

Field Notes

San Joaquin County
May 2024

University of California
Agriculture and Natural Resources

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Symphylans Can Impact Seedlings and Transplants

Symphylans (also called garden centipedes) are small, soil-dwelling arthropods that can sometimes cause problems in annual crops. I have seen problems in tomatoes, onions, and asparagus. I would say that problems are not common, but I did see a number of tomato fields affected last year, and I think it is an easy pest to overlook. I sometimes forget to consider them as a possibility when looking at poorly growing fields and trying to eliminate possible causes.

The primary symptom that is noticed first is that seedlings or transplants fail to grow. Interestingly, weeds are also affected by the symphylans and can also be stunted. Often, there are hot spots in the field where the problem is worse. The size of the hot spots might grow in subsequent years.

These arthropods (technically, they are not insects) are slender, elongated, and white with prominent antennae (Figure 1). Adults are about ¼ inch long with 11 to 12 pairs of legs and prominent antennae. Early instars are smaller with fewer segments.



Figure 1. A symphylan is a small, white, elongated (about ¼" long) arthropod with many legs and prominent antennae.

Their primary food is decomposing organic matter in the soil, but they can also feed on the root hairs and rootlets of plants. They cause problems in young seedlings and new transplants. Once plants get larger, they can handle the

feeding and damage from symphylans without obvious effects.

Unfortunately, they flourish best in fields with good soil structure and high organic matter – which means that efforts to improve your soil can create a greater risk of symphylans. Higher tillage also combats symphylans, so the minimum tillage generally practiced in conjunction with buried drip irrigation is also more hospitable to them. Lastly, we have moved away from the broad-spectrum insecticides that may have controlled or suppressed symphylans in the past.

Last year I saw several tomato fields with symphylans, occurring in various parts of the county, both on the east and west sides of the county. With that in mind, I thought it was worthwhile to summarize what we know about pest monitoring and management.

Information on monitoring from the UC IPM Pest Management Guidelines:

Sampling for symphylans is difficult, and visible detection of any symphylans often indicates a population large enough to cause economic damage. A sampling plan modified from one developed by researchers at Oregon State has proven very efficient and relatively easy.

1. Place thick slices of raw potato on the soil surface at the level at which moisture is clearly visible in the soil. Be careful when removing dry soil from the surface not to disturb the pores in the moist soil to prevent symphylans from reaching the bait. This can be done by raking the dry soil away with a lettuce knife, rather than slicing into the soil with a knife or spade.
2. Then cover the bait with a solid plastic dome to protect it from drying out. This plastic dome or cap must be large enough not to cause excessive heating of the area or to accumulate excess condensation. A 6 X 6

(Continued on page 2)

Table of Contents:

Symphylans Can Impact Seedlings and Transplants.....	1
Cover Crop Variety Trial	2
Byproduct Feeding Practices Important to California's Sustainability: Dry Cows & Heifers	4
UC ANR Announcements and Calendar of Events.....	5

inch round white plastic pot with no drainage holes or a plastic cup is adequate. Cover with a stone or soil to prevent its removal by wind.

3. Leave the bait in place for 24 to 36 hours.
4. Remove the cover to count the symphylans, both on the potato slice and on the soil surface underneath. Count the soil surface first, as the symphylans there will quickly hide.

If symphylan counts approach 75 per potato slice, complete stand loss may occur. Significant stand loss will occur even at lower symphylan numbers.

My own experience is limited to looking for them with my shovel (I haven't used the potato baiting technique myself). If they are causing a problem, you can usually find them in the soil, although they will scurry out of sight quickly. Put on your reading glasses! As they are moving, the most distinctive thing you see is how fast and white they are.

I don't have experience with using the baiting technique prior to planting to predict whether there will be a problem. One challenge to this approach is that they can be quite patchy, so if your bait is not placed in the right spot, you will not detect them.

Symphylans are very difficult to control. Insecticides cannot eliminate symphylans from the soil because they can move down to deeper levels to avoid the chemicals (they can also move deeper to avoid hot or dry soils). However, if you can treat the soil in the rootzone of small plants, you can protect the plants until they are big enough to handle the feeding. Pyrethroids are the group most often used to suppress symphylans, and we have data to support that use from local trials in transplanted tomatoes. Some other materials are also effective based on work on coastal production systems where they impact cool-season vegetable crops. In that study, several different pyrethroids and tolfenpyrad (Torac) killed the symphylans, while some other materials didn't kill them but effectively repelled them, including oxamyl (Vydate) and azadirachtin (Aza-direct). As always, carefully read product labels before making a recommendation or an application.

Alternatives to insecticides include intensive tillage, summer flooding, and crop rotation. For obvious reasons, all these measures can only be implemented to reduce the risk of recurring problems and cannot be used to manage a problem within the current season.

Good luck with the season, and don't hesitate to call me if I can be of assistance.

Brenna Aegerter, Vegetable Crops Advisor

Cover Crop Variety Trial

With funding from the CDFA Healthy Soils Program and CA Rice Research Board, we are evaluating how well different cover crop species establish, provide soil coverage, affect soil carbon and nitrogen dynamics,

and/or impact rice yield in subsequent growing seasons. Since rice may be grown over multiple seasons without rotation, cover crops may provide an opportunity to introduce plant diversity, including nitrogen-fixing legumes. Other potential benefits include increasing soil organic matter, reducing nitrogen loss in the winter, reducing nitrogen inputs during the rice season, and improving rice straw decomposition. While evaluating winter cover crops in the rice system is the primary purpose of the trial, the project has relevance for other annual systems where winter cover cropping may be employed.

The trial took place on Staten Island. We planted the cover crops on November 13th by hand-broadcasting seed over 200-ft² plots and then gently raking it in. We planted 10 single species and two mixes (Tables 1-2). Each treatment was replicated four times, and the graphs below illustrate cover crop stands over the season (Figs. 1-4, pgs. 3-4).

Table 1. Cover crop species and seeding rates.

Cover crop species	Seeding rate (lb/ac)
Balansa clover	18
Bell bean	180
Biomaster pea	72
Field pea	110
Oats	110
Purple vetch	72
Rye	98
Turnip	18
Woodypod vetch	72
Yellow mustard	12

Table 2. Cover crop mixes and seeding rates.

Cover crop mixes	Seeding rate (lb/ac)	% of mixture
Mix 1:		
Purple vetch	13	11
Bell bean	33	27
Field pea	30	25
Rye	45	37
Mix 2:		
Purple vetch	20	21
Balansa clover	3	3
Field pea	38	40
Oats	25	27
Radish	8	9

(Continued on page 3)

The 2023-24 winter season started off dry, which worked well for cover crop sowing and establishment. The site received approximately 0.2” of rain within a week of planting, and about 0.4” by mid-December. The brassicas emerged quickly and started covering the soil after just one month. More frequent storms started in late December, and the project field was adjacent to fields that were winter-flooded. The combination of rain plus seepage from flooded fields meant the project field stayed quite wet after the new year. The data show that the brassicas did not tolerate the wet conditions, and their stands diminished over time. The two vetches and balansa clover started off slowly but had vigorous stands by early spring, despite the wet conditions. While the bell bean did not provide extensive coverage, it survived the wet conditions and was prominent in the plots. We observed that the grass cover crops (i.e. rye, oats) suffered from bird feeding. Based on our experiences and preliminary data, we share the following ‘lessons learned’:

- Timing of operations is critical. Growers should strive to plant winter cover crops as early as conditions allow (e.g. early to mid-November). Drill seeding is more effective (i.e. better stand establishment) than flying on and harrowing in seed.
- Stand establishment is impacted by conditions outside the control of the manager (i.e. weather, herbivory). If neighboring fields will be winter-flooded, having drainage ditches between fields will help cover crop growth.

The project will continue through 2025, and in addition to the Delta site, we are also trialing cover crops in Colusa and Butte counties. Please don’t hesitate to reach out if you would like to learn more information about this project.

Michelle Leinfelder-Miles, Farm Advisor, San Joaquin County and Delta Region

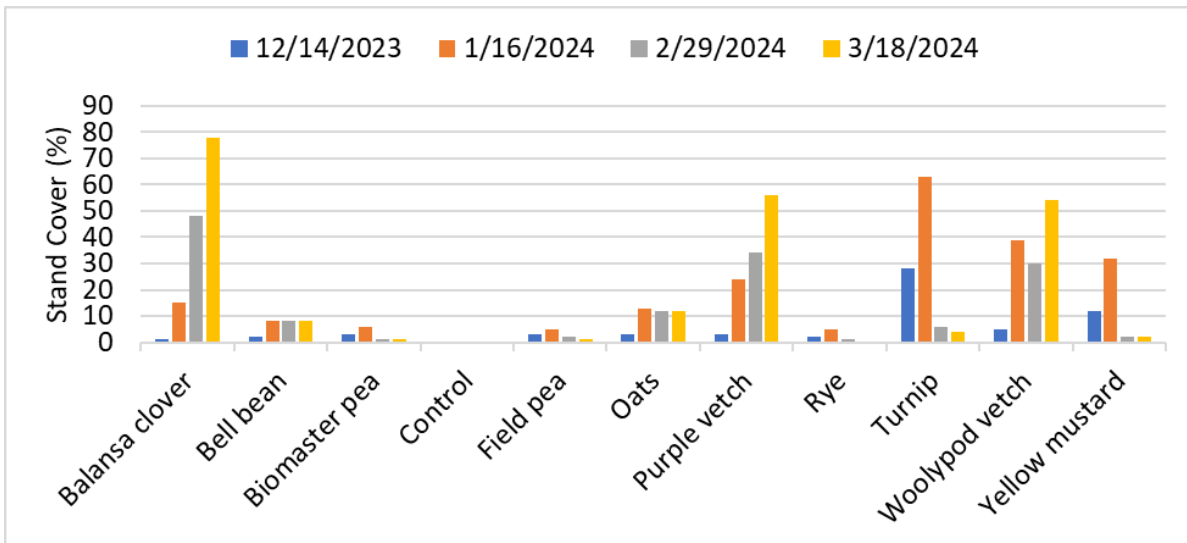


Figure 1. Cover crop species stand cover during the 2023-2024 winter season.

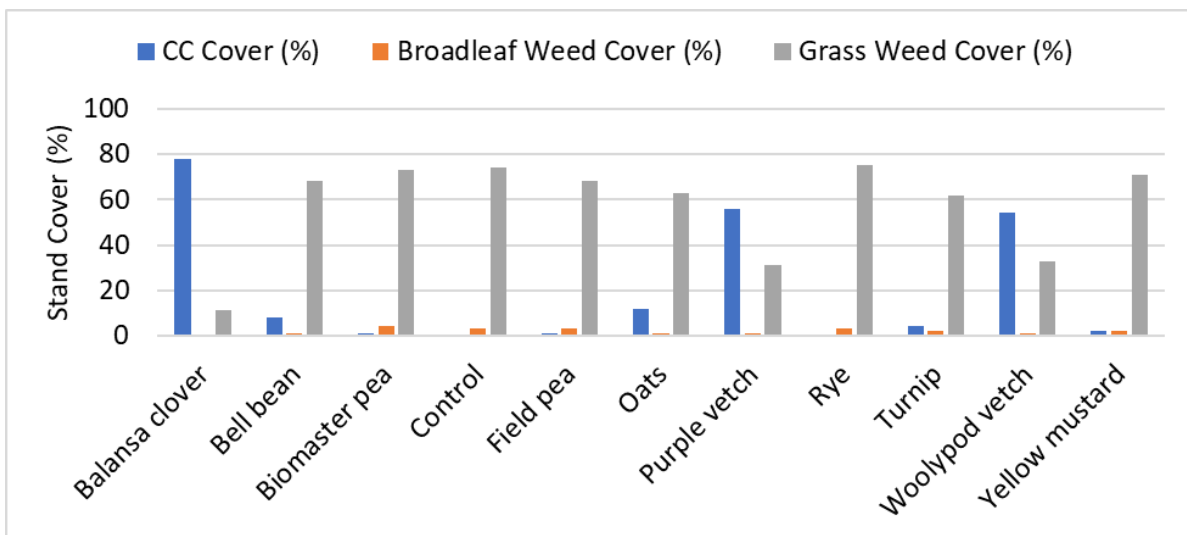


Figure 2. Cover crop and weed cover at the end of the cover crop season (3/18/2024).

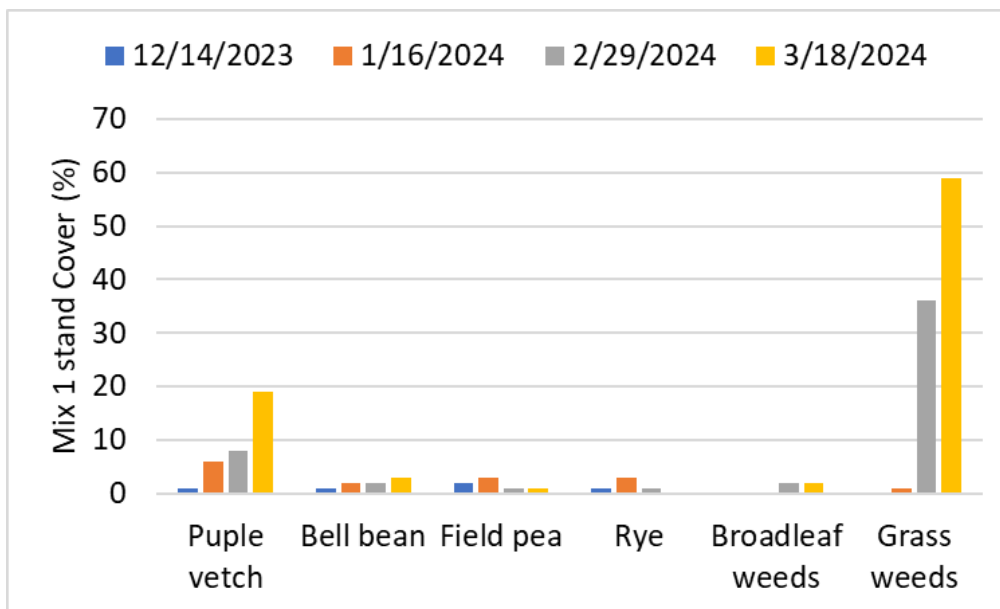


Figure 3. Cover crop mix 1 stand and weed cover during the 2023-2024 winter season.

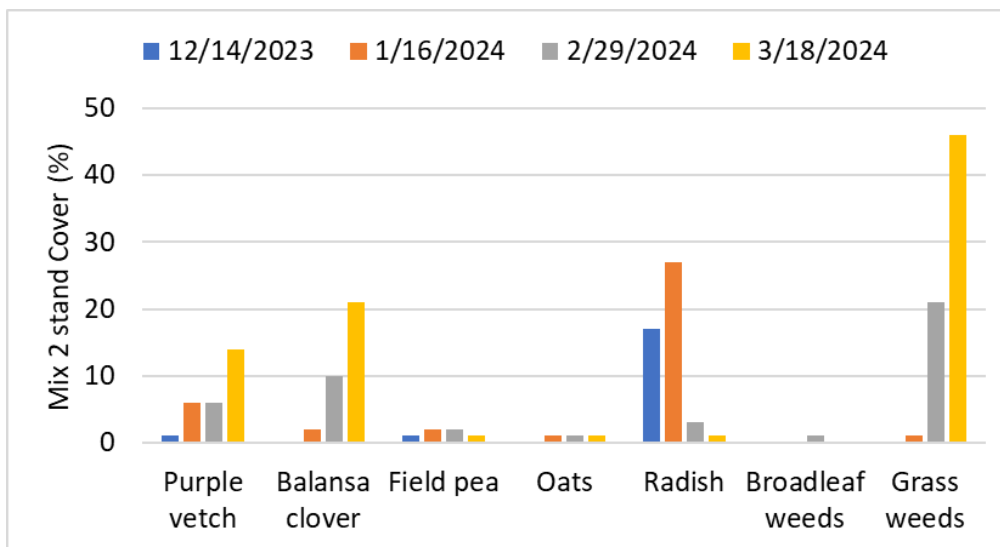


Figure 4. Cover crop mix 2 stand and weed cover during the 2023-2024 winter season.

Byproduct Feeding Practices Important to California's Sustainability: Dry Cows & Heifers

Nearly 41% of the California lactating cow ration is composed of byproducts. That number was calculated from responses to a 2022 survey of California dairy nutritionists. The data set represents approximately 936,700 lactating cows (26 returned surveys); 87.5% of those cows were housed in the San Joaquin Valley. Only 4% of lactating cows (38,100 cows) did not consume byproducts. In this article, we present the data collected on dry cow and heifer rations in the state. Lactating cow ration data were presented in the April 2023 newsletter (https://cestanislaus.ucanr.edu/newsletters/Dairy_Newsletter97200.pdf).

Byproduct inclusion rate. In the survey, we asked a series of questions about ration byproduct inclusion rates of nutritionists' herds. The values for dry cow and heifer rations are presented in Table 1. The range in byproduct feeding amounts was large. On average, California dry cow rations include 48% byproducts and heifer rations include 50% byproducts.

Table 1. Range of byproduct inclusion rates (dry matter basis) in California dry cow and heifer rations (not weighted).

	Dry Cows (%)	Heifers (%)
<i>Minimum</i>	0	0
<i>Maximum</i>	90	90
<i>Average</i>	48	50

(Continued on page 5)

Reasons to use byproducts. In a “select all that apply” question, every nutritionist selected value (worth the price) as a reason for including byproducts (Figure 1). Fewer chose price (they’re cheap; 38%) and availability (65%).



Figure 1. Reasons for incorporating byproducts into dairy rations.

Determination of nutrient composition. Nutritionists fed 63 unique byproducts. Most nutritionists (58%) reported using a commercial laboratory to determine the nutritional composition of all byproducts, whereas 42% analyzed only some byproducts.

Byproduct use trends. Nutritionists reported increased byproduct feeding rates in the last five years (68%); 80% thought feeding rates would increase in the next five years.

Byproduct feeding is not a new practice. The wide range in feeding levels suggests it is possible to feed more byproducts on some dairies. Water regulation and reduced water availability will impact California’s ability to produce forages. Byproduct feeding strategies may help mitigate feedstuff disruptions while contributing to the sustainability and resiliency of the California feeding program.

Thank you to the California dairy nutritionists who participated in the survey and to the California Dairy Research Foundation for funding this project. If you have any questions about this work, you can reach me at jmheguy@ucdavis.edu.

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 Ed DePeters, Professor, UC Davis Animal Science

UC ANR Announcements and Calendar of Events

Equipment Sanitation Field Day
 Tuesday, June 4, 2024
 Dixon, CA

Save the Date! For more information, contact Cassandra Swett, clswett@ucdavis.edu.

Diagnosing Herbicide Symptoms
 June 24-25, 2024

Trinchero Family Estates Building, UC Davis, 501 Hopkins Road

For information and registration, visit <https://registration.ucdavis.edu/Item/Details/1135>.

UC Weed Day 2023

Wednesday, June 26, 2024

Buehler Alumni Center, UC Davis, 530 Alumni Lane

8:00am – 4:30pm, lunch included

For information and registration, visit <https://registration.ucdavis.edu/Item/Details/1131>.

UC Dry Bean Field Day

Thursday, August 15, 2024

UC Davis

Save the Date! More information to follow.



SEEKING FARMERS

Get paid to transform your fields into temporary habitat for migratory shorebirds!

2024 LATE SUMMER FARMLANDS HABITAT PROGRAM

The BirdReturns program is now soliciting applications for the Late Summer Farmlands Habitat Program, which compensates growers for providing critical habitat for waterbirds during their migration from mid-July to September 30. BirdReturns is managed by the Migratory Bird Conservation Partnership in partnership with the Delta Conservancy, with funding and support from the California Department of Fish and Wildlife. [VISIT BIRDRETURNS.ORG AND APPLY > May 8 - June 17, 2024 at noon](https://www.birdreturns.org)

WHO IS ELIGIBLE?

- Farmers located in the Sacramento Valley and the Sacramento-San Joaquin Delta regions.
- Most row or field crops are suitable where shallow flooding (mud flats up to 4 inches) can be maintained.
- Fields must be open with no trees or vines.

WHAT IS REQUIRED?

- Post-harvest stubble management
- Provide habitat for a minimum of 3 weeks between July 15-September 30.
 - Weeks 1-3: Shallow flooding
 - Weeks 4-5: Evaporative drawdown
- Minimum of 30 acres

LEARN MORE! Join us at an in-person workshop!

Lunch and giveaways will be provided!

North Delta

Staten Island House
23319 N. Staten Island Rd. Thornton, CA 95686

➤ May 21 or June 11 at noon

South Delta

San Joaquin Farm Bureau Federation
3290 Ad Art Rd. Stockton, CA 95215

➤ May 22 or June 12 at noon

Sacramento Valley

Yuba – Sutter Farm Bureau
475 Palora Ave STE A Yuba City, CA 95991

➤ May 23 or June 13 at noon

QUESTIONS? VISIT [birdreturns.org](https://www.birdreturns.org) OR CONTACT US:

Billy Abbott at 530.228.1862, william.abbott@tnc.org

Bekka Rosenkrantz at 916.822.3733, bekka.rosenkrantz@tnc.org

NEW!! Virtual workshop coming to our website in late May!



The Nature Conservancy



SACRAMENTO - SAN JOAQUIN
DELTA CONSERVANCY
A California State Agency



Audubon
CALIFORNIA



Point Blue
Conservation
Science

ARE YOU A FARMER IN SAN JOAQUIN COUNTY?

PLEASE TAKE OUR SURVEY!

WE WANT TO HEAR YOUR OPINIONS ON COVER CROPPING

We are a group of **UC Davis undergraduate students** collecting data on cover cropping for our **final senior project**. The data will **inform** our implementation plan that we are creating to make cover cropping more accessible to farmers.



https://ucdavis.co1.qualtrics.com/jfe/form/SV_8bTLYeGkoYvYfHM

Survey time: 5 minutes

Accepting responses until: June 1, 2024



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The University of California working in cooperation with San Joaquin County and the USDA.