Current Herbaceous Perennial Weed Control

GLTE
Lansing, MI
Monday, January 28, 2019 9:00 AM

Hannah Mathers - Mathers Environmental Science Services, LLC
839 Riva Ridge Blvd, Gahanna, OH, USA
https://www.mathersenvironmental.com/
mathers326@gmail.com

Two new projects will be discussed in this presentation along with the findings of other researchers and listing of pro and cons of several herbicides and their availability for herbaceous perennial weed control. Summaries of the two new projects completed in 2018 in MI nurseries are listed below.

1. *Evaluation of Liquid Over-the-Top Herbicide Applications for Field Grown Herbaceous Perennials Soon After Planting*

Herbaceous perennials (HPs) rank 3rd of 18 US major ornamental plant types sold, representing 8.6% of all national sales, and the Midwest region is tied for 1st ranking, with the Northeast, for national HP sales (Hodges et al., 2015). In herbaceous perennials one of the major production/operating costs is weed control with many HP growers/landscapers still relying upon hand-weeding. This practice constrains the industry and renders it non-sustainable in today's economy. The objectives of this trial were to find an over-the-top (OTT) liquid preemergence herbicide that would offer commercially acceptable phytotoxicity and efficacy applied alone and in combination, compared to an untreated control. Additionally, a season-long control program was evaluated with attention to site of action (SoA) rotations, using a novel winter dormant application of SureGuard WDG (flumioxazin 51%) (NuFarm Americas, Alsip, IL) (10 oz/ac) (Group 14) in Dec. 20, 2017. The SureGuard was applied across the entire area that was to be planted in May 2018 for the in-season evaluations. One newer herbicide evaluated was Tower 6EC (dimethamid-p 63.9%) (BASF Corporation, Research Triangle Park, NC) (21 oz/ac) (SoA Group 15) registered in 2011, applied with and without Dimension 2EW (dithiopyr 24%) (Dow AgroSciences LLC, Indianapolis, IN) (2 pt/ac) (Group 3). An older herbicide was also evaluated, Pennant Magnum (S-

metolachlor) (Syngenta Crop Protection, LLC, Greensboro NC) (2 pt/ac) (Group 15) registered in 2001, applied with and without Tower 6EC. Seven species were planted as small plugs on May 7, 2018, 21 weeks after the SureGuard was applied, at Walters Gardens, Zeeland, MI, including: *Amsonia '*Blue Ice', *Coreopsis verticillata* 'Sassy Saffron', *Sanguisorba minor* 'Little Angel', *Kniphofia thomsonii* 'Gold Rush', *Kniphofia pyromania* 'Orange Blaze', *Penstemon* 'Prairie Dusk', *Penstemon* 'Midnight Masaquerade.' Shoot heights were collected at the initiation of the 2nd or in-season applications on May 16, 2018, i.e., nine days after planting. At the trial conclusion shoot height and two perpendicular measures of width were collected and put into an equation to calculate growth index values (GI). Phytotoxicity ratings were taken at four weeks at the second treatment (4WA2T) or 25 weeks after the first treatment (25 WAT), respectively and subsequently at 9 WA2T, 13 WA2T and 20 WA2T. The best herbicide for each species was based on the lowest phytotoxicity ($\leq$ 3, on a scale of 0-10, where 0 is no injury), and highest efficacy ($\geq$ 7, on a scale of 0-10, where 10 is perfect weed control). One species (*Amsonia* sp.) had no previous herbicide registrations and with the exception of Pennant on *Coreopsis verticillata*, the four herbicides tested, to our knowledge, have previously never been evaluated on the remaining five species. Commercially acceptable herbicides were found for five of the seven species. No herbicides were found for *Amsonia '*Blue Ice' or *Penstemon* 'Midnight Masaquerade,' but reduced rates of application in further investigations may uncover an acceptable control.

2. *Evaluation of Current Herbicides for Phytotoxicity and Efficacy on Five Herbaceous Perennials Species in Containers*

The key to the obtaining higher returns in high demand herbaceous perennial (HP) crops is primarily dependent on lowering weed control costs. In addition to lack of herbicide registrations for HP crops, lack of access to workers, and the increased expense of such labor, if available, has diminished the growth potential of this sector. Therefore, the development of new and improved herbicides and label expansion work with common and high value HP crops is required. Unlike a common woody nursery

crop like *Berberis* sp. which has 17 registered herbicides, a common HP crop like *Lobelia* sp. has five (Stamps et al., 2012). At Ray Wiegand's Nursery, Lenox, MI five species were evaluated with eight treatments applied 03/30/2018. Each phytotoxicity and efficacy mean represents eight replications of one-gallon containerized herbaceous plants. Phytotoxicity and efficacy ratings were taken at 6WAT on May 11, 2018, 11 WAT on June 13, 2018 and 16 WAT, July 19, 2018. The objectives of this study were to evaluate efficacy and phytotoxicity of three newer granular herbicides, compared to liquid applications of Tower 6EC (dimethamid-p 63.9%) (BASF Corporation, Research Triangle Park, NC) (26 and 52 oz/ac) (Group 15) registered in 2011, applied with and without Dimension 2EW (dithiopyr 24%) (Dow AgroSciences LLC, Indianapolis, IN) (2 pt/ac) (Group 3) and an untreated control. The three granular formulations evaluated included: Fortress (isoxaben 0.50% + dithiopyr 0.25%) (OHP, Inc., Mainland, PA) (150 and 300 lb/ac) (Group 21 + 3) registered in 2018; Biathlon (oxyfluorfen 2% + prodiamine 0.75%) (OHP, Inc., Mainland, PA) (100 lb/ac) (Group 14 + 3), and Marengo G (indaziflam 7.4%) (Bayer Crop Science Inc, Research Triangle Park, NC) (200 lb/ac) (Group 29) both which garnered EPA registrations in 2013. The five species evaluated included, *Rudbeckia fulgida* 'Little Goldstar', *Penstemon schmidel* 'Red Riding Hood', *Panicum virgatum '*Shenandoah', *Iris sibirica* 'Sparkling Rose', and *Asclepias incarnata.* The best herbicide for each species was based on the lowest phytotoxicity ($\leq$ 3, on a scale of 0-10, where 0 is no injury), and highest efficacy ($\geq$ 7, on a scale of 0-10, where 10 is perfect weed control). One species (*Panicum virgatum '*Shenandoah'.) had no previous herbicide registrations and the remaining four species, to the best of our knowledge, are previously untested with the five products evaluated in this trial. Commercially acceptable herbicides were found for five of the five species. For *Iris sibirica* 'Sparkling Rose', and *Asclepias incarnata* multiple herbicides were acceptable with 4 for *Iris* and 5 for *Asclepias*. *Rudbeckia fulgida* 'Little Goldstar' was the only species with only one acceptable control identified and the remaining two species had two controls each. Fortress and Tower (26 oz) were commercially acceptable for four of five species, but not the same four species. Fortress is currently the broadest HP label in the marketplace with 131 HP crops and groundcovers. Fortress also shows exceptional potential for further label expansion.

We would liked to acknowledge:

- The Specialty Crop Block Grant through USDA via Michigan Department of Agriculture and Rural Development and by way of the Michigan Nursery and Landscape Association.
- BASF, OHP, Syngenta, NuFarm, and Dow all donated chemicals to make this work possible.
- Special thanks also to Walters Gardens, Zeeland, MI and Ray Wiegand's Nursery, Lenox Twp., MI for hosting the trails
    - Also special thanks to Amy Upton (MNLA), Greg Nichols (Walters), Martha Hoffert (Wiegand's), Jim Beaver (MESS) and Emma Beaver (OSU Graduate Student) – this study would not have been possible without their help and technical assistance.