HEMP NEWSLETTER

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OSU hemp crop production research update-2023

By Govinda Shrestha, Everald McLennon, Stephen Baluch, Richard Roseberg and Don Wysocki, Oregon State University

In Oregon, hemp growers are about to finish hemp planting. Oregon State University (OSU) faculty affiliated with the Global Hemp Innovation Center are close to finishing their hemp plantings for a variety of research purposes. Three OSU research and extension centers are conducting production research. Here is the brief synopsis of each project.

1. Southern Oregon Research and Extension Center

At SOREC, we are conducting six hemp production research/demonstration trials:

Hemp breeding nursery. OSU is evaluating their own populations for floral and cannabinoid production. We are aiming to give Oregon hemp farmers an opportunity to grow OSU varieties adapted to local environmental conditions in the near future. The eventual hybrid varieties will be developed with yield, water use efficiency and phenotypic stability at the forefront of the selection process.

Commercially available local floral hemp varietal trial. Along with the breeding nursery research, we are evaluating six commercially available varieties that include Lifter Diploid, Lifter Triploid, White CBG, Oregon Sweet Gum, Photo CBD and 252S. For varietal evaluation, we will collect plant height, flower biomass and cannabinoid yield data. From this study, we will learn which varieties can perform best in the Southern Oregon climate, and help growers in deciding what varieties to choose.

Transplanting date effects on flower biomass and cannabinoid yields. This research is a continuation of our 2021 study to test the effects of transplant timing on flower biomass and cannabinoid yields. Four transplant dates (1st weeks of May, June, July & August) with two varieties (Stella and Lifter) were chosen for the experiment. From our previous trial, we learned that timing can influence both the flower and cannabinoid yields, and observed a decrease in production when planting was shifted later in the season. However, variety affected how much yield reduction occurred. We are excited to see whether our previous results are confirmed with this year's research (Figure 1).

Figure 1. Transplanting date experiment plots, 2023. Photo credit. G. Shrestha, Oregon State University.

Hemp biomass trial. This trial is part of a multistate hemp research project, currently conducted in Oregon, Washington, and California. We are evaluating the performance and the possible utilization of hemp for multiple uses, and two floral hemp varieties (Photo CBD and Bubbatonic) were chosen. We have transplanted 50-60 plants per variety (Figure 2). As the season progresses, multiple measurements, including plant height, flower and cannabinoid yields, the fiber in the stem and root biomass, will be taken.

Figure 2. Hemp biomass trial planted in June, 2023. Photo credit. G. Shrestha, Oregon State University.

Irrigation and plant density effects on hemp flower and cannabinoid yields. This research is a continuation of previous studies to test whether the irrigation (0-120 % potential evapotranspiration) and plant density (2,000-40,000 plants/acre) affect the flower biomass and cannabinoid yield levels. From these studies, we will be able to optimize irrigation and plant density rates that can help improve crop yield levels.

Floral hemp dryland farming demonstration plots. This demonstration is a continuation of 2021 study (Figure 3) to test the possibility of integrating floral hemp in the Southern Oregon dryland cropping system. Last year, we established demonstration plots for two varieties (Sour Kush and Photo CBD). We found that plants can able to produce flowers and cannabinoid under dryland conditions (Figure 3). This year, we have established demonstration plots for five varieties including three autoflower type (Blue Genius, Alpha Explorer and Rincon) and two full season type (Sour Kush and Stella) varieties. Both years, seeds were sown using Jang-Seeder with narrow spacing (4 inches by 9 inches) at a depth of 1/2 inch and planted in early May.

2. Klamath Basin Research and Extension Center (KBREC)

Commercially available grain and fiber varietal trials. At KBREC, we are evaluating ten commercially

Figure 3. Hemp dryland demonstration plots in September, 2023. Photo credit: G. Shrestha, Oregon State University.

available varieties that includes four fiber (Bialobrzeskie, F6-3/19 OR21, Altair and Jin Ma), three grain (G7/6-19 OR21, Hlesiia and X-59) and three dual purposes (Henola, NWG 4113 & NWEG 2463) varieties under irrigated system, similar to our trial last year as pictured in Figure 4. For fiber varietal evaluation, we will measure plant height, stem diameter, and collect data on yield components such as biomass and blast fiber yields. For grain varietal evaluation, we will measure grain and protein yields. For the dual type, we will take both the grain and fiber measurements. From this study, we will learn which varieties can perform best in the Southern Oregon climate, and help growers in deciding what grain and fiber varieties to choose.

Figure 4. Hemp grain and fiber varietal plots, 2022. Photo credit: E. McLennon, Oregon State University.

3. Columbia Basin Agriculture Research Center (CBARC)

Commercially available grain and fiber varietal trials. Similar to KBREC, we are evaluating the same grain, fiber and dual-purpose varieties at CBARC but under dryland conditions. From this study, we will learn which varieties can perform best in the Eastern Oregon climate, and help growers in grain and fiber varietal selection.

Nitrogen effects on hemp grain production under dryland system. This research is a continuation of previous studies to test whether the nitrogen rate affect the grain and protein yield levels. From these studies, we will be able to optimize nitrogen requirement that can help improve grain and protein yield level.

All of our research projects are supported by United States Department of Agriculture (USDA) Agricultural Research Service (ARS) Non-Assistance Cooperative Agreement (NACA) Project #2072-2100-054-00-D, and by USDA ARFI Sustainable Agriculture Systems Grant# 13333755.

Hone your skills to minimize crop loss in hemp from beet leafhopper and beet curly top virus

By Govinda Shrestha and Cynthia M. Ocamb, Oregon State University

Become familiar with the following:

Pest monitoring tool kit. Use yellow sticky traps to monitor the beet leafhopper (BLH) population in hemp fields. Establish traps (1-2 traps) 1-2 feet above the ground at the edge of fields and begin monitoring early in the growing season. Usually, the higher the beet leafhopper population, the greater the beet curly top virus (BCTV) impact on the crop.

How the beet leafhopper transmits beet curly top virus particles. While feeding on phloem tissues, BLH ingests the virus from BCTV-infected plants, and then the virus passes into the digestive tract of the leafhopper. The virus enters the hemolymph (the blood-like fluid that circulates in insects' bodies) and viral particles are transported to the insect's salivary glands. Virus particles are subsequently delivered to plants via infected saliva during BLH feeding. The virus doesn't replicate inside the insect body and is not transferred to BLH offspring.

BCTV symptoms on plants. BCTV-infected leaves on hemp plant are distorted, exhibiting curling or twisting, and sometimes having an upward curling of the leaf tips. Plants can be stunted or have shortened internodes along branch tips. Leaves can show coloration changes and be pale green to yellow as well as show a mottling or mosaic pattern (Figure 5).

Figure 5. BCTV symptoms observed on hemp plants grown outdoors in the Pacific Northwest. Photo credits: G. Shrestha and C.M. Ocamb, Oregon State University.

BLH and BCTV weed hosts. Several weed species, including tansy mustard, tumble mustard, and Russian thistle, can serve as reservoirs for both BLH and BCTV.

Managing weeds in hemp fields and along field borders can help to minimize the spread of BCTV to hemp plants and potential crop damage.

Pesticide products. There are no effective products specifically labeled to control BLH on hemp. However, a formulation of kaolin (Surround® WP) is currently permitted for use on hemp in Oregon. It has been shown to reduce BCTV incidence in other crops. Spray kaolin clay every two weeks, starting before BLH is detected or after transplanting through canopy closure.

Contact local OSU Extension Office. Contact your local OSU Extension County Agent for further information about BLH and BCTV. You can also submit symptomatic plant samples to the OSU-Corvallis Plant clinic or OSU-Hermiston Extension Plant Pathology to determine whether BCTV is present in plant and leafhopper samples.

See the newsletter article "Monitoring for beet leafhopper adults helps halt spread of plant virus" that was published in 2022 for more information.

What to consider to minimize root rot and damping-off in hemp

By Cynthia M. Ocamb, Oregon State University

June 2023 has been cooler than normal in parts of Oregon in western and southern Oregon. So far in June 2023, the maximum air temperatures recorded at the Hyslop weather station in Corvallis and at the Rogue Valley International Airport station in Medford have been slightly cooler than the 20-year averages for June at the respective weather stations. The maximum air temperature in Medford has been 92°F for June 2023 so far, while the 20-year average is 99.4°F. The average temperature at the Medford station for June 2023 to date is 76.6°F and the 20-year average June temperature is 80.4°F at this station. The average temperature for June 2023 at the Hyslop station is 73.6°F whereas the 20-year average for June is 76.9°F.

Hemp plants are at a greater risk for root rot and damping-off during cooler conditions, especially when hemp plants are transplanted into beds covered with plastic or if plants are over-watered. Pythium root rot especially is promoted by cooler, wetter soil conditions.

To manage root rot and damping-off, consider the following aspects:

- Monitor seedlings and young plants at least once a week for symptoms of root rot or damping-off (yellowing of foliage, discoloration of lower stem portions, or stunting, wilting, or dying plants).
- If aboveground symptoms are observed, dig up a portion of the affected plants and examine root and crown portions for evidence of rot (discolored tissues that range from grayish to brownish to black coloration).
- Practice optimum water management, especially avoid overwatering younger plants.
- Apply a bio-fungicides to suppress root rot. Follow directions on the pesticide label. See the Oregon Department of Agriculture hemp pesticide guide list at https://www.oregon.gov/oda/shared/Documents/Publications/PesticidesPARC/GuidelistPesticideCannabis.pdf.
- You can also submit symptomatic plant samples to the OSU-Corvallis Plant Clinic or OSU-Hermiston Extension Plant Pathology to determine whether pathogens are present in plant samples exhibiting disease symptoms.

See the newsletter article "Hemp Seedling Diseases and Their Management in the Pacific Northwest" that was published in 2022 for more information.

NEWS and UPDATES

OSU & WSU Hemp Field Days

We are excited to organize the collaborative Oregon State University & Washington State University Hemp Field Days on **July 25 and 26**. In the field day event, we will visit **OSU-Pendleton** (July 25) and **WSU-Prosser** (July 26) research centers and learn about irrigated and dryland fiber and grain trials, an essential oil variety trial, nitrogen management, dual-purpose production systems, current pest and disease issues, and other topics. In addition, we will tour Columbia Basin Bioscience's production fields and processing facility in Oregon and a commercial hemp field in Washington.

The tentative Field Day Agenda is attached with this Link. This is an excellent opportunity for **networking** with the growing Oregon and Washington hemp industries.

This event is free to attend, but registration is required. Lunch will be provided. You may register for one or both days by following this link: https://oregonstate.qualtrics.com/jfe/form/SV_83dhY14fVZj6wUm

Please feel free to share this announcement with your colleagues and others who might be interested to join the event.

We look forward to seeing you on July 25 & 26 for OSU & WSU Hemp Field Days!

Sincerely,

Field Day Organizing Committee
Govinda Shrestha, Gordon Jones, Don Wysocki, and David Gang

Hemp Disease Workshop

OSU Extension hosted a Hemp Disease Workshop in April 2023. The event was created in support of the Western IPM Grant. Here is the link to the recordings.

Western Hemp Train-the-Trainer

OSU Extension hosted a Western Hemp Train-the-Trainer in March 2023. The event was created in support of the USDA NIFA Sustainable Agriculture Systems grant: Sustainably Incorporating Hemp Biobased Economy into Western U.S. Regional Rural and Tribal Lands. Recordings and presentations slides are linked here.