

MANAGING EMERGING OLD WEED PROBLEMS IN WISCONSIN

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Common dandelion (*Taraxacum officinale*) and field horsetail (*Equisetum arvense*) continue to be troublesome weeds in Wisconsin and are common in no-till fields. Two factors contributing to a resurgence of these weed species are reduced tillage and changes in herbicide programs in corn and soybeans. We have conducted on-farm trials on dandelion and off-farm trials on field horsetail for the past several years, the results of which will be presented here.

Dandelion

Dandelion is uniquely designed to succeed in no-till systems. It is a deep-rooted perennial that is one of the first weeds to green-up in the spring and one of the last to go dormant in the fall. Seed production at the Arlington Research Station typically starts in late April to early May. Systemic herbicides are required to control mature dandelions while contact herbicides may be sufficient to control seedlings. Tillage can be effective in reducing the number of mature dandelion plants but will not eliminate them entirely. As with most difficult weeds, a systems approach which includes tillage, crop rotation and herbicide selection will provide the best results.

Trials conducted at the Arlington Research Station in 2009 and 2010 investigated the efficacy of various herbicides and application timings to control mature dandelion in a no-till corn system. Fall treatments were applied on 14 Nov. 2008 and 23 Nov. 2009 and the spring treatments were applied on 4 May 2009 and 20 April 2010. Both fall applications were made after a killing frost.

Table 1. Dandelion control-fall compared to spring applications (2009 and 2010).

Treatment	Rate	Application timing	Percent dandelion control				Yield ^{de} (bu/a)
			Early ^a	Mid ^b	Late ^c	Harvest ^{de}	
2,4-D + Roundup PowerMax + AMS	16 fl oz + 0.75 lb ae + 17 lb/100 gal	Fall	82	69	40	3	53
		Spring	0	38	72	40	58
Canopy EX+ COC + 2,4-D + Roundup PowerMax	1.1 oz + 1% v/v + 16 fl oz + 0.75 lb ae	Fall	95	91	88	93	60
		Spring	0	46	71	53	52
Synchrony + COC + AMS 2,4-D + Roundup PowerMax	0.375 oz + 1% v/v + 2.5 lb 16 fl oz + 0.75 lb ae	Fall	90	75	47	28	57
		Spring	0	50	80	66	59
Enlite + COC + AMS Roundup PowerMax	2.8 oz/a + 1% v/v + 2.5 lb 0.75 lb ae	Fall	90	79	46	5	57
		Spring	0	74	86	71	58

^a 151-173 days after treatment (DAT) fall application, 2-3 DAT spring application

^b 163-187 DAT fall application, 15-16 DAT spring application

^c 182-199 DAT fall application, 28-34 DAT spring application

^d 2010 data only

^e includes in-season glyphosate application

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Differences in dandelion control were observed among the fall-applied treatments. Canopy EX and Synchrony tank mixed with 2,4-D and glyphosate and Enlite tank mixed with glyphosate all provided better dandelion control at spring green-up than 2,4-D tank mixed with glyphosate. Dandelion control decreased with all treatments except Canopy EX at subsequent evaluations. Canopy EX provided 88% dandelion control at the final evaluation 182-199 DAT compared to 47 to 40% dandelion control for the remaining treatments. Differences in control were also observed between the fall and spring application timings. All fall-applied treatments provided greater dandelion control at the mid-evaluation than the spring application. This trend was reversed at the late evaluation as spring applied 2,4-D/glyphosate, Synchrony tank mixes and Enlite tank mixes all provided better dandelion control than fall applied. Conversely, fall applied Canopy EX tank mixes gave better dandelion control than spring applied. A final evaluation was taken prior to soybean harvest to determine season-long control. It is important to remember that an in-season application of glyphosate at 0.75 lb ae/a was applied to all treatments. Fall-applied Canopy EX was the best overall treatment, averaging 93% dandelion control compared to 53% control for spring-applied. Spring-applied 2,4-D/glyphosate, Synchrony and Enlite provided better dandelion control at harvest than fall applications. No differences in soybean yields were observed among treatments. The results show the importance in matching the proper herbicide treatments to the cropping system. Fall-applied treatments will provide reduced early-season dandelion competition in instances where a crop is to be planted early where spring applications may be desired when planting maybe delayed.

The second objective was to evaluate various fall-applied herbicide treatments of dandelion control the following spring.

Autumn, Canopy EX, Synchrony, Enlite, Express and Sharpen tank mixes all provided 90% or greater dandelion control at spring green-up. Dandelion control decreased with most of the treatments at the mid and late evaluation. Canopy EX was the best overall treatment, providing 88% dandelion control at the late evaluation. Autumn and Express tank mixes were the only other treatments that gave greater than 50% control, averaging 74 and 67% control, respectively. Sharpen/glyphosate and Sharpen/Express tank mixes were only evaluated in 2009 and provided contrasting results. Sharpen/glyphosate gave good initial burn-down, 90% compared to 66% control with Sharpen/Express. Dandelion control decreased by 24% with the Sharpen/glyphosate tank mix at the late evaluation and only 8% with the Sharpen/Express tank mix. No differences in yields were observed among treatments.

Field Horsetail

From a biology standpoint, field horsetail is a very unique plant. It is a perennial that reproduces mostly by rhizomes, but it also produces spores in the early spring. The role of the spores is not well understood. The first indication that field horsetail is in a field is the emergence of tan-colored stalks in the early spring. The stalks are topped by a cone-shaped body which contains the spores. The stalk dies soon after spore release and is replaced by the vegetative phase, a green plant that resembles a small Christmas tree. Field horsetail is a very competitive plant that can cause significant yield reductions. Populations generally start at the edges of fields and slowly spread. Like many perennials, field horsetail is favored by reduced tillage.

Results have been extremely variable among locations and between years (results not shown). In 2010, no differences in field horsetail control were observed among the soil-applied herbicide programs. Steadfast plus Hornet applied postemergence provided the least amount of

ground cover when evaluated 23 July, averaging 5% compared to 29% for the standard treatment of Dual + atrazine + SelectMax applied preemergence. The field horsetail population decreased dramatically during the late fall for unknown reasons. No differences in yield were observed among the treatments.

Summary

Both dandelion and field horsetail require a system approach to provide best results. Understanding the weed biology and factors that favor weed development are important in determining the best integrated approach. Work continues at the Arlington Research Station to determine the optimum application timing and best herbicide treatments to control common dandelion.

Table 2: Comparison of fall-applied herbicide treatments (2009 and 2010).

Treatment	Rate	Application timing	Percent dandelion control				Yield ^{de} (bu/a)
			Early ^a	Mid ^b	Late ^c	Harvest ^{de}	
Autumn + COC	0.3 oz + 1% + 0.75 lb ae + 2.5 lb	Fall	91	87	74	48	56
PowerMax + AMS	0.75 lb ae + 2.5 lb						
Distinct + NIS + Roundup Original + AMS	2 oz + 0.25% v/v + 0.75 lb ae + 17 lb/100 gal	Fall	74	64	47	20	52
Distinct + 2,4-D + NIS + Roundup Original + AMS	2 oz + 16 fl oz + 0.25% v/v + 0.75 lb ae + 17 lb/100 gal	Fall	85	76	57	48	57
2,4-D + Roundup PowerMax + AMS	16 fl oz + 0.75 lb ae + 2.5 lb	Fall	82	69	40	3	53
Valor + AMS + 2,4-D + Roundup PowerMax	2 oz + 2.5 lb + 16 fl oz + 0.75 lb ae	Fall	82	69	41	20	54
Canopy EX+ COC + 2,4-D + Roundup PowerMax	1.1 oz + 1% v/v + 16 fl oz + 0.75 lb ae	Fall	95	91	88	93	60
Synchrony + COC + AMS 2,4-D + Roundup PowerMax	0.375 oz + 1% v/v + 2.5 lb 16 fl oz + 0.75 lb ae	Fall	90	75	47	28	57
Enlite + COC + AMS Roundup PowerMax	2.8 oz/a + 1% v/v + 2.5 lb 0.75 lb ae	Fall	91	80	46	5	57
Express + NIS + AMS + 2,4-D + Roundup PowerMax	0.25 oz + 0.25% v/v + 2.5 lb + 16 fl oz + 0.75 lb ae	Fall	93	82	67	51	62
Sharpen + COC + Roundup PowerMax + AMS ^f	1 fl oz + 1% v/v + 0.75 lb ae + 2.5 lb	Fall	90	79	48		
Sharpen + Express + COC + AMS ^f	1 fl oz + 0.25 oz + 1% v/v + 2.5 lb	Fall	66	68	58		

^a 151-173 days after treatment (DAT) fall application

^e includes in-season glyphosate application

^d 2010 data only

^b 163-187 DAT fall application

^f 2009 data only

^c 182-199 DAT fall application

Table 3. Field horsetail control in field corn.

Treatment	Rate	Application timing	7/1	7/23	10/18	Yield (bu/a)
Dual II Magnum + atrazine + SelectMax + COC	1.67 pt + 1 qt + 4 fl oz + 1%	Pre	23	29	19	171
Dual II Magnum + atrazine + RU + 2,4-D + AMS	1.67 pt + 1 qt + 22 fl oz + 1 pt + 3.4 lb	Pre	24	18	5	192
Dual II Magnum + Python+ atrazine+ RU + NIS + AMS	1.67 pt + 1 oz + 1 qt + 11 fl oz + 0.25% + 3.4 lb	Pre	38	23	6	174
Dual II Magnum + Sharpen + atrazine + COC + AMS	1.67 pt + 1 fl oz + 1 qt + 1% + 3.4 lb	Pre	24	31	9	183
Dual II Magnum + Python + Sharpen + COC + AMS	1.67 pt + 1 oz + 3 fl oz + 1% + 3.4 lb	Pre	29	29	6	162
Dual II Magnum + RU + AMS fb	1.67 pt + 11 fl oz + 3.4 lb	Pre	1	14	4	188
Steadfast + Status + COC + AMS	0.75 oz + 5 oz + 1% + 2 lb	Post				
Dual II Magnum + RU + AMS fb	1.67 pt + 11 fl oz + 3.4 lb	Pre	33	48	11	157
Yukon + NIS	4 oz + 0.25%	Post				
Dual II Magnum + RU + AMS fb	1.67 pt + 11 fl oz + 3.4 lb	Pre	24	50	16	177
Status + RU + NIS + AMS	5 oz + 22 fl oz + 0.25% + 2 lb	Post				
Dual II Magnum + RU + AMS fb	1.67 pt + 11 fl oz + 3.4 lb	Pre	18	5	0	189
Steadfast + Horney + COC + AMS	0.75 oz + 4 oz + 1% + 2 lb	Post				
Dual II Magnum + RU + AMS fb	1.67 pt + 11 fl oz + 3.4 lb	Pre	30	34	8	179
Laudis + atrazine + MSO + AMS	3 fl oz + 1 pt + 1% + 1.7 lb	Post				
Python + RU + NIS fb	1 oz + 11 fl oz + 0.25%	Pre	21	19	8	193
RU + AMS	22 fl oz + 3.4 lb	Post				
Sharpen + COC + AMS fb	3 fl oz + 1% + 3.4 lb	Pre	45	53	5	186
RU + AMS	22 fl oz + 3.4 lb	Post				