The Five Most Unwanted Midwest Nursery Weeds

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Five of the most unwanted Midwest nursery weeds include: Creeping Yellow Cress (*Rorippa sylvestris* L.); Mugwort (*Artemisia vulgaris* L.); Red Stem Filaree (*Erodium cicutarium*); Field Horsetail (*Equisetum arvense*) and Yellow Nutsedge (*Cyperus esculentus* L.). In past USDA Specialty Crop Block Grants (SCBG) conducted in MI in conjunction with the Michigan Department of Agriculture (MDA) and the Michigan Nursery and Landscape Association (MNLA), we have found various products to control three of these extreme weeds with varying levels of success. In this article we will discuss Creeping Yellow Cress (*Rorippa sylvestris* L.), issues with this weed species and the controls found effective in past MI trials.

Creeping Yellow Cress (*Rorippa sylvestris* L.)

Creeping yellow cress (*Rorippa sylvestris)* also known as Kik and yellow cress, is a major nuisance weed in MI nursery fields (Fig. 1A). *Rorippa* is a member of the mustard family and forms dense stands (Fig. 1B). Creeping yellow cress has roots that spread widely and can be propagated by small pieces of the roots (Fig. 1C). Stands of creeping yellow cress cover the ground and choke the life out of any nearby plants (Fig. 1B). *Rorippa sylvestris* is the most rapidly dispersing invasive weed in OH and MI and most efforts to control its spread have been ineffective.

Fig. 5. A, B and C. (A) (Top right) Creeping yellow cress elongating clusters of stalked flowers at the end of branching stems. The yellow flowers are ¼ inch across, forming at the tip of the expanding raceme. They have 4 petals, are rounded, spatula shaped and twice as long as the sepals. Leaves are thin and pinnately parted almost to midrib. **(B)** (Top left) Creeping yellow cress will form thick mats of itself. The greatest difficulty in its control is the rapidness at which it grows. **(C)** (Lower left) Creeping yellow cress also propagates readily from its rhizomes (Lower left) or broken pieces of rhizomes. (Pictures by: H. Mathers).

Two previous SCBG trials conducted at nurseries in Grand Haven, MI consisted of a preemergence and a postemergence study for *Rorippa*. These were initiated on April 4, 2013 and May 16, 2013, respectively. Both were conducted in liner beds of common purple lilacs (*Syringa vulgaris*). For the preemergence trial, plants had not yet broken dormancy and were approximately 6" (15 cm) tall. Six herbicides and one herbicide + mulch were compared to an untreated control. Herbicides included Riverdale® Corsair™(Chlorsulfuron, NuFarm America Inc., IL) at 5.3 oz/ac, Certainty (Sulfosulfuron, Monsanto Corp.) at 1 oz/ac, Sedgehammer (Halosulfuron-methyl, Gowan Co., AZ) at 2 oz/ac, Lontrel® (Clopyralid, Dow Agro Sciences) at 1 pt./ac, V-10336 (flumioxazin + pyroxasulfone, NuFarm) at 15 oz/ac, and Diuron 80 (Diuron, Drexel, Inc.) at 3 lb./ac. An herbicide + mulch treatment was also included and consisted of an application of Casoron CS (Dichlobenil, Chemtura Corp.) at 3 gal/ac just prior to application of two inches of pine nugget mulch. The herbicides were applied with a CO_2 backpack sprayer delivering 25 gal/ac. The creeping yellow cress was just

beginning to green below the soil surface. Plots were approximately 3' x 3' with approximately 1-2' between plots.

For the postemergence trial, unlike the preemergence trial, plants had broken dormancy at the time of application and were approximately 7" (17.5 cm) tall. Corsair, Certainty, Sedgehammer, Lontrel, V-10336 and Diuron 80 were used as in the preemergence trial. In addition, Classic (Chlorimuron, Dupont Crop Protection) at 2/3 oz/ac, and Marengo SC at 9 oz/ac were added in the postemergence trial. All treatments included the addition of nonionic surfactant at 0.25% v/v. Rainfall at Grand Haven, MI in 2013 set a new record for April, measuring 11.10". This was 7.75" more than usual and 8.12" more than 2012 which was 2.98". This abnormally high rainfall caused leaching of the treatments into adjacent plots. Some of the control plots demonstrated higher phytotoxicity than normally expected, as a result.

Preemergence Studies:

Corsair, a sulfonylurea herbicide, although extremely efficacious, was also extremely phytotoxic. Sulfonylurea herbicides kill weeds by inhibiting the enzyme Acetolactate synthase (ALS). ALS inhibitor is their mode of action (MoA) and are classified as Group 2 by the Weed Science Society of America (WSSA). ALS inhibitors work on a broad range of grasses and broadleaf weeds, but do not damage many cereal crops. The invention of sulfonylurea herbicides, in June 1975, by George Levitt of DuPont revolutionized the use of agriculture herbicides. However, their unpredictable, selectivity for causing damage in ornamentals, has limited their use in nursery/ landscape. By 11 WAT, all the lilacs were dead in the Corsair plots (Table 1). V-10336 at 15 oz/ac was also very phytotoxic to lilac by 11 WAT (Table 1). V-10336 became more phytotoxic as the trial progressed (Table 1), even though it was applied during dormancy. The V-10336 formulation has been changed to V-10233. In studies we conducted in 2014-2015, we found the phytotoxicity of V-10233 was greatly reduced, but its efficacy was still very high (Mathers and Beaver, 2016). Casoron also became increasingly phytotoxic over time and significantly so by 11 WAT (Table 1). We recommend Certainty, the new V-10233, Diuron 80DF and Sedgehammer be used in further studies for preemergence control of *Rorippa* in lilacs and other species as both showed promise in efficacy and reduced phytotoxicity. Corsair, Certainty, and Sedgehammer provided perfect efficacy through 8 WAT. Corsair provided the highest efficacy at 11 WAT and was the only treatment that was significantly better than the untreated controls (Table 2). Lontrel provided little to no preemergence efficacy for creeping yellow cress (Table 2); however, the control's efficacy again was influenced by the heavy rains. V-10336 provided excellent control through 5 WAT; however, by 6 WAT, efficacy decreased to a rating of 5.5, only slightly better than untreated (Table 2),

again heavy leaching conditions may have been at play in causing high ratings in the control.

Table 1. Phytotoxicity to *Syringa vulgaris* from selected **preemergence** applications at Berry Family Nurseries, Grand Haven, MI, 2013.

		Phytotoxicity				
Treatment	Rate/ac	4 WAT[z]	5 WAT	6 WAT	8 WAT	11 WAT
Corsair	5.3 oz	7.5[yx]	8.3 **	9.0 **	9.3 **	10.0 **
Certainty	1 oz	4.5	4.5	5.5	6.5	5.0
Sedgehammer	2 oz	5.3	5.3	6.3 *	6.0	4.8
Lontrel	1 pt.	3.3	3.5	4.8	4.5	4.3
V-10336	15 oz	3.8	4.3	5.0	7.3	7.0 **
Diuron	3 lb	2.0	3.0	4.5	5.8	5.8
Casoron + PN	3 gal	3.5	4.8	5.3	6.3	8.0 **
Untreated	--	2.3	1.5	2.5	3.5	2.5

Table 2. Efficacy in *Syringa vulgaris* fields for *Rorippa sylvestris* (creeping yellow cress) from selected **preemergence** applications at Berry Family Nurseries, Grand Haven, MI.

		Creeping yellow field cress control				
Treatment	Rate/ac	4 WAT	5 WAT	6 WAT	8 WAT	11 WAT
Corsair	5.3 oz	9.0[wv] a	9.3 a	10.0 a	10.0 a	9.8 a
Certainty	1 oz	10.0 a	9.5 a	10.0 a	10.0 a	8.8 ab
Sedgehammer	2 oz	10.0 a	9.8 a	10.0 a	9.8 a	8.5 abc
Lontrel	1 pt.	2.8 c	3.3 d	6.8 bcd	7.0 bc	6.8 bc
V-10336	15 oz	9.5 a	7.5 ab	5.5 cd	2.5 d	5.8 c
Diuron	3 lb	4.3 bc	6.3 bc	7.5 bc	7.8 ab	8.3 abc
Casoron + PN	3 gal	6.3 b	8.0 a	7.8 ab	7.0 bc	9.0 ab
Untreated	--	3.5 c	4.0 cd	5.0 d	4.8 cd	6.0 bc

z = weeks after treatment

y = **Phytotoxicity** ratings based on a 0-10 scale with 0 being no phytotoxicity and 10 death with ≤3 commercially acceptable

x = **Phytotoxicity** treatment ratings followed by *,** are significantly different from the control, based on Dunnett's t-test (α = 0.10 and 0.05, respectively)

w = **Efficacy** ratings are based on a 0-10 scale with 0 being no control and 10 perfect control with ≥7 commercially acceptable

v = **Efficacy** treatment ratings followed by the same letter in the same column are not significantly different based on lsmeans (α = 0.05)

Postemergence Studies:

Although April had record rainfall in Grand Haven, MI, May 2013 had normal rainfall. April showers did bring "lots of flowers" and weeds in May 2013. Unfortunately, all postemergence treatments caused greater phytotoxicity than the control (Table 3). Lontrel, however, was the only treatment where the injury was near commercially acceptable (Table 3). Excellent efficacy was achieved with six of the eight treatments; Marengo SC and Lontrel were the only two treatments not providing acceptable control at 5 WAT (Table 4). Marengo was significantly better than the control at 2 WAT, but not 5 WAT (Table 4). Marengo in this 2013 trial was tested well below the label rate of 15 oz/ac. Lontrel, although not commercially acceptable, provided better control than Marengo and the untreated plots and was similar to Diuron at 5 WAT (Table 4). Corsair, just like in the preemergence trial, provided the best control of *Rorippa* through 5 WAT. From this trial we recommend Lontrel, Diuron and Marengo SC be used again as postemergence products for *Rorippa.*

Table 3. Phytotoxicity to *Syringa vulgaris* from selected **postemergence** herbicide applications at Berry Family Nurseries, Grand Haven, MI, 2013.

Phytotoxicity			
Treatment	Rate/ac	2 WAT[z]	5 WAT
Corsair	5.3 oz	6.0[yx] **	9.8 **
Certainty	1 oz	4.8 **	6.3 **
Sedgehammer	2 oz	6.0 **	7.3 **
Classic	2/3 oz	6.5 **	8.8 **
Lontrel	1 pt.	3.8 **	3.3 **
V-10336	15 oz	9.0 **	7.8 **
Diuron	3 lb	7.5 **	7.5 **
Marengo SC	9 oz	4.3 **	6.0 **
Untreated	--	1.0	0.8

Table 4. Efficacy in *Syringa vulgaris* fields for *Rorippa sylvestris* (creeping yellow cress) from selected **postemergence** applications at Berry Family Nurseries, Grand Haven, MI.

Creeping yellow field cress control			
Treatment	Rate/ac	2 WAT	5 WAT
Corsair	5.3 oz	9.0[wv] a	9.8 a
Certainty	1 oz	9.0 a	9.5 a
Sedgehammer	2 oz	8.8 ab	9.0 a

Classic	2/3 oz	9.0 a	9.5 a
Lontrel	1 pt.	6.0 c	6.5 b
V-10336	15 oz	9.0 a	9.0 a
Diuron	3 lb	6.5 bc	7.8 ab
Marengo SC	9 oz	6.8 abc	5.5 bc
Untreated	--	3.0 d	2.3 c

z = weeks after treatment

y = Phytotoxicity ratings based on a 0-10 scale with 0 being no phytotoxicity and 10 death with ≤3 commercially acceptable

x = Treatment ratings followed by *,** are significantly different from the control, based on Dunnett's t-test (α = 0.10 and 0.05, respectively)

w = Control ratings are based on a 0-10 scale with 0 being no control and 10 perfect control with ≥7 commercially acceptable.

Conclusions:

Creeping yellow cress can be misidentified as marsh yellow cress and southern yellow cress; however, a check of the roots for horizontal spreading roots will identify it as creeping yellow cress. Glyphosate is only marginally effective on creeping yellow cress. Until a selective postemergence control is found, it is imperative to eradicate nursery infestations as soon as detected. Infested nursery crops should be destroyed to prevent spread. Because *Rorippa* is rapidly dispersing in MI fields and into landscapes and nurseries in other Midwest states; further studies are essential. Since Sedgehammer and Corsair did so well post- and pre-emergence in these past MI SCBG's, we recommend other Group 2 herbicides be evaluated in future studies. It may be possible to find an ALS inhibitor that is not phytotoxic to common nursery plants.