Environment Horticulture Program Research Summaries

IR-4 Environmental Horticulture Program Nutsedge and Sedge Efficacy

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Date: December 13, 2023

Acknowledgements
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This material is based upon work that is supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, under award numbers 2015-34383-23710, 2017-34383-27100, 2019-34383-29973, 2020-34383-32455 and 2021-343830-34848 with substantial cooperation and support from the State Agricultural Experiment Stations and USDA-ARS.

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Abstract

Nutsedges and sedges (*Cyperus sp*.) are difficult to manage during the production of perennial environmental horticulture crops grown in containers or in the field. During the 2006 IR-4 Environmental Horticulture Workshop, a project was prioritized to screen for efficacious products to manage sedge and nutsedge in container or field grown environmental horticulture crops. Between 2007 and 2023, IR-4 evaluated a diverse group of products for pre- and post-emergent control of several sedges and nutsedges. During this time, IR-4 sponsored 84 research trials on 28 products or product formulations with 20 actives to manage sedges and nutsedge. Most research was conducted with pre-emergent herbicides.

The most effective options across these studies where IR-4 has at least 3 experiments include Pennant Magnum, SedgeHammer, Tower, and V-10142 for yellow nutsedge management. However, the IR-4 dataset is limited, and several products tested show promise for managing annual sedges, rice flatsedge, purple nutsedge or compressed sedge.

Introduction

During the 2006 IR-4 Environmental Horticulture Workshop, a project was prioritized to screen for efficacious products to manage sedge and nutsedge in container or field grown environmental horticulture crops. Between 2007 and 2023, IR-4 evaluated a diverse group of products for pre- and post-emergent control of several sedges and nutsedges.

Materials and Methods

A total of twenty-eight (28) herbicides (Table 1) were evaluated for five different sedge and nutsedge species, although not all treatments were in all studies. Over the top liquid applications or granular broadcast applications were made with preemergent or postemergent herbicide experiments, depending on protocol and location.

Efficacy evaluations were recorded at varying time points on a scale of 0 to 10 (0= no efficacy; 10 = complete kill) or counts of individual weed plants present in pots or plots. For IR-4 testing implemented after 2003, the following protocols were used: 07-010, 07-014, 18-013*, 19-013*, 19-020*, 22-017*, and 23-017* (*extra data provided as part of crop safety experiments). Please visit https://www.ir4project.org/ehc/ehc-registration-support-research/env-hort-researcher-resources/#Protocols to view and download these protocols.

Products were supplied to researchers (See researchers in Appendix 1) by their respective manufacturers.

Results and Summary

Between 1977 and 2023, IR-4 sponsored 84 research trials on 28 products or product formulations with 20 actives to manage sedges and nutsedge. Most research was conducted with pre-emergent herbicides.

The most effective options across these studies where IR-4 has at least 3 experiments include Pennant Magnum, SedgeHammer, Tower, and V-10142 for yellow nutsedge management (Table 1). However, the IR-4 dataset is limited and several products tested show promise for managing annual sedges, rice flatsedge purple nutsedge or compressed sedge.

Table 1. Overall Efficacy Summary for post-emergent and pre-emergent herbicide applications on Sedges and Nutsedges

Product (Active Ingredients)	**MOA**	**Sedge, Annual (*Cyperus sp.*)**	**Flatsedge, Rice (*Cyperus iria*)**	**Nutsedge, Purple (*Cyperus rotundus*)**	**Nutsedge, Yellow (*Cyperus esculentus*)**	**Sedge, Compressed (*Carex acuta*)**
Basagran Herbicide (Bentazon)	WSSA 6				5.0 (5 - 5) n1	
Basagran T&O Herbicide (Bentazon)	WSSA 6				5.0 (5 - 5) n2 Labeled	
BroadStar 0.25G (Flumioxazin)	WSSA 14				4.0 (4 - 4) n1 Labeled	
BroadStar 0.25G VC1604 (Flumioxazin)	WSSA 14	1.0 (1 - 1) n1				
Casoron 4G (Dichlobenil)	WSSA 20				3.0 (3 - 3) n2	
Dismiss 4F (Sulfentrazone)	WSSA 14				4.0 (4 - 4) n1 Labeled	
Eptam EC (EPTC)	WSSA 8				3.0 (3 - 3) n1 Labeled	
Eptam G (EPTC)	WSSA 8				5.0 (5 - 5) n1 Labeled	
F6875 0.3G (Sulfentrazone + Prodiamine)	WSSA 14 + WSSA 3				1.0 (1 - 1) n2	
F6875 4SC (Sulfentrazone + Prodiamine)	WSSA 14 + WSSA 3				3.0 (3 - 3) n1	
Fiesta Herbicide (Iron HEDTA)	unknown				1.0 (1 - 1) n2	
Fortress (OHP1701B) (isoxaben + dithiopyr)	WSSA 21 + WSSA 3	1.0 (1 - 1) n1	5.0 (5 - 5) n1			1.0 (1 - 1) n1
Freehand G (Dimethenamid-p + pendimethalin)	WSSA 15 + WSSA 3		5.0 (5 - 5) n1 Labeled		5.0 (5 - 5) n2 Labeled	4.0 (4 - 4) n1 Labeled

Product (Active Ingredients)	**MOA**	**Sedge, Annual (*Cyperus sp.*)**	**Flatsedge, Rice (*Cyperus iria*)**	**Nutsedge, Purple (*Cyperus rotundus*)**	**Nutsedge, Yellow (*Cyperus esculentus*)**	**Sedge, Compressed (*Carex acuta*)**
Gemini Granular (Prodiamine + isoxaben)	WSSA 3 + WSSA	2.0 (2 - 2) n1				3.0 (3 - 3) n1
Marengo G (Indaziflam 0.0224%)	WSSA 29	1.0 (1 - 1) n1				
Pennant Magnum (S-Metolachlor)	WSSA 15	5.0 (5 - 5) n1 Labeled	5.0 (5 - 5) n1 Labeled		4.0 (1 - 5) n4 Labeled	
SedgeHammer (Halosulfuron)	WSSA 2		5.0 (5 - 5) n1 Labeled	3.0 (3 - 3) n1 Labeled	4.3 (2 - 5) n6 Labeled	
Snapshot 2.5TG (Trifluralin + Isoxaben)	WSSA 3 + WSSA 21				1.0 (1 - 1) n1	2.0 (2 - 2) n1
Sulfentrazone 0.2G (Sulfentrazone)	WSSA 14		2.5 (1 - 4) n2		1.0 (1 - 1) n2	
SureGuard 51WDG (Flumioxazin)	WSSA 14	5.0 (5 - 5) n2				
Tower (Dimethenamid-p)	WSSA 15				3.0 (1 - 5) n3 Labeled	
V-10142 0.5G (Imazasulfuron)	WSSA 2				4.0 (3 - 5) n2	
V-10142 75WG (Imazasulfuron)	WSSA 2		5.0 (5 - 5) n1	4.0 (4 - 4) n1	**3.5 (3 - 5) n4**	
V-10233 76WG (Flumioxazin + pyroxasulfone)	WSSA 14 + WSSA 15	5.0 (5 - 5) n2				

Average rating on a scale of 1 – 5 with 1 = 0 to about 70% efficacy and 5 = 100 efficacy or equivalent to non-inoculated control; minimum to maximum rating; number of trials. A rating of 2 or lower is considered unacceptable. A rating of 3 or higher is considered commercially acceptable.

Annual Sedges

Mathers 2009

In 2009, Mathers compared sedge and total weeds of 10 herbicides to nontreated plots. Herbicides were applied in late March and plots were rated in May and Julye. None of the herbicides differed significantly from the nontreated plots at either time point (Table 2). However, Sedgehammer provided numerically the highest level of control in the July ratings.

Table 2. Preemergent control of *Cyperus sp*., Mathers, 2009

	May		July	
Treatment	**Sedge**	**Total Weeds**	**Sedge**	**Total Weeds**
Casoron G	9.5 ab	8.2	6 ab	7
Eptam G	9.8 a	6.2	6 ab	4
F6875 0.3G	6 b	7 5.	3 ab	3.7
F6875	8 ab	7	5 ab	5
FreeHand	10 a	7 6.	7 ab	4.3
Pennant Magnum	9.8 a	7.2	5.3 ab	5
Sedgehammer	9.5 ab	8	9.3 a	6.3
Tower	6.7 ab	7.3	3.2 b	4.6
V 10142	9.2 ab	7.5	4 ab	2.7
V 10142 0.5G	9.8 a	7.2	5.7 ab	4.7
Nontreated	8.25 ab	7.5	5.3 ab	5.3

z = Visual ratings based on a 0-10 scale with 0 being no weed control and 10 perfect weed control
y = Visual ratings within the same column followed by the same letter are not significantly different based on lsd ($\alpha = 0.05$).
x = no significant differences were found for total weed control for May or July

Beste 2016

In 2016, Beste compared sedge and total weeds of two herbicides to nontreated in oak seedling seed beds. Herbicides were applied April 29 and plots were rated June 21. Sureguard and V-10233 provided excellent efficacy for annual sedge (Table 3).

Table 3. Untreated Control Weed Population and % Weed Control by species on June 21, 2016 at 53 days after pre-emergence herbicide application to acorn seedbeds.

	Willow Oak					Pin Oak				
	Weeds	% Control				Weeds	% Control			
Treatments:	UTC Population	V-10233			Sure-Guard	UTC Population	V-10233			Sure-Guard
Product - OZ/A	0.0	2.0	2.5	3.0	1.5	0.0	2.0	2.5	3.0	1.5
Annual sedge (Cyperus spp.)	2/ft2	100	100	100	100	2-3/ft2	100	100	100	100

Derr 2022

During 2022, Derr studied the efficacy of 5 herbicides to manage various weeds including compressed sedge. Broadstar at 400 lb per acre reduced annual sedge, but the two lower rates were less effective. Fortress did not provide adequate sedge reduction; neither did Specticle G. However, Gemini Granular and Pennant Magnum provided almost complete reduction of annual sedge populations at all three rates tested. (Table 4).

Table 4. Efficacy for Annual Sedge (*Carex acuta*), Derr, 2022

		Annual sedge
		Jun 22 2022
		#/plot
Treatment		21 DAT
Nontreated	--	4.5
BroadStar	100 lb/a	4.5
	200 lb/a	2.8
	400 lb/a	1.8
Fortress	150 lb/a	5.3
	300 lb/a	3.3
	600 lb/a	3.0
Gemini Granular	200 lb/a	1.3
	400 lb/a	0.5
	800 lb/a	0.5
Pennant Magnum	2 pt/a	0.0
	4 pt/a	1.0
	8 pt/a	0.0
Specticle G	200 lb/a	4.0
LSD p=0.05		3.2

Derr 2023

During 2023, as a supplement to a crop safety experiment, Derr studied the efficacy of Pennant Magnum, Fortress and Freehand for three weeds including rice flatsedge (*Cyperus iria*) (Table

5). Complete control was observed for all three rates of Pennant Magnum and the single rate of Freehand (200 lb per acre). For Fortress, all rates controlled rice flatsedge through 21 days after the second application, but the 150 lb product per acre rate exhibited less efficacy by 58 days after the second application.

Table 5. Pre-emergent efficacy for Rice Flatsedge (*Cyperus iria*), Derr, 2023

Treatment	Rate per acre	Number per plot		Percent Control
		36 DAT	21 DAT2	58 DAT2
		6-20-23	7-17-23	8-23-23
Nontreated	--	47.0	74.0	0
Pennant Magnum	2.5 lb ai/a	0.0	0.0	100
	5.0 lb ai/a	0.0	0.0	100
	10.0 lb ai/a	0.0	0.0	100
Fortress	150 lb/a	0.3	0.0	84
	300 lb/a	0.0	0.0	100
	600 lb/a	0.0	0.0	100
FreeHand	200 lb/a	0.0	0.0	100
LSD P=.05		7.9	8.4	9

Nutsedges

Chen 2005

Chen in 2005 examined Broadstar (flumioxazin) and Snapshot (trifluralin + isoxaben) for management of yellow nutsedge. Applications were made on 4/21/05 (Week 0) and 5/19/05 (Week 4). For Broadstar, the high label rate of 0.375 provided 83.8 % reduction of yellow nutsedge at week 8. Higher rates used for phytotoxicity screening provided 95% and 100% control. Snapshot did not provide effective management at the label rate. At 4x, population suppression was observed.

Table 6. Broadstar and Snapshot Efficacy for Yellow Nutsedge (*Cyperus esculentus*), Chen, 2006

Treatment	Rate (lb ai per acre)	Percent Control				
		Week 4	Week 5	Week 6	Week 7	Week 8
Nontreated Control	0	0	0	0	0	0
Broadstar (flumioxazin)	0.375	68.8	72.5	80.0	83.8	83.8
	0.75	78.8	63.5	91.3	92.5	95.0
	1.5	95.0	97.5	98.8	97.5	100.0
Snapshot (trifluralin + isoxaben)	2.5	32.5	31.25	31.25	30.0	22.5
	5.0	30.0	32.5	33.75	27.5	25.5
	10.0	58.75	65.0	55.0	56.25	52.5

Neal 2007

During 2007, Neal studied nine pre-emergent herbicides for management of yellow nutsedge. Diclobenil was applied on 3/6/07, before soil temperatures reach 50 F. Other treatments were applied on 4/2/07, prior to expected yellow nutsedge emergence, and then reapplied about 8 weeks after the initial treatment. Freehand provided 91% control initially, but it declined over time (Table 7). Similarly, Casoron exhibited good efficacy initially (80%) but it decreased over time Sulfentrazone and F6875 provided little or no control of nutsedge. Tower EC (dimethenamid-p) and Eptam (EPTC) efficacy was low initially but slowly increased after the second application to about 75% by the end of the experiment. Both formulations of V10142 provided consistently good to excellent nutsedge control. Sedgehammer (halosulfuron) provided little preemergence control but did provide excellent postemergence control following the second application.

Table 7. Pre-emergent and post emergent herbicide efficacy for Yellow Nutsedge (*Cyperus esculentus*), Neal, 2007

Treatment	Rate (ai per acre)	Rating (0-10)							
		May-16-07		Jun-21-07		Jul-05-07		Aug-03-07	
Nonntreated		0.0	e	0.0	f	0.0	f	0.0	e
Tower (dimethenamid)	1.5	2.8	de	4.3	cd	6.8	a-d	7.4	ab
Freehand (dimethenamid-p + pendimethalin)	8	9.1	a	6.4	abc	6.1	bcd	5.8	bc
Eptam (EPTC)	6	5.8	c	5.5	bc	7.5	abc	7.5	ab
F6875 G (sulfentrazone + prodiamine)	0.375	2.5	de	1.3	ef	2.5	e	3.0	d
Pennant Magnum (s-metolachlor)	2	0.5	de	2.5	de	5.0	d	5.3	c
Sulfentrazone	0.125	2.8	de	1.0	ef	1.8	e	3.8	cd
V10142 75EW	0.75	6.5	bc	8.0	a	8.9	a	8.3	a
V10142 0.5G	0.75	8.4	ab	8.3	a	8.3	ab	8.0	a
Sedgehammer (halosulfuron)	0.061	3.3	d	7.4	ab	8.5	ab	9.3	a
Casoron (diclobenil)	6	8.0	abc	4.3	cd	5.3	cd	5.4	c

Sensac 2007

During 2007, Senesac studied 15 pre-emergent and postemergent herbicides for management of yellow nutsedge. Treatments were applied preemergent (5/4/2007 – before yellow nutsedge emerged), postemergent (5/30/2007 – 4-6 true leaves) or postemergent with a second application approximately 4 weeks later (5/31/2007 + 7/2/2007 – 4-6 true leaves + early flowering). Evaluations started 6 weeks after the postemergent timing and continued another 6 weeks until the end of July. Among the pre-emergent applications, good to excellent control of yellow nutsedge was obtained with Casoron, Imazasulfuron 75WDG, and Pennant Magnum. The best treatments among the post emergent treatments wer Dismiss 4F, mesotrione L, Roundup (by the end of the experiment), Sedgehammer, and V-10142 75WG.

Table 8. Pre-emergent and post emergent herbicide efficacy for Yellow Nutsedge (*Cyperus esculentus*), Senesac, 2007

Treatment	Rate lb/a a.i.	Timing	Yellow Nutsedge			
			No./sf	Percent Control		
			6/15	6/15	7/9	7/30
Nontreated	~	~	38	0	0	0
Basagran (bentazon)	1.0	Post + 4 wks	17	39	66	73
Casoron (diclobenil)	6.0	Pre	3	91	89	78
Dismiss 2G (sulfentrazone)	0.125	Pre	17	60	44	25
	0.125	Post + 4 wks	27	73	53	49
	0.25	Post	29	73	71	66
Dismiss 4F (sulfentrazone)	0.125	Post + 4 wks	13	86	90	85
Eptam (EPTC)	6.0	Pre	4	79	55	35
F6875 (Sulfentrazone + Prodiamine)	0.375	Pre	14	53	36	30
Freehand (Dimethenamid-p + Pendimethalin)	3.5	Pre	6	76	48	23
Imazasulfuron 75WDG	0.75	Pre	3	93	83	71
Imazasulfuron 0.5G	0.75	Pre	4	89	80	64
Mesotrione G	0.187	Post + 4 wks	18	79	63	58
Mesotrione L	0.187	Post + 4 wks	7	78	86	90
Pennant Magnum (s-metolachlor)	2.0	Pre	2	95	90	86
Round-Up PRO	1(2)*	Post + 4 wks	38	26	34	94
Sedgehammer (halosulfuron)	0.05	Post + 4 wks	21	81	95	95
	0.05	Pre	13	48	40	25
Tower (Dimethenamid-p)	0.97	Pre	3	93	54	23
V-10142 0.5G	0.75	Post + 4 wks	27	73	88	86
V-10142 75 WG	0.75	Post + 4 wks	27	80	93	91
Fisher's LSD @ 0.05			19	17	17	17

Derr 2018

In 2018, Derr compared Basagran and Fiesta to Sedgehammer to manage yellow nutsedge. Basagran gave good to excellent control of yellow nutsedge after 2 applications, comparable to SedgeHammer with the two higher rates (64 and 128 fl oz per acre). Fiesta at 25, 50 and 100 fl oz did not provide sufficient efficacy (Table 9).

Table 9. Pre-emergent and post emergent herbicide efficacy for Yellow Nutsedge (*Cyperus esculentus*), Derr, 2018

		Percent yellow nutsedge control			
		Jul 13 2018	Jul 16 2018	Jul 20 2018	Aug 03 2018
Treatment		8 DAT	11 DAT	4 DAT2	18 DAT2
Nontreated	--	5	8	3	5
Basagran + MSO	32 fl oz/a +1 qt/a	28	35	49	81
	64 fl oz/a +1 qt/a	23	30	60	98
	128 fl oz/a +1 qt/a	43	50	76	99
Fiesta	25 fl oz/a	5	5	0	15
	50 fl oz/a	0	0	0	0
	100 fl oz/a	8	13	5	0
SedgeHammer + Capsil	1 oz/a + 0.25 % v/v	38	60	68	91
	LSD p=0.05	13	14	11	15

Derr 2019

In 2019, Derr repeated the comparisons of Basagran and Fiesta to Sedgehammer to manage yellow nutsedge, but with much higher rates of Fiesta. Basagran gave good to excellent control of yellow nutsedge after 2 applications, comparable to SedgeHammer with all three rates (32, 64 and 128 fl oz per acre). Fiesta at 8.5, 17 and 34 gal per acre did not provide sufficient efficacy (Table 10).

Table 10. Pre-emergent and post emergent herbicide efficacy for Yellow Nutsedge (*Cyperus esculentus*), Derr, 2019

		Percent yellow nutsedge control			
		Jul 19 2019	Jul 30 2019	Aug 07 2019	Aug 21 2019
Treatment		2 week	4 week	5 week	7 week
Nontreated	--	3	0	0	0
Basagran + MSO	32 fl oz/a +1 qt/a	35	100	100	100
	64 fl oz/a +1 qt/a	64	100	100	100
	128 fl oz/a +1 qt/a	80	100	100	100
Fiesta	8.5 gal/a	9	3	10	15
	17 gal/a	1	3	8	0
	34 gal/a	1	18	21	5
SedgeHammer + Capsil	1 oz/a + 0.25 % v/v	84	73	98	100
	LSD p=0.05	13	14	22	11

Table 11. Summary of product efficacy byproduct and crop.

PR #	Product (Active Ingredients)	MOA Class	Weed	Crop	Production Site	Researcher	Trial State	Trial Year	Application Type	Results
26139	Basagran Herbicide (Bentazon)	WSSA 6	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Poor to fair control at 1 lb ai per acre
26139	Basagran Herbicide (Bentazon)	WSSA 6	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Talbert	AR	1977	Directed	By 3 weeks after second application, 100% of the arborvitae had died. 100% control with 1.68 and 3.36 lb ai per acre 3 weeks after second application; about 50% control with 0.84 lb ai per acre
33910	Basagran T&O Herbicide (Bentazon)	WSSA 6	Nutsedge, Yellow (Cyperus esculentus)	Hydrangea, Wild (Hydrangea arborescens)	Field Container	Derr	VA	2018	Over the top	Good control with 32, excellent with 64 and 128 fl oz per acre + MSO, applied twice. Severe crop injury.
34363	Basagran T&O Herbicide (Bentazon)	WSSA 6	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Derr	VA	2019	Over the top	Excellent control with 32, 64 and 128 fl oz per acre + MSO applied twice.
25748	BroadStar 0.25G (Flumioxazin)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Chen	LA	2005	Broadcast	Good to excellent control increasing with rates (0.375, 0.75 and 1.5 lb ai per acre).
27826	BroadStar 0.25G (Flumioxazin)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Czarnota	GA	2007		No clear results due to variability in nutsedge tuber germination.
35285	BroadStar 0.25G VC1604 (Flumioxazin)	WSSA 14	Sedge, Annual (Cyperus sp.)	None (None)	Field Container	Derr	VA	2022	Over the top	Poor control from 100, 2000, or 400 lb/a 21 days after application (DAA). No control 43 DAA
27707	Casoron 4G (Dichlobenil)	WSSA 20	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Good initial control decreasing over time at 4 lb ai per acre.
27707	Casoron 4G (Dichlobenil)	WSSA 20	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Good initial control decreasing over time at 6 lb ai per acre
27707	Casoron 4G (Dichlobenil)	WSSA 20	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Good to excellent control at 6 lb ai per acre
25792	Dismiss 4F (Sulfentrazone)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Chen	LA	2005	Foliar	Gread (90% reduction) efficacy with 0.25 lb ai per acre after second application; excellent efficacy with the higher than label rates of 0.5 and 1.0 lb ai per acre.

PR #	Product (Active Ingredients)	MOA Class	Weed	Crop	Production Site	Researcher	Trial State	Trial Year	Application Type	Results
25792	Dismiss 4F (Sulfentrazone)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Good to excellent control at 0.125 lb ai per acre
27709	Eptam EC (EPTC)	WSSA 8	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Fair to good control at 6 lb ai per acre
27709	Eptam EC (EPTC)	WSSA 8	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Poor to fair control at 6 lb ai per acre
29453	Eptam G (EPTC)	WSSA 8	Nutsedge, Yellow (Cyperus esculentus)	None (None)	TBD	Mathers (OSU)	OH	2007	Over the top	Excellent initial control decreasing over time at 3 lb ai per acre; at least equal to Casoron.
27823	F6875 0.3G (Sulfentrazone + Prodiamine)	WSSA 14 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Czarnota	GA	2007		No clear results due to variability in nutsedge tuber germination.
27717	F6875 0.3G (Sulfentrazone + Prodiamine)	WSSA 14 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Poor control at 0.375 lb ai per acre
27717	F6875 0.3G (Sulfentrazone + Prodiamine)	WSSA 14 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Poor control at 0.375 lb ai per acre
27717	F6875 0.3G (Sulfentrazone + Prodiamine)	WSSA 14 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Poor control at 0.375 lb ai per acre
29454	F6875 4SC (Sulfentrazone + Prodiamine)	WSSA 14 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Good initial control decreasing over time at 0.375 lb ai per acre; inferior to Casoron.
33911	Fiesta Herbicide (Iron HEDTA)		Nutsedge, Yellow (Cyperus esculentus)	Hydrangea, Wild (Hydrangea arborescens)	Field Container	Derr	VA	2018	Over the top	Poor control with 25, 50 and 100 fl oz per acre applied twice (rates should have been in oz per 1000 sq ft). Minor crop injury.
34364	Fiesta Herbicide (Iron HEDTA)		Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Derr	VA	2019	Over the top	Poor control with 8.5, 17 and 34 gal per acre applied twice.
35282	Fortress (OHP1701B) (isoxaben + dithiopyr)	WSSA 21 + WSSA 3	Sedge, Compressed (Carex acuta)	None (None)	Field Container	Derr	VA	2022	Over the top	Poor control from 150 lb/a 28 days after application
35929	Fortress (OHP1701B) (isoxaben + dithiopyr)	WSSA 21 + WSSA 3	Flatsedge, Rice (Cyperus iria)	None (None)	Field Container	Derr	VA	2023	Broadcast	Good to xcellent control through 58 days after second application with 150, 300, and 600 lb per acre.

PR #	Product (Active Ingredients)	MOA Class	Weed	Crop	Production Site	Researcher	Trial State	Trial Year	Application Type	Results
35286	Fortress (OHP1701B) (isoxaben + dithiopyr)	WSSA 21 + WSSA 3	Sedge, Annual (Cyperus sp.)	None (None)	Field Container	Derr	VA	2022	Over the top	Poor to no control from 150, 300 or 600 lb/a 21 days after applicaiton (DAA). No control 43 DAA.
35284	Freehand G (Dimethenamid-p + pendimethalin)	WSSA 15 + WSSA 3	Sedge, Compressed (Carex acuta)	None (None)	Field Container	Derr	VA	2022	Over the top	Great control from 200 lb/a 28 days after application
27825	Freehand G (Dimethenamid-p + pendimethalin)	WSSA 15 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Czarnota	GA	2007		No clear results due to variability in nutsedge tuber germination.
27708	Freehand G (Dimethenamid-p + pendimethalin)	WSSA 15 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Excellent initial control decreasing over time at 3.5 lb ai per acre; at least equal to Casoron.
27708	Freehand G (Dimethenamid-p + pendimethalin)	WSSA 15 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	One application at 8 lb ai per acre - excellent control
27708	Freehand G (Dimethenamid-p + pendimethalin)	WSSA 15 + WSSA 3	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Poor to fair control at 3.5 lb ai per acre
35927	Freehand G (Dimethenamid-p + pendimethalin)	WSSA 15 + WSSA 3	Flatsedge, Rice (Cyperus iria)	None (None)	Field Container	Derr	VA	2023	Broadcast	Excellent control through 58 days after second application with 200 lb product per acre
35281	Gemini Granular (Prodiamine + isoxaben)	WSSA 3 + WSSA	Sedge, Compressed (Carex acuta)	None (None)	Field Container	Derr	VA	2022	Over the top	Good control from 200 and 400 lb/a and great control from 800 lb/a 28 days after application
35287	Gemini Granular (Prodiamine + isoxaben)	WSSA 3 + WSSA	Sedge, Annual (Cyperus sp.)	None (None)	Field Container	Derr	VA	2022	Over the top	Mediocre to Good control from 200, 400, or 800 lb/a 21 days after application (DAA). At 43 DAA, poor control from 200 lb/a, mediocre control from 400 lb/a and complete control from 800 lb/a.
35289	Marengo G (Indaziflam 0.0224%)	WSSA 29	Sedge, Annual (Cyperus sp.)	None (None)	Field Container	Derr	VA	2022	Over the top	Poor control from 200 lb/a 21 days after application (DAA). No control 43 DAA.
27718	Mesotrione 4SC (Mesotrione)	WSSA 27	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Good to excellent control at 0.187 lb ai per acre
27716	Mesotrione G (Mesotrione)	WSSA 27	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Fair to good control at 0.187 lb ai per acre

PR #	Product (Active Ingredients)	MOA Class	Weed	Crop	Production Site	Researcher	Trial State	Trial Year	Application Type	Results
25785	Pennant Magnum (S-Metolachlor)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Chen	LA	2005	Over the top	Good control at 2.5, excellent at 5 and 10 lb ai per acre.
25785	Pennant Magnum (S-Metolachlor)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Derr	VA	2021	Over the top	Excellent efficacy with 2 pint per acre.
25785	Pennant Magnum (S-Metolachlor)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Excellent initial control decreasing over time at 2.1 pt per acre; equal to Casoron.
25785	Pennant Magnum (S-Metolachlor)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Fair control at 2 lb ai per acre
25785	Pennant Magnum (S-Metolachlor)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Good to excellent control at 2 lb ai per acre
35928	Pennant Magnum (S-Metolachlor)	WSSA 15	Flatsedge, Rice (Cyperus iria)	None (None)	Field Container	Derr	VA	2023	Broadcast	Excellent control through 58 days after second application with 2.5, 5 and 10 lb ai per acrel.
35288	Pennant Magnum (S-Metolachlor)	WSSA 15	Sedge, Annual (Cyperus sp.)	None (None)	Field Container	Derr	VA	2022	Over the top	Mediocre to complete control from 2, 4, or 8 pt/a 21 days after application (DAA). Complete control from all rates 43 DAA.
27710	RoundUp (Glyphosate)	WSSA 9	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Poor to excellent control at 1 to 2 lb ai per acre
33912	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	Hydrangea, Wild (Hydrangea arborescens)	Field Container	Derr	VA	2018	Over the top	Great control with 1 fl oz per acre + Capsil applied twice. Severe crop injury.
34365	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Derr	VA	2006	Over the top	Some reduction with pre-emergent applications increasing with rate (0.047, 0.094 and 0.188 lb ai per acre) but virtually no impact with post emergent applications
34365	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Derr	VA	2019	Over the top	Excellent control with 1 oz per acre + Capsil applied twice.
27711	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Excellent control at 1 oz product per acre; best treatment.

PR #	Product (Active Ingredients)	MOA Class	Weed	Crop	Production Site	Researcher	Trial State	Trial Year	Application Type	Results
27711	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Excellent control at 1 oz product per acre; best treatment.
27711	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Poor control pre, excellent post after 2nd application at 0.061 lb ai per acre
27711	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Good to excellent control at 0.05 lb ai per acre
27711	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Poor control at 0.05 lb ai per acre
35159	SedgeHammer (Halosulfuron)	WSSA 2	Flatsedge, Rice (Cyperus iria)	None (None)	Field Container	Derr	VA	2006	Over the top	Excellent control with pre-emergent applications increasing with rate (0.047, 0.094 and 0.188 lb ai per acre) but 50% reduction with post emergent applications
35160	SedgeHammer (Halosulfuron)	WSSA 2	Nutsedge, Purple (Cyperus rotundus)	None (None)	Field Container	Derr	VA	2006	Over the top	Poor to good efficacy with pre-emergent applications increasing with rate (0.047, 0.094 and 0.188 lb ai per acre)
27827	Showcase (Trifluralin + Isoxaben + Oxyfluorfen)	WSSA 3 + WSSA 21 +WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Czarnota	GA	2007		No clear results due to variability in nutsedge tuber germination.
35283	Snapshot 2.5TG (Trifluralin + Isoxaben)	WSSA 3 + WSSA 21	Sedge, Compressed (Carex acuta)	None (None)	Field Container	Derr	VA	2022	Over the top	Mediocre control from 200 lb/a 28 days after application
25786	Snapshot 2.5TG (Trifluralin + Isoxaben)	WSSA 3 + WSSA 21	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Chen	LA	2005	Broadcast	Poor control at 2.5 and 5, fair at 10 lb ai per acre.
35164	Sulfentrazone 0.2G (Sulfentrazone)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Derr	VA	2006	Broadcast	Poor efficacy with pre-emergent or post emergent applications (0.125, 0.25 and 0.5 lb ai per acre)
27712	Sulfentrazone 0.2G (Sulfentrazone)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Poor control at 0.125 lb ai per acre
27712	Sulfentrazone 0.2G (Sulfentrazone)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Fair control at 0.125 lb ai per acre

PR #	Product (Active Ingredients)	MOA Class	Weed	Crop	Production Site	Researcher	Trial State	Trial Year	Application Type	Results
27712	Sulfentrazone 0.2G (Sulfentrazone)	WSSA 14	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Poor to fair control at 0.125 lb ai per acre
35165	Sulfentrazone 0.2G (Sulfentrazone)	WSSA 14	Flatsedge, Rice (Cyperus iria)	None (None)	Field Container	Derr	VA	2006	Broadcast	Poor efficacy with pre-emergent applications (0.125, 0.25 and 0.5 lb ai per acre)
35165	Sulfentrazone 0.2G (Sulfentrazone)	WSSA 14	Flatsedge, Rice (Cyperus iria)	None (None)	Field Container	Derr	VA	2006	Broadcast	Poor to great efficacy with pre-emergent applications increasing with rate (0.125, 0.25 and 0.5 lb ai per acre) but little impact with post emergent applications
33120	SureGuard 51WDG (Flumioxazin)	WSSA 14	Sedge, Annual (Cyperus sp.)	Oak, Pin (Quercus palustris)	Seedbed	Beste	MD	2016	Soil applied broadcast	100% efficacy at 2.0, 2.5, and 3.0 oz per acre
33100	SureGuard 51WDG (Flumioxazin)	WSSA 14	Sedge, Annual (Cyperus sp.)	Oak, Willow (Quercus phellos)	Seedbed	Beste	MD	2016	Soil applied broadcast	100% efficacy at 1.5 oz per acre
27824	Tower (Dimethenamid-p)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Czarnota	GA	2007		No clear results due to variability in nutsedge tuber germination.
27713	Tower (Dimethenamid-p)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Derr	VA	2021	Over the top	Excellent efficacy with 21, 42, and 84 fl oz per acre
27713	Tower (Dimethenamid-p)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Poor control at 1.5 lb ai per acre.
27713	Tower (Dimethenamid-p)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Poor initial control, good after 2nd application at 1.5 lb ai per acre
27713	Tower (Dimethenamid-p)	WSSA 15	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Excellent initial control but short residual at 0.97 lb ai per acre
27714	V-10142 0.5G (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Good control at 0.75 lb ai per acre.
27714	V-10142 0.5G (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Good to excellent control at 0.75 lb ai per acre
27714	V-10142 0.5G (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Fair to good control at 0.75 lb ai per acre

PR #	Product (Active Ingredients)	MOA Class	Weed	Crop	Production Site	Researcher	Trial State	Trial Year	Application Type	Results
27714	V-10142 0.5G (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Good to excellent control at 0.75 lb ai per acre
35161	V-10142 75WG (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field Container	Derr	VA	2006	Over the top	Poor to good efficacy with pre-emergent applications increasing with rate (0.5, 1.0 and 2.0 lb ai per acre) but virtually no impact with post emergent applications
27715	V-10142 75WG (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Good control at 0.75 lb ai per acre.
27715	V-10142 75WG (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Mathers (OSU)	OH	2007	Over the top	Good initial control decreasing over time at 0.75 lb ai per acre; equal to Casoron
27715	V-10142 75WG (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Neal	NC	2007	Over the top	Good to excellent control at 0.75 lb ai per acre
27715	V-10142 75WG (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Fair to excellent control at 0.75 lb ai per acre
27715	V-10142 75WG (Imazasulfuron)	WSSA 2	Nutsedge, Yellow (Cyperus esculentus)	None (None)	Field In-Ground	Senesac	NY	2007	Over the top	Good to excellent control at 0.75 lb ai per acre
35162	V-10142 75WG (Imazasulfuron)	WSSA 2	Flatsedge, Rice (Cyperus iria)	None (None)	Field Container	Derr	VA	2006	Over the top	Excellent efficacy with pre-emergent applications (0.5, 1.0 and 2.0 lb ai per acre) but virtually no impact with post emergent applications
35163	V-10142 75WG (Imazasulfuron)	WSSA 2	Nutsedge, Purple (Cyperus rotundus)	None (None)	Field Container	Derr	VA	2006	Over the top	Poor to great efficacy with pre-emergent applications increasing with rate (0.5, 1.0 and 2.0 lb ai per acre)
33119	V-10233 76WG (Flumioxazin + pyroxasulfone)	WSSA 14 + WSSA 15	Sedge, Annual (Cyperus sp.)	Oak, Pin (Quercus palustris)	Seedbed	Beste	MD	2016	Soil applied broadcast	100% efficacy at 1.5 oz per acre
33099	V-10233 76WG (Flumioxazin + pyroxasulfone)	WSSA 14 + WSSA 15	Sedge, Annual (Cyperus sp.)	Oak, Willow (Quercus phellos)	Seedbed	Beste	MD	2016	Soil applied broadcast	100% efficacy at 2.0, 2.5, and 3.0 oz per acre

Label Suggestions

It is recommended that when V-10142 is registered thatn yellow nutsedge be included on the label along with other sedges and nutsedges if additional supportive data are available. Further screening is suggested for SureGuard 65WDG and for V-10233; both are effective in limited trials. If additional data are available for both formulations, it is recommended that the Surguard 65WDG label be amended with sedges and nutsedges and that these weeds are included on the initial registration of V-10233 for environmental horticulture uses.

Appendix 1: Contributing Researchers

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