**Final Report SSWGO 2024-2026:**
**Developing Symphylan Control Methods for Specialty Seed Crops in Oregon.**
The objective of this study were to evaluate the efficacy of various insecticidal treatments for managing symphylans in commercial sugar beet and organic vegetable seed production systems in Oregon. Field trials were conducted across three sites in 2024 to determine treatment effects on symphylan populations and plant biomass production. The data were disseminated at various grower meetings in the Willamette Valley and one OSU organic field day event during 2025.

1. Sugar beet for Seed Symphylan Trials- 2024

Seven commercial sugar beet seed field sites were sampled, and data were collected using the potato bait method for symphylan abundance at each site. Symphylan distribution maps were created for all sites. Two commercial field sites were selected with reasonably high pressure and uniform distribution to conduct the efficacy trial.

**Field Treatment**

Insecticide treatments were administered at two symphylan-infested sites on March 21, 2024. Site 1 (44.450043340892286, -123.23983978160007) and Site 2 (44.25012145167685, -123.22410791837771) were located in Benton and Lane Co., Oregon. Each field trial consisted of six treatments (Table 1) and one untreated control, replicated four times in a randomized complete block design with 12 feet × 25 feet plots at each site. A bicycle sprayer with a CO2-operated sprayer calibrated to deliver 20GPA at 21 PSI was used for treating experimental plots.

**Data collection**

Data were collected using the potato bait method at various sampling intervals at both locations (specified days after treatment, i.e., DAT in Tables 1 and 2). Biomass imagery was collected at both sites on June 7$^{th}$, 2024. Two images per plot were taken at approximately 4 feet above ground level of an area of 7 feet × 4 feet wide over the two center rows. Both images were analyzed using Canopeo© 2024 Canopeo App. for percent biomass, and the mean of the two plots was evaluated.

Data were analyzed using ANOVA using a generalized linear model, and Tukey's Honest Significant Difference (HSD) test was run to assess the differences between treatment means.

**Results**

Site 1: At 10DAT, no differences in the mean symphylan abundance between control and insecticide treatment were found (Table 1). However, at 18 DAT, all insecticide treatments were found to effectively suppress symphylan densities compared to untreated control and Azaguard. Capture LFR and A21377X were found to provide higher efficacy than other insecticide treatments and control at 38DAT. At 45 DAT, Capture LFR plots had significantly lower densities than no-fly-treated plots, followed by an overall higher biomass percentage than untreated control and no-fly-treated plots at the end of the season.

Site 2: No differences in treatment means were observed; hence, the results were inconclusive (Table 2).

The overall mean comparisons at both locations (Table 3) indicated that the Seduce insect baits, A21377X, and Capture LFR were more effective than the untreated control, no-fly, and Azaguard at Site 1 for symphylan control.

Table 1. Treatment, mean symphylan densities at the specified days after treatment (DAT), and mean percentage biomass at the end of the trial period at Site 1.

| Treatment | 10DAT | 18DAT | 25DAT | 38DAT | 45 DAT | %Biomass |
|---|---|---|---|---|---|---|
| Control | 24.5ab | 26.7a | 25.5a | 23.5a | 23.5ab | 16.5d |
| No-fly WP Mycoinsecticide | 28.0a | 13.0b | 20.0a | 15.7ab | 32.0a | 21.6cd |
| AzaGuard | 15.0b | 16.5ab | 20.7a | 21.5a | 22.5ab | 24.3bc |
| Seduce Insect Bait | 15.2b | 15.0b | 15.5a | 14.2ab | 13.0ab | 23.6bc |
| A21377X | 17.2b | 8.7b | 10.7a | 7.0b | 15.0ab | 28.3b |
| Capture LFR | 8.0b | 9.7b | 13.5a | 6.5b | 4.7b | 35.9a |
| *P- value* | 0.0097 | 0.0124 | 0.0747 | 0.0031 | 0.0077 | <0.0001 |

*Means with the same letter are not significantly different.

Table 2. Treatment, mean symphylan densities at the specified days after treatment (DAT), and mean percentage biomass at the end of the trial period at Site 2.

| Treatment | 7 DAT | 16 DAT | 25 DAT | % Biomass |
|---|---|---|---|---|
| Control | 19.5a | 24.7a | 14.7a | 81.7a |
| No-fly WP Mycoinsecticide | 23.5a | 10.7a | 12.7a | 82.0a |
| AzaGuard | 13.0a | 14.7a | 5.0a | 86.7a |
| Seduce Insect Bait | 28.7a | 10.5a | 9.0a | 82.4a |
| A21377X | 27.7a | 24.5a | 15.5a | 82.4a |
| Capture LFR | 21.0a | 6.5a | 1.7a | 86.3a |
| P-value | 0.8099 | 0.5823 | 0.8076 | 0.5703 |

*Means with the same letter are not significantly different.

Table 3. Overall mean symphylan densities in the treatment plots during the spring of 2024 at both sites.

| Treatment | Site 1 | Site 2 |
|---|---|---|
| Control | 24.1a | 19.7a |
| No-fly WP Mycoinsecticide | 21.6a | 15.7a |
| AzaGuard | 19.2ab | 10.9a |
| Seduce Insect Bait | 13.4bc | 16.1a |
| A21377X | 13.0bc | 22.6a |
| Capture LFR | 8.5c | 9.7a |
| P-value | 0.0001 | 0.3944 |

*Means with the same letter are not significantly different.

2. **Symphylan control in organic vegetables grown for seed**

One commercial vegetable seed field site (44.330159484559196, -122.83514292577394) was selected in Lane Co., Oregon. Two insecticide treatments (Table 4) and untreated control (water) were applied on May 1, 2024, using a $CO_2$ backpack sprayer to plots 6 feet × 12 feet arranged in a randomized complete block design with four replicates. Symphylan counts were taken using the potato bait method and biomass data was taken as described above and analyzed for the mean difference between treatment groups (Table 4).

Table 4. Treatment, mean symphylan densities at the specified days after treatment (DAT), and mean percentage biomass.

| Treatment | 9 DAT | 16 DAT | 22 DAT | % Biomass |
|---|---|---|---|---|
| Control | 19.8a | 20.5a | 23.3a | 12.9a |
| AzaGuard | 16.0a | 16.5a | 11.3a | 17.7a |
| Seduce Insect Baits | 5.0b | 5.5a | 13.5a | 26.8a |
| P-value | 0.0202 | 0.2064 | 0.2119 | 0.1269 |

AT 9 DAT, significantly lower mean symphylan densities were observed than in untreated control and Azaguard-treated plots, but no significant differences were observed in treatment means on subsequent sampling periods. The mean percent biomass was not different among treatment groups.

**Summary**

Capture LFR, A21377X, and Seduce insect bait showed the most promising symphylan control in sugar beet seed trials, while Seduce provided short-term suppression in organic vegetable systems, though effectiveness diminished over time.