

Effect of Soil Adjuvants on the Efficacy of Pre-emergence Herbicide Programs for Weed Management in Asparagus



Joshua Miranda, Abraham Akuoko, Josué Cerritos

Background

Michigan is the leading asparagus-producing state in the U.S., and pigweeds (*Amaranthus* spp.) are among the most problematic weeds for growers. Weed management is particularly challenging in asparagus because it is a perennial crop and cultivation can damage crowns and emerging spears. Growers therefore rely heavily on PRE-emergence herbicides for residual weed control. However, PRE herbicide performance can vary with rainfall and soil conditions, and the limited number of effective herbicide options increases concerns about herbicide resistance. **Soil adjuvants are marketed to improve herbicide deposition and retention in the soil. We evaluated whether these products could improve the performance of PRE herbicide programs in asparagus.**



Objective

Determine whether soil-applied adjuvants improve the efficacy of PRE-emergence herbicide programs for pigweed control in asparagus during harvest.

Experimental setup

The experiment was arranged as a 7 × 4 factorial treatment within a randomized complete block design (RCBD) with three replications. The factors consisted of seven PRE-emergence herbicide programs and four adjuvant programs. This resulted in a total of 28 treatments. Treatments were applied April 22, 2026, at 20 GPA.

PRE herbicides programs	Rate (ai/acre)
Flumioxazin (Chateau)	6 fl oz/a
Pendimethalin (Prowl)	8.2 pt/a
Norflurazon (Solicam)	4 lb /a
Chateau + Prowl	“ “
Chateau + Solicam	“ “
Prowl + Solicam	“ “
Prowl + Solicam + Chateau	“ “

Soil adjuvants	Rate
Grounded (COC+NIS+Fatty acids)	1 % v/v
Oro-RZ (OMRI; NIS+COC)	1 % v/v
Sustain (Polymers+NIS)	1 % v/v
No adjuvant	NA

Data collection

Weed control (0-100%), crop injury (0-100%), and aboveground weed biomass were collected at 2, 4, 6, and 8 weeks after treatment (WAT).

Results

Did soil adjuvants improve pigweed control?

No. Grounded, Infuse, and Sustain did not improve pigweed control or reduce pigweed biomass compared with no adjuvant.

Because adjuvants had no significant effect, the herbicide results below are pooled across adjuvant treatments.

Which herbicide programs provided the best control?

At 6 WAT, Chateau alone and Chateau-containing mixtures provided 80–85% pigweed control.

- Solicam alone provided the lowest control at approximately 55–60%.
- Prowl alone provided intermediate control at 70%.
- Adding Prowl or Solicam to Chateau did not consistently improve control compared with Chateau alone.

How long did control last?

Pigweed control declined across all treatments by 8 WAT, indicating that residual activity was beginning to weaken later in the season.

- Solicam remained the weakest treatment, providing only about 35% control.
- Most Chateau-containing programs maintained approximately 60% control.
- The three-herbicide mixture had the highest numerical control at 8 WAT, around 65–70%, although it was statistically similar to several two-herbicide programs.

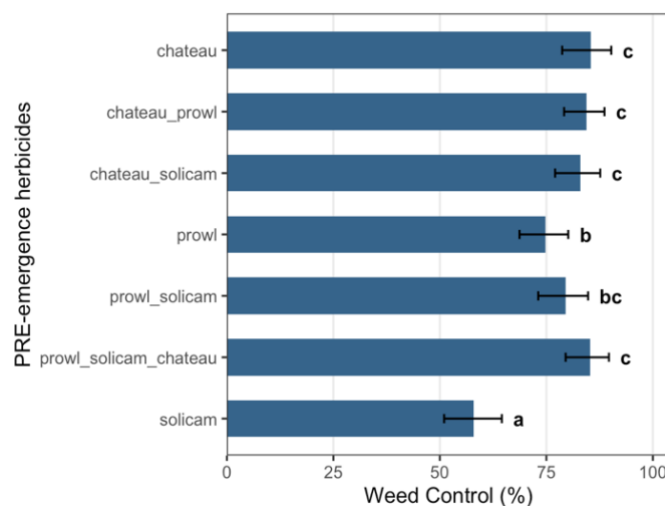
Pigweed aboveground biomass

- Solicam alone resulted in the greatest pigweed biomass.
- Chateau alone resulted in the lowest biomass, and biomass was similarly low in several Chateau-containing programs.
- Differences among most two- and three-herbicide mixtures were relatively small.

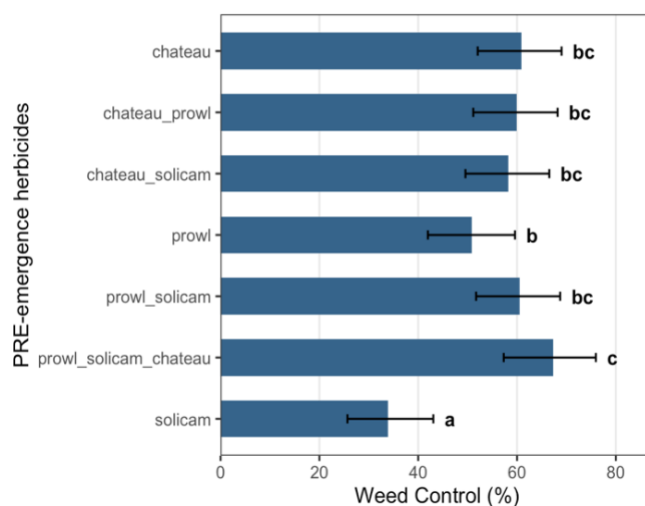
Take-Home Message

- Soil adjuvants did not increase the performance of PRE herbicides in this trial.
- Herbicide selection had a much greater effect on pigweed management.

Pigweed control at 6 WAT



Pigweed control at 8 WAT



Aboveground Pigweed Biomass

