

Long-term control of smooth scouringrush with glyphosate in no-till fallow.

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In 2018, we compared broadcast and rope wick applications of RT 3® glyphosate for control of smooth scouringrush in no-till fallow/wheat rotations. Smooth scouringrush is a persistent perennial plant with an extensive root system, making it difficult to control with standard fallow herbicide applications targeted at annual weed populations. One advantage of the rope wick applicator is that the RT 3 label allows up to a 75% v/v solution, which is a very high rate of herbicide contacting the plant surface. For the broadcast comparison, we applied RT 3 at 96 oz/A. This rate is consistent with labeled rates for other difficult-to-control perennial weeds. At Reardan, an additional treatment combined Silwet® L77 with RT 3 to see if an organosilicone surfactant would aid RT 3 efficacy in smooth scouringrush since the stems contain a relatively high concentration of silica. Rhonox® MCPA ester was broadcast applied as a burndown check because it quickly turns stems black after application, but does not seem to have much long-term effect. This report compares data collected in 2018 with visual assessments made this year in June and July.



Figure 1. Rope wick applicator and smooth scouringrush stems.

Treatments were applied May 25, 2018 at a site near Omak, WA, and July 5, 2018 near Reardan, WA (Table 1). Both sites were in no-till fallow with a uniform density of smooth scouringrush stems. Plots measured 10 by 30 ft at Omak and 10 by 40 ft at Reardan. At both sites, plots were arranged in a randomized complete block design with four replications per treatment. Broadcast treatments were applied with a hand-held spray boom with six TeeJet® XR11002 nozzles on 20-inch spacing and pressurized with a CO₂ backpack at 3 mph. Spray output was 15 gpa at 25 psi. Rope wick treatments were applied with a 10-ft by 3-inch wick tube with braided polyester wicking ropes (Rodgers Sales Co. Inc., Lyon, MS) mounted on the front of a four wheeler ATV moving approximately 3 mph (Figure 1). A 3-gal tank, lightly pressurized with CO₂, fed the wick tube to keep the ropes saturated and dripping.

Treatments were evaluated in 2018, 45 days after treatment (DAT) at Omak and 33 DAT at Reardan. At the Omak site, stems were counted in two ¼-m² quadrats per plot on July 9, 2018. Stems were counted if green living tissue was visible. An accidental cattle-grazing incident removed much of the biomass at this site, so biomass sampling was not practical. At the Reardan site, living portions of stems were collected in two ¼-m² quadrats/plot on August 7, 2018. Data are shown in plants/yd². Excessive branching on the lower portion of the stems conversely made stem counts impractical. In 2019, overall abundance (density, mass) was visually assessed and compared to the non-treated check plots on a percent basis.

Table 1. Application and soil data.

| Location | Omak, WA | Reardan, WA |
|-----------------------------------|---|--|
| Application date | May 25, 2018 | July 5, 2018 |
| Growth stage, smooth scouringrush | stems with strobili, up to 20 inches | stems with strobili, 6 to 20 inches |
| Crop phase | no-till fallow | no-till fallow |
| Air temperature | 85 | 79 |
| Relative humidity (%) | 23 | 36 |
| Wind (mph, direction) | 4-6, S | 3-7, NNE |
| Cloud cover (%) | 60 | 0 |
| Soil temperature at 6 inches (F) | 80 | 68 |

In 2018, the RT 3 treatment at Omak and the Rhonox and the RT 3 + Silwet L77 treatments at Reardan were most effective at reducing stem abundance; however, at Reardan, RT 3 without Silwet L77 had very little effect (Tables 2 and 3). It is not exactly clear why RT 3 alone worked so well at Omak but not at Reardan, but timing of application seems to be a factor. The rope wick application was also more effective at Omak as stem density/yd² averaged 73 and was three times lower than the non-treated check (Table 2). When RT 3 was visually effective, stems turned a yellow straw color during several weeks after treatment, but in contrast, Rhonox treated stems turned black very quickly after treatment (Figure 2). In 2019, it was evident that some of the 2018 treatments had long-term effects on smooth scouringrush density. At Omak, very few stems were seen in plots treated with the rope wick and broadcast RT 3 applications, and averaged 78 and 88% control, respectively (Table 2, Figure 3). At Reardan, the rope wick and RT 3 + Silwet L77 treatments averaged 65 and 90% control, respectively, and were both superior to RT 3 alone and Rhonox (Table 3). These data suggest that long-term control of smooth scouringrush can be obtained if RT 3 visibly discolors the stems, and that the addition of Silwet L77 may be necessary. In contrast, quick burndown or blackening of the stems with Rhonox does very little to effect long-term control.

Table 2. Smooth scouringrush control comparing rope wick with broadcast herbicide treatments at Omak, WA. Stem density in 2018 measured 45 days after treatment in the fallow phase, visual rating in 2019 was on July 12 in the winter wheat phase.

| Treatment ¹ | Rate | Smooth scouringrush control ² | |
|------------------------|---------|--|-----------------------------|
| | | 2018 Stem density (stems/yd ²) | 2019 Rating (% check) |
| RT 3 – rope wick | 75% v/v | 73 b | 78 a |
| RT 3 – broadcast | 96 oz/A | 20 c | 88 a |
| Rhonox – broadcast | 48 oz/A | 203 a | 13 b |
| Non-treated check | - | 225 a | - |

¹ Treatments applied May 25, 2018.

² Values in each column followed by the same letter are not different (Pvalue≤0.05).

Table 3. Smooth scouringrush control comparing rope wick with broadcast herbicide treatments at Reardan, WA. Stem biomass in 2018 measured 33 days after treatment in the fallow phase, visual rating in 2019 was on June 28 in the winter wheat phase.

| Treatment ¹ | Rate | Smooth scouringrush control ² | |
|---------------------------|---------------------|---|--------------------------------|
| | | 2018 Biomass (lb dry mass/yd ²) | 2019 Rating (% of check) |
| RT 3 – rope wick | 75% v/v | 0.42 a | 65 a |
| RT 3 – broadcast | 96 oz/A | 0.53 a | 16 b |
| RT 3 + Silwet – broadcast | 96 oz/A + 0.25% v/v | 0.25 b | 90 a |
| Rhonox – broadcast | 48 oz/A | 0.27 b | 25 b |
| Non-treated check | - | 0.55 a | - |

¹ Treatments applied July 5, 2018.

² Values in each column followed by the same letter are not different (Pvalue≤0.05).



Figure 2. Photo on left is blackened smooth scouringrush stems from a Rhonox application. Photo on right shows yellow straw-colored stems affected by an RT 3 application. Green plants are volunteer canola. Tall stems in background are untreated smooth scouringrush in no-till fallow. Photos taken near Omak, WA.



Figure 3. Photo on left is 2019 smooth scouringrush stems in a non-treated check plot in 2018. Photo on right, taken in 2019, is from a plot treated with RT 3 in 2018.