock Orange (Pittosporum tobira)	Field Container	Fraelich	GA	1997	Broadcast	Slight injury increasing with rate, but all plants still marketable.
10842	Basagran Herbicide	Japanese Mock Orange (Pittosporum tobira)	Field Container	Fraelich	GA	1999	Broadcast	Slight phytotoxicity at 1 lb ai per acre, moderate at 4 lb ai per acre.
10842	Basagran Herbicide	Japanese Mock Orange (Pittosporum tobira)	Field Container	Glaze	GA	1993	Broadcast	No injury. Fair control of cudweed and brassica.
10842	Basagran Herbicide	Japanese Mock Orange (Pittosporum tobira) 'Compacta Green'	Field Container	Norcini	FL	1991	Foliar	Variable response from slight chlorosis to plant death.
10843	Basagran Herbicide	Yew Plum Pine (Podocarpus macrophyllus)	Field Container	Glaze	GA	1992	Broadcast	No injury. Marginal control of cudweed and brassica.
10843	Basagran Herbicide	Yew Plum Pine (Podocarpus macrophyllus)	Field Container	Glaze	GA	1993	Broadcast	Minimal injury, but marketability was poor in two of the reps - possibly due to disease. Trifolium control was poor, brassica control increased with number of applications.
10843	Basagran Herbicide	Yew Plum Pine (Podocarpus macrophyllus) D. Don	Field Container	Fraelich	GA	1996	Broadcast	Slight injury at 1 and 2 lb ai per acre; moderate at 4 lb ai per acre.
10843	Basagran Herbicide	Yew Plum Pine (Podocarpus macrophyllus) D. Don	Field Container	Fraelich	GA	1999	Broadcast	Slight phytotoxicity at 2 and 4 lb ai per acre.
07819	Basagran Herbicide	Firethorn (Pyracantha sp.) 'Lalandei'	Field In-Ground	Buriff	OH	1995	Directed	No significant injury
00224	Basagran Herbicide	Oak (Quercus sp.) Q. agrifolia	Field Container	Glaze	GA	1992	Broadcast	No injury. Some reduction of weed populations of cudweed, brassica, and black willow.
00224	Basagran Herbicide	Oak (Quercus sp.) Q. nigra	Field Container	Schreiber	OH	1990		Some damage with both single and double applications
00224	Basagran Herbicide	Oak (Quercus sp.) Q. nigra	Field Container	Schreiber	OH	1991	Foliar	Some damage with 1 and 2 lb ai per acre
00224	Basagran Herbicide	Oak (Quercus sp.) Q. rubra	Field Container	Linderman	OR	1990	Foliar	Single app caused no damage; second app caused moderate damage
10838	Basagran Herbicide	Indian Hawthorn (Raphiolepis indica)	Field Container	Glaze	GA	1993		No injury. Trifolium control was poor and the Brassica control increased with number of applications.
10838	Basagran Herbicide	Indian Hawthorn (Raphiolepis indica) Alba	Field Container	Norcini	FL	1991	Foliar	No injury in recently transplanted or established plants.
11291	Basagran Herbicide	Azalea (Rhododendron sp.) Azalea 'Coral Bells'	Field Container	Senesac	NY	1990	Over the top	No visible injury, but reduction in vigor and fresh weight.
02472	Basagran Herbicide	Azalea (Rhododendron sp.) 'Hong Kong'	Field In-Ground	Linderman	OR	1994	Foliar	No injury.

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
11291	Basagran Herbicide	Azalea (Rhododendron sp.) R. indicum 'Sweet'	Field Container	Fraelich	GA	1996	Broadcast	No injury after second application at 1 and 2 lb ai per acre; moderate at 4 lb ai per acre. Good control of oxalis; no observable impact on carolina geranium, crabgrass, cudweed, pine or spurge.
11291	Basagran Herbicide	Azalea (Rhododendron sp.) R. macrophylla	Field Container	Linderman	OR	1994	Over the top	No injury
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Blaaus Pink'	Field In-Ground	Beste (ARS)	MD	1993	Foliar	No significant injury Effective suppression of weeds
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Blaaus Pink'	Field In-Ground	Beste (ARS)	MD	1994	Over the top	No phytotoxicity
11291	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Delaware Valley White'	Field Container	Beste (ARS)	MD	1994	Over the top	Some injury but plants recovered Some control of yellow woodsorrel but bittercress and spurge not controlled
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Delaware Valley White'	Field In-Ground	Beste (ARS)	MD	1994	Over the top	Transient necrosis, but plants were saleable at end of experiment Excellent control of yellow nutsedge; no control of prostrate spurge and carpetweed
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Delaware Valley White'	Field In-Ground	Beste (ARS)	MD	1995	Over the top	Slight injury but plants were saleable
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Girard Fuschia	Field In-Ground	Beste (ARS)	MD	1995	Over the top	Slight injury but all plants were saleable Controlled chickweed completely
11291	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Girard Rose'	Field Container	Buriff	OH	1995	Over the top	Some injury at the 2.0 and 4.0 lb ai per acre rate. Plants recovered
11291	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Hino Crimson'	Field Container	Beste (ARS)	MD	1993	Over the top	Injury made plants unsaleable
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Hino Crimson'	Field In-Ground	Beste (ARS)	MD	1995	Over the top	Bentazon plus crop oil caused noticeable but transient phytotoxicity
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Hino Crimson'	Field In-Ground	Beste (ARS)	MD	1995	Over the top	Some injury at the 4 lb ai per acre rate but all plants were saleable Effective control of yellow nutsedge
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Hino Crimson'	Field In-Ground	Talbert	AR	1990	Over the top	Poor control of yellow nutsedge
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. obtusum 'Pleasant White'	Field In-Ground	Beste (ARS)	MD	1995	Over the top	Some injury but plants were saleable Excellent chickweed control
02472	Basagran Herbicide	Azalea (Rhododendron sp.) R. X 'Hershey Red'	Field In-Ground	Derr	VA	1993	Over the top	Extensive injury at both rates Excellent yellow nutsedge control
02473	Basagran Herbicide	Rhododendron (Rhododendron sp.) 'Hershey Red'	Field In-Ground	Derr	VA	1993	Over the top	Bentazon plus crop oil caused significant damage. Good control of yellow nutsedge
02473	Basagran Herbicide	Rhododendron (Rhododendron sp.) 'Roseum Elegans'	Field In-Ground	Beste (ARS)	MD	1990	Over the top	Significant foliar injury with single and two applications of 1 lb ai per acre.
25194	Basagran Herbicide	Rose (Rosa sp.) 'Mediland'	Field Container	Senesac	NY	1990	Over the top	No visible injury, but there was a reduction in vigor and fresh weight.
20658	Basagran Herbicide	Scarlet Sage (Salvia splendens) Caradonna	Field In-Ground	Boydston	WA	2004	foliar	Slight injury at 1X, moderate at 2X and 4X rates

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33440	Basagran T&O Herbicide	Stonecrop, Moss (Sedum acre)	Field Container	Marble	FL	2019	Over the top	Minor to moderate injury increasing with rates (32, 64 and 128 fl oz per acre) applied twice; severe growth reduction at 4X.
33440	Basagran T&O Herbicide	Stonecrop, Moss (Sedum acre)	Field Container	Senesac	NY	2018	Over the top	Moderate injury with 32, 64 and 128 fl oz per acre applied twice; no stunting.
33410	Basagran T&O Herbicide	Stonecrop, Kamchatka (Sedum kamtschaticus) 'Ellacombeanum'	Field Container	Senesac	NY	2018	Over the top	Minor injury with 32 and 64, moderate with 128 fl oz per acre applied twice; no stunting.
33408	Basagran T&O Herbicide	Stonecrop, Jenny's (Sedum rupestre) 'Angelina'	Field Container	Senesac	NY	2018	Over the top	Moderate to severe injury increasing with rates (32, 64 and 128 fl oz per acre) applied twice; stunting wit 4X.
33407	Basagran T&O Herbicide	Stonecrop, Two-Row/Caucasian (Sedum spurium) 'John Creech'	Field Container	Senesac	NY	2019	Over the top	Minor injury and no stunting with 32, 64 and 128 fl oz per acre applied twice.
20649	Basagran Herbicide	Stonecrop, Two-Row/Caucasian (Sedum spurium) Sedum spurium 'Tricolor'	Field In-Ground	Boydston	WA	2004	foliar	No injury at 1X and 2X rates, slight at 4X
20634	Basagran Herbicide	Aster, White Heath (Symphyotrichum ericoides) Aster novi-belgii 'Woods Light Blue'	Field In-Ground	Boydston	WA	2004	foliar	Slight, moderate and high injury at 1X, 2X and 4X rates
10834	Basagran Herbicide	Marigold (Tagetes sp.)	Field Container	Schreiber	OH	1991	Foliar	No injury.
10820	Basagran Herbicide	Marigold (Tagetes sp.) 'Aurora Gold'	Field In-Ground	Senesac	NY	1991	Over the top	Slight injury with single application of 1 lb ai per acre; moderate damage with two consecutive applications of 1 lb ai per acre.
10820	Basagran Herbicide	Marigold (Tagetes sp.) 'Bolero'	Field In-Ground	Linderman	OR	1994	Foliar	No phytotoxicity.
10834	Basagran Herbicide	Marigold (Tagetes sp.) 'Inka Orange'	Field Container	Linderman	OR	1991	Foliar	No injury.
10820	Basagran Herbicide	Marigold (Tagetes sp.) T. erecta	Field In-Ground	Talbert	AR	1994	Over the top	No injury with one application at 1 and 2 lb ai per acre rate; slight with the 4 lb ai per acre rate. The second application caused slight to moderate injury increasing with rate. Excellent control of smooth pigweed, common purslane, yellow nutsedge, and
10834	Basagran Herbicide	Marigold (Tagetes sp.) T. erecta 'Inca Yellow'	Field Container	Norcini	FL	1993	Foliar	Trial 1 (newly transplanted): moderate to severe necrosis with some mortality. Trial 2 (established plants): some necrosis at 1 and 2 lb ai per acre sevens days after first application.
10827	Basagran Herbicide	Bald Cypress (Taxodium distichum)	Field Container	Buriff	OH	1995	Over the top	No significant injury
10813	Basagran Herbicide	Bald Cypress (Taxodium distichum)	Field In-Ground	Buriff	OH	1996	Till incorporated	No injury
10827	Basagran Herbicide	Bald Cypress (Taxodium distichum)	Field Container	Glaze	GA	1993	Over the top	No significant injury

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10827	Basagran Herbicide	Bald Cypress ( <i>Taxodium distichum</i> )	Field Container	Schreiber	OH	1991	Foliar	Slight to moderate injury.
10666	Basagran Herbicide	Yew ( <i>Taxus</i> sp.)	Field Container	Schreiber	OH	1991	Foliar	No injury.
00986	Basagran Herbicide	Yew ( <i>Taxus</i> sp.)	Field In-Ground	Williams	IL	1977	Directed	No injury noted; acceptable nutsedge control
00986	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. cuspidata</i>	Field In-Ground	Ahrens	CT	1977	Foliar	No damage at 1 or 2 lb ai per acre
00986	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. cuspidata</i>	Field In-Ground	Ahrens	CT	1978	Foliar	No damage at 1 or 2 lb ai per acre
00986	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. cuspidata densiformis</i>	Field In-Ground	Ahrens	CT	1977	Over the top	No damage at 1 or 2 lb ai per acre
00986	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. cuspidata densiformis</i>	Field In-Ground	Ahrens	CT	1978	Over the top	No damage at 1 or 2 lb ai per acre
10666	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. cuspidata</i> 'Densiformis'	Field Container	Linderman	OR	1991	Foliar	No injury.
10666	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. media</i> 'Densiformis'	Field Container	Beste (ARS)	MD	1993	Over the top	No injury. Good common sowthistle control; no effect on prostrate spurge; necrosis on <i>Eclipta</i> , but no control; perfect sowthistle was controlled with two applications.
00986	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. media</i> 'Hatfieldii'	Field In-Ground	Senesac	NY	1990	Over the top	No injury. About 30% control of nutsedge
10666	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. media</i> 'Hicksi'	Field Container	Beste (ARS)	OH	1990	Over the top	No injury.
10666	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. media</i> 'Hicksi'	Field Container	Beste (ARS)	MD	1991	Over the top	No injury. Good initial control of prostrate spurge, no control of PA bittercress or yellow woodsorrel
10666	Basagran Herbicide	Yew ( <i>Taxus</i> sp.) <i>T. media</i> 'Hicksi'	Field Container	Glaze	GA	1993	Broadcast	No significant injury. <i>Trifolium</i> control was poor and brassica control increased with number of applications.
00549	Basagran Herbicide	Red Cedar, <i>Arborvitae</i> ( <i>Thuja</i> sp.) <i>T. occidentalis</i>	Field In-Ground	Senesac	NY	1990	Over the top	No injury. About 30% control of nutsedge
25190	Basagran Herbicide	Jasmine, Asian Star ( <i>Trachelospermum asiaticum</i> ) 'Aslo'	Field Container	Norcini	FL	1991	Foliar	Slight to moderate chlorosis and necrosis increasing with rate.
25190	Basagran Herbicide	Jasmine, Asian Star ( <i>Trachelospermum asiaticum</i> ) <i>T. jasiminoides</i>	Field Container	Norcini	FL	1993	Over the top	Trial 1 (recently transplanted): slight injury at 1 lb ai per acre and lasting injury at 2 lb ai per acre. Trial 2 (established plants): moderate to lasting injury at 1 lb ai per acre; nearly complete mortality at 2 lb ai per acre.
26132	Basagran Herbicide	Hemlock, Eastern ( <i>Tsuga canadensis</i> )	Field In-Ground	Ahrens	CT	1978	Over the top	Moderate injury with 1 and 2 lb ai per acre
33431	Basagran T&O Herbicide	Tulip ( <i>Tulipa</i> sp.) 'Negrita'	Field Container	Miller	WA	2018	Over the top	No injury with 1, 2 and 4 qt per acre applied twice.

PR#	Product	Crop	Production Site	Researcher	State	Year	Application Type	Results
20642	Basagran Herbicide	Vervain (Verbena sp.) Homestead Purple	Field In-Ground	Boydston	WA	2004	foliar	Slight injury at 1X, high at 2X and 4X rates
10840	Basagran Herbicide	Arrowwood (Viburnum sp.) V. carlesi	Field Container	Schreiber	OH	1991	Foliar	Moderate injury with both 1 and 2 lb ai per acre.
10840	Basagran Herbicide	Arrowwood (Viburnum sp.) V. odoratissimum	Field Container	Glaze	GA	1993	Broadcast	Minor injury. Trifolium control was poor and brassica control increased with number of applications.
10840	Basagran Herbicide	Arrowwood (Viburnum sp.) V. opulus	Field Container	Linderman	OR	1991	Foliar	Control plants performed poorly; no conclusions can be reached from this trial
00559	Basagran Herbicide	Weigela (Weigela sp.) 'Red Prince'	Field In-Ground	Linderman	OR	1994	Foliar	Necrosis at 1, 2, and 4 lb ai per acre. Most susceptible tissue were young leaves. Damage became masked within 3 weeks so that by end of experiment plant were saleable.
00559	Basagran Herbicide	Weigela (Weigela sp.) W. florida 'Java Red'	Field In-Ground	Buriff	OH	1995	Directed	No injury with directed applications.

## Label Suggestions

It is suggested based upon data accumulated over the past 45 years, the following species be added to the Basagran T/O label for over the top applications with single application for those crops with asterisks:

*Buxus* sp.

*Caryopteris* sp. (See Fretz)

*Cynodon dactylon*

*Hedera canariensis*

*Hydrangea* sp.

*Podocarpus macrophyllus*

*Taxus* sp.

*Viola* sp. \*

Figure 6. Excerpt from Basagran T/O Label

Table 3. Ornamental Species for Over-the-top Application	
Common Name	Scientific Name
Alumroot	<i>Heuchera</i> spp.
Apple (nonbearing)	<i>Malus</i> spp.
Arborvitae*	<i>Thuja occidentalis</i>
Barberry, Japanese	<i>Berberis thunbergii</i>
Bugle, common	<i>Ajuga</i> spp.
Butterfly bush	<i>Buddleia davidii</i>
Cabbage ornamental	<i>Brassica</i> spp.
Cape jasmine	<i>Gardenia</i> spp.
Chokeberry	<i>Photinia</i> spp.
Coral bells	<i>Heuchera</i> spp.
Cotoneaster	<i>Cotoneaster</i> spp.
Crabapple (nonbearing)	<i>Malus</i> spp.
Crape myrtle	<i>Lagerstroemia indica</i>
Cypress, bald	<i>Taxodium distichum</i>
Daylily	<i>Hemerocallis</i> spp.
Dusty miller	<i>Centaurea cineraria</i>
Euonymus	<i>Euonymus</i> spp.
Gardenia, common	<i>Gardenia</i> spp.
Golden-rain tree	<i>Koelreuteria bipinnata</i>
Hawthorn, Indian	<i>Rhaphiolepis indica</i>
Holly	<i>Ilex</i> spp.
Holly, Chinese	<i>Ilex cornuta</i>
Holly, dwarf Chinese	<i>Ilex cornuta</i>
Holly, Japanese	<i>Ilex crenata</i>
Jasmine	<i>Jasminum</i> spp.
Lily, plantain	<i>Hosta fortunei</i>
Lilyturf	<i>Liriope</i> spp.
Lilyturf, big blue	<i>Liriope muscari</i>
Liriope, creeping	<i>Liriope spicata</i>
Marigold	<i>Tagetes</i> spp.

Table 3. Ornamental Species for Over-the-top Application (continued)	
Common Name	Scientific Name
Myrtle, wax	<i>Myrica cerifera</i>
Oak, red*	<i>Quercus rubra</i>
Pachysandra	<i>Pachysandra terminalis</i>
Petunia	<i>Petunia hybrida</i>
Photinia	<i>Photinia</i> spp.
Pine, Mugo	<i>Pinus mugo</i>
Pine, white	<i>Pinus strobus</i>
Pittosporum, Japanese	<i>Pittosporum tobira</i>
Snapdragon	<i>Antirrhinum majus</i>

\* Make no more than one application per crop per growing season. Some species within a genera may vary in degree of tolerance. Before application across a large number of plants within the same species, test **Basagran® T&O herbicide** on a small number of plants of that species and observe for 2 weeks. **DO NOT apply crop oil** with application of **Basagran T&O** over the top to ornamentals or injury may occur.

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