

Effect of sulfonylurea herbicides and non-ionic surfactants on smooth scouringrush in no-till fallow – Steptoe, WA.

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The sulfonylurea herbicide, chlorsulfuron, is effective for controlling smooth scouringrush (*Equisetum laevigatum* A. Braun), and its long soil persistence is a likely factor. However, its persistence limits its use in areas where pulse or other susceptible crops are grown due to damage that can occur if the crops are planted within the plantback restriction period (See Plantback Restrictions for Herbicides Used in the Dryland Wheat Production Areas of the Pacific Northwest – PNW 571). Other sulfonylureas have shorter plantback intervals, but their efficacy on smooth scouringrush may be lower. Recently, we have shown that the organosilicone non-ionic surfactant Silwet® L77 increases efficacy of RT 3 glyphosate on smooth scouringrush. This trial compares Silwet L77 with M-90, a commonly used non-ionic surfactant, each added to three different sulfonylurea herbicides. Herbicides compared are Finesse®, which contains chlorsulfuron and metsulfuron and is known to control smooth scouringrush, Amber®, which contains triasulfuron and has intermediate plantback intervals, and Affinity® BroadSpec, which contains thifensulfuron and tribenuron and has relatively short plantback intervals. Smooth scouringrush can form dense stands (Figure 1) and interfere with field operations and reduce crop yield.



Figure 1. Smooth scouringrush in no-till fallow.

The study site is located on the Hall farm near Steptoe, WA (Table 1). The field is in a three-year rotation of no-till fallow/winter wheat/spring wheat. Initial smooth scouringrush density averaged 52 stems/ft². Plots measure 10 by 30 ft and are arranged in a randomized complete block design with four replications per treatment and a factorial arrangement with three herbicides and two surfactants. All herbicide 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 is 15 gpa at 25 psi. Treatments were evaluated visually on October 3, 2019, 16 weeks after treatment (WAT) for stem discoloration or death. The trial will be re-evaluated in 2020 to see if any of the treatments effect a change in stem density the following year.

Table 1. Application and soil data.

Location	Steptoe, WA
Application date	6/12/2019
Rotation phase	no-till fallow
Smooth scouringrush stage	stems with strobili
Air temperature (F)	85
Relative humidity (%)	28
Wind (mph, direction)	3, N
Cloud cover (%)	40
Soil temperature at 2 in (F)	80
Soil texture	Palouse-Thatuna silt loam
OM (%)	2.2
pH	5.0

At assessment, stems most affected by the treatments were discolored or partially dead with a yellow straw color by the time the treatments were visually rated on October 3 (16 WAT). None of the treatments had completely killed the standing stems but all caused some effect. Analysis showed that Finesse + Silwet L77 was more effective than all other treatments (Table 2).

Table 2. Herbicide and surfactant effect on smooth scouringrush in no-till fallow.

Herbicide	Rate (oz /A + % v/v)	Visual injury (16 WAT) (% of check)*
Finesse + Silwet L77	0.5 + 0.25	66 a
Finesse + M-900	0.5 + 0.25	38 b
Amber + Silwet L77	0.56 + 0.25	29 bc
Amber + M-90	0.56 + 0.25	21 c
Affinity BroadSpec + Silwet L77	1.5 + 0.25	30 bc
Affinity BroadSpec + M-90	1.5 + 0.25	21 c

*Numbers followed by the same letter are not different (Pvalue≤0.05).

Finesse + Silwet L77 resulted in 66% injury and was greater than Finesse + M-90, which yielded 38% injury. Finesse + M-90 was not different from either Amber + Silwet L77 or Affinity BroadSpec + Silwet L77, but was greater than either Amber + M90 or Affinity BroadSpec + M90, which both resulted in only 21% injury, the lowest overall. From these results, we predict that next year stem density will be lowest in Finesse + Silwet L77 treated plots, but it will be interesting to see if either Amber + Silwet L77 or Affinity BroadSpec + Silwet L77 will also reduce stem density given there was no observed difference this year between these treatments and Finesse + M-90. If sulfonylurea herbicides with shorter plantback intervals can be effective with the addition of an organosilicone surfactant, then maybe growers in the pulse-growing areas can begin to reduce the stands of smooth scouringrush that have been on the increase over the past 15 or so years (Figure 2). In the future, Kinetic®, a similar organosilicone non-ionic surfactant will replace Silwet L77 in this region.



Figure 2. No-till fallow near Steptoe, WA with spreading stands of smooth scouringrush, likely taking advantage of available sub-soil moisture.