Fall-applied Eptam® 7-E herbicide for Italian ryegrass control in spring-planted crops

Mark Thorne and Drew Lyon

Controlling annual ryegrass (*Lolium perenne* L. ssp. *multiflorum*) in spring crops is a challenge in areas where Italian ryegrass has developed resistant to Group 1 (ACCase inhibitors) and Group 2 (ALS inhibitors). Alternate herbicide strategies include Group 3 (root growth inhibitors) like Sonalan® HFP or Treflan® HFP, or Group 15 herbicides like Far-Go® 4EC or Avedex® Microactiv that inhibit synthesis of very long chain fatty acids; however, these soil-active herbicides require incorporation and rainfall for soil activation and lack of rainfall after application can limit their efficacy when applied in the spring prior to crop planting. Fall application guarantees there will be sufficient moisture to activate soil-applied herbicides, but it is not clear if herbicides applied in the fall will still be active the following spring.

We applied Eptam 7-E (EPTC), a Group 15 herbicide like Far-Go 4EC, alone and in tank mixes with other soil-active herbicides (Table 1) on September 22, 2023, following rains that moistened the soil enough for cultivation and to absorb the herbicides. The field site that had been in winter wheat during 2023 and was prepared by flail mowing the winter wheat stubble and cultivating the ground to a depth of 4 inches to expose enough soil to intercept the herbicides. Following herbicide applications, the study site was roller packed to help seal the soil to keep the Eptam 7-E from volatilizing off the surface. Herbicides were applied with a 10-ft hand-held spray boom with six TeeJet® AIXR110015 nozzles on 20-inch spacing and pressurized with a CO_2 backpack. Spray output was 15 gpa at 40 psi with a ground speed of 3 mph.

Figure 1. Eptam 7-E field trial following preparation and herbicide applications in September 2023 (left); nontreated check plot July 2024 (middle) compared with Italian ryegrass control with fall-applied herbicides (right).

The Eptam 7-E label allows for fallow applications at a minimum of 45 days prior to planting of a crop not labeled for Eptam 7-E application; therefore, the application timing was within label requirements because it was in the fallow period between winter wheat harvest and spring planting; however, we included a 14 pt/A rate, which is twice the maximum labeled rate. Tank mixes included Eptam 7-E with Treflan HFP, Sonalan HFP, Far-Go 4EC, Zidua® SC (pyroxasulfone, Group 15), and Alion® (indaziflam, Group 29). Tank mixes with Far-Go 4EC (above allowable rate), Sonalan HFP (above allowable rate), and Alion (not labelled for this use) are experimental off-label applications.

Table 1. Italian ryegrass control following fall-applied soil-active herbicides.

Treatment	Rate	Italian ryegrass	Italian ryegrass control in spring crops*				
		Preplant	Chickpeas	Lentils	Peas	Wheat	Average
		---------- (percent of nontreated check)----------					
Nontreated check		0	0	0	0	0	0
Eptam 7-E	5 pt/A	74 d	52 bc	22 c	17 d	0 d	25 d
Eptam 7-E	7 pt/A	93 c	24 c	11 c	88 c	15 cd	40 d
Eptam 7-E	14 pt/A	94 bc	49 bc	41 bc	93 bc	74 ab	67 bc
Eptam 7-E + Treflan HFP	7 pt/A + 1.5 pt/A	95 bc	83 ab	38 bc	97 abc	37 bc	67 c
Eptam 7-E + Far-Go 4EC	7 pt/A + 4 qt/A	97 ab	89 a	78 a	100 a	77 ab	85 ab
Eptam 7-E + Zidua SC	5 pt/A + 2.5 oz/A	98 ab	88 a	68 ab	99 ab	67 ab	80 abc
Eptam 7-E + Zidua SC	7 pt/A + 6.5 oz/A	98 ab	93 a	86 a	100 a	96 a	93 a
Eptam 7-E + Sonalan HFP	7 pt/A + 4.5 pt/A	99 a	77 ab	78 a	99 ab	63 b	80 abc
Eptam 7-E + Alion	7 pt/a + 3.5 oz/A	99 a	91 a	85 a	99 ab	61 b	84 abc

*Means followed by the same letter in each column are not different (P≤0.05).

On April 2, 2024, prior to planting spring crops, PowerMax® (glyphosate) was applied at 24 oz/A to control volunteer crop and weeds that had germinated during the winter. On April 16, spring peas (163 lb/A), lentils (33 lb/A), and spring wheat (110 lb/A) were direct-seeded across each plot with a Great Plains® drill with double-disc openers on 10-inch spacing. On April 28, chickpeas (128 lb/A) were seeded when the soil temperature had warmed above 55°F.

Herbicide efficacy was evaluated visually as percent of the nontreated check plots on March 20, 2024, prior to the April 2 PowerMax application and again on July 5 when the Italian ryegrass could be easily identified in the crops (Table 1) and crop injury from the herbicides was evident. Crop injury was seen as stunting and/or decreased crop density.

Italian ryegrass control on March 20 was greater than 90% with all treatments except the 5 pt/A rate of Eptam 7-E. Treatments with the highest level of control were tank mixes of Eptam 7-E with either Far-Go 4EC, Zidua SC, Sonalan HFP, or Alion. On July 5, crop height was 16 inches for chickpeas, 12 inches for lentils, 30 inches for spring peas, and 32 inches for spring wheat. Italian ryegrass had flowered and was developing seeds in all crops; however, the dense spring pea canopy was very competitive and Italian ryegrass plants were stunted under the canopy. By July 5, Italian ryegrass control, on average, was still greatest with tank mixes of Eptam 7-E with Far-Go 4EC, Zidua SC, Sonalan HFP, and Alion; however, some differences in control could be seen in each crop. Italian ryegrass control in spring peas was high with all tank mixes and was aided by the dense crop canopy. In spring wheat, Eptam 7-E plus the 6.5 oz/A rate of Zidua SC had better control than Eptam 7-E with Sonalan HFP or Alion or the 7 oz/A rate of Eptam 7-E, alone. The wheat canopy was vertically dense but not horizontally dense, therefore light could get to the ground between the rows. Italian ryegrass control in chickpeas appeared greater than in lentils as ratings were 90% or greater with all treatments except the 5 oz/A rate of Eptam 7-E alone. In lentils, ≥90% was only seen with the high rate of Zidua SC plus Eptam 7-E.

Crop injury observed as stunting and/or decreased density was only slightly evident on the pulse crops from the Eptam 7-E plus Alion tank mix with 7% for chickpeas and 4% for lentils (data not shown). Slight stunting to the spring peas was highly variable and not statistically different from zero. However, Eptam 7-E plus Alion caused 35% stunting and thinning of the spring wheat. Furthermore, Eptam 7-E plus Sonalan HFP injury to the spring wheat crop was 5%. No other herbicide treatments caused any visible injury; however, we did not harvest the crops for yield.

Eptam 7-E at 7 pt/A applied in the fall is a labeled fallow application providing it occurs at least 45 days before planting a crop that is otherwise not on the Eptam 7-E label. Fall-applied Eptam 7-E in our trial substantially reduced Italian ryegrass density into the following spring prior to planting; however, the 7 pt/A rate did not maintain good control during crop growth without the addition of a tank mix partner such as the above-label rate of Far-Go 4EC or with the maximum labeled rate of Zidua SC of 6.5 oz/A. On a cautionary note, applying Zidua SC in the fall following a wheat crop where it may have been also applied is not recommended. Zidua SC is one of the few herbicides still active on Italian ryegrass and applications two years in a row may promote resistance to the herbicide. Sonalan HFP at the above-label rate of 4 pt/A rate was more effective than the label rate of Treflan HFP in lentils, peas, and spring wheat.

Fall applied soil-active herbicides may be an option for reducing Italian ryegrass in spring crops, but more research is needed to identify effective herbicide treatments and labeled rates.

Off-Label or Experimental-Use Disclaimer

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