http://www.ir4project.org/about-environmental-horticulture/environmental-horticulture-research-summaries

IR-4 Ornamental Horticulture Program
Pelargonic acid Crop Safety

Authors: Ely Vea and Cristi Palmer
Date: August 19, 2014

Acknowledgements
Diane Infante
Lori Harrison
Kathleen Hester

Table of Contents

Table of Contents 2
Table of Tables 3
Abstract 4
Introduction 5
Materials and Methods 5
Results and Summary 5
    Phytotoxicity 5
Label Suggestions 9
Appendix 1: Contributing Researchers 10

Table of Tables

Table 1. List of Scythe treated crops with no or minimal transitory injury. 6
Table 2. List of Scythe treated crops with no or minimal transitory injury seen at the 1X rate, but the 2X rate did cause significant phytotoxicity 6
Table 3. List of Scythe treated crops exhibiting significant injury. 6
Table 4. List of Scythe treated crops where more information is needed. 6
Table 5. Detailed Summary of Crop Safety Testing with Scythe 7

Abstract

From 2010 to 2013, IR-4 completed 14 trials on Scythe (Pelargonic acid). The data contained in this report was generated to register uses of active ingredient on and around ornamental horticulture plants with broadcast applications, including over the top of established plants. The Scythe rates in this testing program were at 3 and 6 % v/v as the 1X and 2X rates. It had been applied to 12 plant genera or species. Results showed Scythe causing no injury when applied to these crops in the dormant stage of growth. Of these genera and species, none exhibited no or minimal transient injury after the second application at both rates. Four (4) crops showed significant injury after the second application. Of the eight (8) crops that still need additional information, there are two (2) genera or species in which one or two trials do not show significant injury at 1X and 2X rates, and one (1) genera/species showing variable response at the 1X rate.

Introduction

Control of broadleaved weeds and sedges in the production of woody and herbaceous perennials can be problematic because nurseries grow many different types of plants and not all genera or species are listed on labels. These weeds can also be difficult to control in landscape settings for the same reason. Five herbicides, acetic acid (WeedPharm), d-limonene (Avenger Ag), oregano oil (Bryophyter), pelargonic acid (Scythe), and ammonium nonanoate (Emery Agro / Racer), were chosen for research activities into level of crop safety with over the top applications.

Materials and Methods

In the 2010 protocol, two applications of Scythe were made approximately 4 weeks apart. In the 2012 and 2013 protocols, two applications of Scythe were made approximately 8 weeks apart, with the first made under winter conditions and the second application when crop demonstrated active growth. In some trials (CA and VA), applications were made when plants were already growing. The application rates were 3 and 6 % v/v, plus a water treated control. A minimum of four plants (replicate treatments) were required with many researchers exceeding this minimum. Phytotoxicity was recorded on a scale of 0 to 10 (0 = No phytotoxicity; 10 = Complete kill) at 1, 2, and 4 weeks after each application. Some researchers also included readings at 8 weeks after the initial and second applications. For more detailed materials and methods, please see protocols at http://ir4.rutgers.edu/Ornamental/Ornamentals.cfm.

Scythe was supplied to researchers (See list of researchers in Appendix 1) by Gowan Co.

Results and Summary

Phytotoxicity

Based on the type and nature of injury seen with Scythe 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 rate 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.

Scythe caused sufficient injury on four genera/species to recommend growers not utilize Scythe as an over-the-top treatment on actively growing plants for liverwort control (Table 3). For eight genera/species, more information is needed because only 1 or 2 trials were conducted to date (Table 4). Of these eight (8) crops that still need additional information, there are two (2) genera or species in which one trial did not show significant injury at 1X and 2X rates, and one (1) genera/species showing variable response at the 1X rate.

Please see Table 5 for a list of individual trial summaries on Scythe.

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

None

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

None

Table 3. List of Scythe treated crops exhibiting significant injury.

Berberis thunbergii
Buxus microphylla
Hydrangea sp.
Syringa sp.

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

Delosperma sp. [2]
Dryopteris erythrosora
Hemerocallis sp.[1]
Heuchera sp.
Hosta sp. [1]
Ilex x meserveae
Osmunda regalis
Thuja occidentalis

[1] Little to no injury observed in one container trial.
[2] Variable response observed with crops exhibiting little to no injury at 1X in some trials but exhibiting moderate injury at 1X in others.

Table 5. Detailed Summary of Crop Safety Testing with Scythe (pelargonic acid)

Notes: Table entries are sorted by crop Latin name. Only those trials with research reports received by 8/01/14 are listed below. Table entries with blank results have been received but not yet cataloged in the database.

PR#	Product (Active Ingredients)s	Crop	ProductionSite	Researcher	State	Year	ApplicationType	Results
30123	Scythe (Pelargonic acid)	Japanese Barberry (Berberis thunbergii) B. 'Crimson Pygmy'	Greenhouse	Mathers	MI	2010	Over the top	Severe injury 2 WAT leading to mortality with 10% v/v.
30122	Scythe (Pelargonic acid)	Boxwood, Japanese (Buxus microphylla) B. 'Green Velvet'	Greenhouse	Mathers	MI	2010	Over the top	Severe crop injury (70%) 2 WAT decreasing to moderate but unacceptable (40-53%) injury for the remainder of the trial with 10% v/v.
30793	Scythe (Pelargonic acid)	Delosperma sp. (Delosperma sp.) 'Cooper's Ice'	Greenhouse	Wilen	CA	2012	Over the top	Significant injury with 3 and 6 % v/v; great liverwort control.
30793	Scythe (Pelargonic acid)	Delosperma sp. (Delosperma sp.) D. cooperi 'Fire Spinner'	Greenhouse	Derr	VA	2012	Over the top	Minor injury with 3 and 6 % v/v w/ irrigation; unacceptable initial injury only with both rates w/o irrig, but plants quickly outgrew injury. Best overall liverwort control and limited injury with both rates rate w/o irrig.
30793	Scythe (Pelargonic acid)	Delosperma sp. (Delosperma sp.) D. nubigenum 'Basutoland'	Greenhouse	Senesac	NY	2012	Over the top	Low injury at 3 % w/ irrig. after 2nd applic.; severe at 3% w/o, and 6 % v/v w/ or w/o irrig.; fair to excellent liverwort control with 2 applications.
31048	Scythe (Pelargonic acid)	Fern, Autumn & Wood (Dryopteris sp.) D. erythrosora	Greenhouse	Senesac	NY	2012	Over the top	Slight to moderate injury of evergreen/past season foliage with 3 % and 6 % applied twice, no injury of new growth; fair to excellent liverwort control with 2 applications.
30796	Scythe (Pelargonic acid)	Daylily (Hemerocallis sp.) 'Mini Pearl'	Greenhouse	Senesac	NY	2012	Over the top	Low injury at 3 % and 6 % v/v with irrigation after 2nd applic., moderate w/o irrig.; fair to excellent liverwort control with 2 applications.
30797	Scythe (Pelargonic acid)	Coral Bells, Alumroot (Heuchera sanguinea) H. villosa 'Caramel'	Greenhouse	Senesac	NY	2012	Over the top	Low injury with 3 % v/v w/ irrig., moderate to severe w/o, and at 6 %; fair to excellent liverwort control with 2 applications.
30798	Scythe (Pelargonic acid)	Hosta (Hosta sp.) ‘Blue Hawaii’	Greenhouse	Derr	VA	2013	Over the top	Low injury and high liverwort control with 3 % v/v w/ or w/o irrigation and 6 % w/ irrig.
30121	Scythe (Pelargonic acid)	Hydrangea (Hydrangea sp.) H. 'Invincibelleamorences'	Greenhouse	Mathers	MI	2010	Over the top	Severe crop injury with second application (1 WAT2) and for remainder of trial with 10% v/v. No evaluations were taken in first and second WAT due to dormancy.
30124	Scythe (Pelargonic acid)	Holly, Blue (Ilex x meserveae) I. 'China Girl'	Greenhouse	Mathers	MI	2010	Over the top	Moderate crop injury with at 2 WAT and continuing throughout trial (20-45%) with 10% v/v.

31876	Scythe (Pelargonic acid)	Fern, Royal (Osmunda regalis)	Greenhouse	Derr	VA	2013	Over the top	Low injury and good liverwort control only with 3 % v/v w/ irrigation; unacceptable injury at 3 % w/o, and 6 % w/ or w/o, irrig.
30120	Scythe (Pelargonic acid)	Lilac (Syringa sp.) S. 'Paliban'	Greenhouse	Mathers	MI	2010	Over the top	Significant (45%) crop injury 4 WAT increasing to mortality with 10% v/v. No ratings taken in first two weeks due to dormancy.
30125	Scythe (Pelargonic acid)	Arborvitae, American (Thuja occidentalis) T. 'Techny'	Greenhouse	Mathers	MI	2010	Over the top	Little crop injury with one application of 10% v/v. Second application caused significant (40%) continuing to end of trial.

Label Suggestions

For Scythe, data suggest no change in its current label recommendations to avoid contact with desirable plants.

Appendix 1: Contributing Researchers

Dr. Jeffrey Derr	Hampton Roads Ag. Exp. Station 1222 Diamond Springs Road, Virginia Beach, VA 23244
Dr. Hannah Mathers	The Ohio State University Dept. Hort. and Crop Science 2001 Fyffe Ct. Columbus, OH 23210
Dr. Andy Senesac	Long Island Horticultural Research Laboratory 39 Sound Avenue Riverhead, NY 11901
Dr. Cheryl Wilen	University of California, San Diego 4444 Overland Ave., Bldg. 2 San Diego, CA 92123