

S1084 Meeting Minutes 2021

Held virtually on 2/11/21

See end of report for attendees list.

Following a call to order, S1084 Chair John Fike asked for vote to approve minutes from 2020 meeting via poll. Minutes were approved.

Bill Richmond, USDA US Domestic Hemp Production Program provided update on USDA's final rule related to hemp. Acknowledged members of S1084 for taking part in the rulemaking process by submitted comments.

Some admin updates: States are able to extend 2014 pilot program, can do so for the rest of the year. Hemp Final Rule not subject to the formal administrative freeze, though administration working on understanding where the rule currently stands. May allow it to become effective March 22 as planned, reopen comment period, or extend the effective date past March 22.

Changes since Interim Final Rule:

Mostly centered around sampling requirements.

Performance based sampling: States and Tribes can include performance-based metrics and goals into sampling requirements. Can consider past performance and use and provide different requirements for research. Still have some baseline requirements for licensing and disposal, but there is now more flexibility to accommodate research in state plans.

More guidance on how to cut samples from plants: samples need to be 5-8 inches in length from main cola; adds requirements around sampling agents and training them; states tribes must publicize who those sampling entities are

Harvest window: Sample collection-to-harvest window is now 30 days extended from 15.

DEA- Labs testing for compliance still need to be registered through DEA, but USDA recognizes the backlog in getting that from DEA so compliance date bumped out 2 years until end of 2022.

Rules around negligence: 0.5 threshold increased to 1.0; above 0.3 needs to be destroyed/remediated, but will you will not be receive a negligence violation if under 1.0.

“Hot” hemp disposal guidance now allows growers to destroy on-site without law enforcement. Also can on-farm remediate: can shred to form biomass and retest. If in range, then can be sold into the stream of commerce. Can also separate flowers for destruction and find buyer for residual material.

Points from Q/A: They are working to get final rule compliant state plans out on the website so everyone can see them.

There is no current limit to how high the THC can be to try to remediate the crop.

Researchers are required to report to FSA, but they are happy to have a conversation about ways to make it less onerous.

Sampling requirements are further detailed in the individual state plans.

Bill Hoffman provided a quick NIFA update. About 218 people now at NIFA so re-staffing continues following the move to Kansas City.

SAS Program in AFRI- Had a special call-out for hemp related proposals. Up to \$10M per project. LOI deadline already passed. If you got one in, keep in mind the recommendations are not binding and you may still submit even if the LOI response was discouraging.

Supplemental & Alt crop program: will fund one grant that contributes to germplasm inventory at USDA <https://www.nifa.usda.gov/funding-opportunity/supplemental-and-alternative-crops-sacc>

NIFA will consider hemp in any relevant program offered, so not limited to those that specifically mention hemp in the RFA.

John McKay/Abdel Barrada National Hemp Research & Education Conference overview: Went virtual but pretty well attended. Recording available as well as the chat and breakout discussions- <http://hemp.agsci.colostate.edu/2020/07/02/national-hemp-research-education-virtual-conference-presentation-recordings> and a summary report is available at a link on the S1084 report page: https://research.ca.uky.edu/S1084_reports.

Larry Smart added that there is a special Issue of Global Change Biology Bioenergy coming out with 5 papers from the conference. Available online now.

Nicole Gauthier update on Disease & Pest Working Group: Working to determine what the pest management and plant health priorities are for research and extension. Received National Plant Diagnostic Network reports from 2014 -2020. Since it is not inclusive of every plant disease or entomological data, they surveyed university and industry diagnosticians, researchers, etc. to see what else might be out there. Goal for 2021 is to publish the findings to identify what the priorities might be and include Canada for a North American perspective. Will be important for grant funding. Need some additional engagement in entomology and regional representation in the North Central and Southwest regions.

Bob Pearce update on dual purpose variety trials: 14 institutions participated. Some challenges- late to get seeds out thus later planting and some stand establishment problems, COVID-19 induced delays and staffing issues. Data was still obtained from several of the locations. 13 entries into the trial; some locations able to source and add additional cultivars. Germination seems to be improving; data were provided before planting to allow for adjustments at locations. Appear to be some seedling vigor also impacting establishment of stands. Results show a few varieties coming out of Canada with grain yields of 1500 lbs/A or more. Didn't break more than 2 tons/A in straw yields, though a couple of locations may have reached an economic threshold for production. Publication of 1st 2 years probably worth pursuing despite the messiness and some missing data. Zach Brym at UFL offered to assist with that. Group needs to discuss the process going forward during the breakout- cultivar selection etc.

Jeff Steiner update essential oil trials: 14 institutions at 16 locations around the country participated. Still getting materials for analysis. Got strong donations from companies to provide seed. Next year will try to focus more strategically on ecoregions and will establish standard evaluation methods. Southern locations also had problems with establishment as was seen in the dual purpose trial. Where establishment was successful, planting with 6 in. spacing and thinning to 12 in. in autoflower or 18 in. for full season types provided good stands when they were achieved. Worked with companies and S1084 members to come up with standard plant growth descriptors and data collection process. 12 cannabinoid profile panels being run on samples collected. Data analysis to come; hoping to have sufficient data to publish after 1st year. Related studies are trying to identify optimal timing for harvest.

Zach Stansell update on National Hemp Germplasm Repository: Permanent curator (Zach) hired and working to hire additional staff, identifying donors of germplasm, and working to navigate the regulatory framework (treating as if they need DEA Schedule 1 approvals). Working on developing protocols for documenting and distributing materials. Looking for opportunities to increase seed and developing a handbook of phenotypic descriptors. The genetics and breeding group of S1084 has already contributed to the repository and Cornell is willing to serve as an initial conduit for which materials can be accepted while determining their compliance for inclusion in the federal resource.

Tyler Mark update on economic landscape for hemp: 2020 saw an increase in licensed acres, but not all were planted into production; likely trend to continue with surplus in floral material. Biomass price continues below \$0.50 average across the country. Refined product prices also decreasing but hasn't seemed to carry forward to retail. Conventional grain holding around \$.50/ lb which is not competitive with other grains considering input costs, though input costs are going down. About 700 crop insurance policies; participation low due to low number of contracts. Not expected to increase in coming year. Getting ready to launch a 36 mo. survey to help identify ways the industry can educate consumers about their product. Lots of other research going on so more information should be available in the next year.

Breakout Groups: Following updates, the participants went to breakout groups around the 4 Objectives. Groups were asked to share progress, major challenges and needs, and identify 1-3 activities to do in the coming year. Groups were asked to report out following the return from the lunch break.

Agronomics & crop quality- Discussed value of the trials as they are currently conducted and how to better coordinate and communicate issues. Top priority to get existing data out in publication. Trials will make an effort to be more coordinated and develop standardized protocols for both agronomic practices and data collection. Also indicated a desire to ensure coordination with the 1890s. There is also a need for more genetic resources more appropriate for southern latitudes. This need was also identified in the Genetics & Breeding breakout. Zach Stansell indicated he was starting international collections and wants to know what people are collecting for trait data currently so that the standard dataset can be developed. NC State herbarium has developed vouchers of their collection that can be shared with ARS.

Economics & Marketing-Talking about the need to better understand the industry structure: roadblocks to overcome to help it develop; vertical integration in hemp vs other industries; US vs international markets. Lots of folks working on surveys and other data gathering activities. There was discussion of integrating production economists into variety trials to better inform the creation of production budgets. Crop insurance & pricing data are starting to be available, but pricing services collect data differently; this group could look into which is preferable. The implication of regulations is another big area of investigation. Trying to merge databases from different states which has some challenges. Would like to develop more decision tools, including production budgets, contracting and crop insurance tools. Montana indicated they might have data to help compare conventional vs organic production.

Genetics & breeding- Access to germplasm, characterization of it and creation of populations or diversity panels to access traits of interest for the various regions is a priority. Talked about meeting again to make priorities for traits for each of the regions to help understand baseline genetics, creating markers for breeding, etc. All need germplasm so group may need to develop a list of what is currently in hand and what is needed to understand the key traits so folks can start doing phenotypic evaluations for traits of highest concern. Need better understanding of how diverse the genetics in hand are to help inform population selection moving forward. One idea that emerged was to look at the list of priority pests and diseases described by the plant protection working group and then looking at what genetic variation exists in resistance to help prioritize breeding for improved disease and pest resistance.

John Fike had a student observe that even though some high pest defoliation occurred in some stands, they saw little loss in harvestable materials. Others are seeing some ability to recover from defoliating events, but pest pressures still had a significant impact on floral biomass. Grasshoppers and fall armyworms have been significant problems. Silvia Rondon noticed mites and aphids with strong host affinities for other plants not establishing on hemp during attempts to do so.

Plant Protection- There is a lot of regional diversity in pest and disease pressures so challenges vary. Will continue cataloging pest and diseases and evaluate frequency, distribution and impact. Goal to have survey out to diagnosticians and growers in the spring. Next highest priority is to look at cultivar susceptibility. Would start with developing rating scales and start with the multistate coordinated trials. Would give standard protocols for scouting and documenting. Plan to have in time for 2021 growing season. That required a discussion about who has the earliest growing season. Alabama indicated that the approval process means usually March or April. Eastern OR also may be as early as March. Pearce hoping to get grain trial seeds out by mid-April.

**Minutes from some of the breakout sessions immediately follow the main meeting minutes.*

Chairman Fike reminded folks about the individual state reports being available on the web link provided and opened up the floor for anyone who wanted to highlight something in particular. Then there was a discussion about the ideal way to report by state. Lesley is to send more guidance for next time.

Then there was a discussion about how best for this group to share documents since last year's Basecamp site was set up. Most people have moved to MS Teams.

Jeff Steiner weighed in to reiterate that impact should be highlighted on the state reports. Anything that can also emphasize the “multistate” piece is important.

Hemp Glossary project overview from Tyler Mark:

This is an effort to provide a common glossary of terms to use across the industry. They looked at all approved state and Tribal plans to gather terms and definitions to cross reference those who use different terminology for the same definition. Will cross reference with new federal Final Rule as well. Internal review complete. Now looking to find the best way to make accessible; currently an Excel spreadsheet which is not ideal. Looking for ideas and volunteers to further review and contribute. S1084 would be a good group to help promote. This is an example of a project that has spun out of S1084 and received NIFA funding. Zach Brym pointed out that some of the technical terminology used by the agronomists (not only for plant components but also for growth stages, etc.) would also benefit from standardization. A couple of folks pointed to <http://www.internationalhempassociation.org/jiha/jiha5201.html> as an existing resource for hemp growth stages that the plant pathology folks are using for their ratings.

Strategic Planning:

The group had an open discussion about planning for the coming year. One suggestion was to put together teams that can go after funding for some activities with synergy to this group. Some thought it might be better for those to bubble up organically out of the group as they have been the last couple of years. Others pointed out that team projects would require significant funding to be worthwhile for many.

There will likely be some opportunities for no-cost leveraging (for example sharing of donated seed for trials) that could be identified.

Lesley Oliver was asked about how the group should consider strategic planning. She pointed out that the group will need to start writing the next 5 year proposal next year so the group should start thinking about what they want their next set of goals to be and how they will be measuring progress on those goals. They should also think about metrics that could be used to measure impact. Also asked the group to think about whether they want to stay broad or if they want to break the next project into more focused pieces to spin out new Multistate projects. AA also suggested that having the objective-specific groups meet on a more regular basis rather than just during the annual meeting.

Tyler Mark and Vermont have been looking at metrics for the industry (net income, C sequestration, etc. across the supply chain) and there might be some measures out of that to consider for the group. ARS project so hopefully will be released there.

Jorge DeSilva suggests having an objective specifically related to C-sequestration and addressing climate change. That is a noted priority for NIFA and the current federal administration.

Chairman pointed out that we don't have lots working on post-process aspects so wondered if there are opportunities for linkages with those folks to work toward traits of importance outside of the field

characteristics. Jian Shi pointed out in the chat that another multistate project S1075 is looking at post processing and bioenergy aspects of multiple feedstocks, including hemp so there may be some potential synergies there <https://www.nimss.org/projects/view/mrp/outline/18521>.

How do we use hemp in rotations and cropping systems to either make hemp work better economically or to achieve sustainability goals?

What changes need to take place in the germplasm from the processing standpoint to have a crop more suitable for processing?

Next meeting: Discussed whether the group would try to meet in person later this year or not, and if so, who might want to host. Oregon may be able to serve as host for the next time we get together. Feb 2022? Other host volunteers are welcomed.

State updates and reports can be found at https://research.ca.uky.edu/S1084_reports.

Attendees

Abdel Berrad abdel.berrada@colostate.edu Colorado State University
Allen Parrish aparrish@illinois.edu University of Illinois
Andrew Ristvey, aristvey@umd.edu U of Maryland, College Park
Biswanath Dari, b.dari@oregonstate.edu Oregon State University
Bob Pearce rpearce@uky.edu University of Kentucky
Calvin Trostle c-trostle@tamu.edu Texas A&M University
Chengci Chen cchen@montana.edu Montana State University-EARC
Chris Ringo Chris.Ringo@OregonState.edu Oregon State University
Debjani Sihi debjani.sihi@emory.edu Emory University
Gary Lopez ghlo222@uky.edu University of Kentucky
Gordon Jones gordon.jones@oregonstate.edu Oregon State University
Heather Darby heather.darby@uvm.edu University of Vermont
Janice Degni jgd3@cornell.edu CCE SCNY DFC
Jason Griffin jgriffin@ksu.edu Kansas State University
Jeanine Davis Jeanine_Davis@ncsu.edu North Carolina State University
John Fike jfike@vt.edu Virginia Tech
John Kaminski kaminski@psu.edu Penn State
Josh Jackson joshjackson@uky.edu UNIVERSITY OF KENTUCKY
Karla Gage kgage@siu.edu Southern Illinois University Carbondale
Kurt Thelen thelenk3@msu.edu Michigan State University
Louis Bengyella lbengyella@psu.edu Penn State University
Louis McDonald Immcdonald@mail.wvu.edu West Virginia University
Nicole Fiorellino nfiorell@umd.edu University of Maryland, College Park
Phillip Alberti palberti@illinois.edu University of Illinois Extension
Raul Cabrera cabrera@njaes.rutgers.edu Rutgers University
Richard Roseberg richard.roseberg@oregonstate.edu Oregon St Univ. - SOREC
Savanna Shelnett ss2655@cornell.edu Cornell University
Shawn Lucas shawn.lucas@kysu.edu Kentucky State University
Shuresh Ghimire shuresh.ghimire@uconn.edu University of Connecticut
Zack Brym brymz@ufl.edu University of Florida

Benjamin Schwab benschwab@ksu.edu Kansas State University
Bill Richmond william.richmond@usda.gov USDA, Agricultural Marketing Service, Hemp Program
Braden Hoch braden.hoch@ks.gov Kansas Department of Agriculture
Dana Ladner dana.ladner@ks.gov Kansas Department of Agriculture
GrahamDavis graham.davis@usda.gov USDA - Domestic Hemp Production Program
JameikaHenderson jameika.henderson@usda.gov USDA/AMS/SCP
Jeffrey Steiner jeffrey.steiner@oregonstate.edu Oregon State University
Jian Shi j.shi@uky.edu University of Kentucky
Julie Hansen jlh17@cornell.edu Cornell University
Kate Tantakis katelyn.tantakis@usda.gov USDA
Liangcheng Yang lyang@ilstu.edu Illinois State University
Shaoqing Cui scui4@utk.edu University of Tennessee
Suzanne Thornsby susanne.thornsby2@usda.gov USDA
Tyler Mark Tyler.Mark@uky.edu University of Kentucky
Wenqi Li wenqi.li@uky.edu Biosystems & Agricultural Department, University of Kentucky
William Hoffman whoffman4@usda.gov USDA/NIFA
Avat Shekoofa ashekoof@utk.edu UT
Chance Riggins cwrigin@illinois.edu University of Illinois at Urbana-Champaign
Craig Carlson chc89@cornell.edu Cornell University
David Gang gangd@wsu.edu Washington State University
Fiona Pexton fiona.pexton@usda.gov USDA
George Stack gms252@cornell.edu Cornell University
Gerald Berkowitz gerald.berkowitz@uconn.edu University of Connecticut
Gerald Myers gmyers@agcenter.lsu.edu LSU Agricultural Center
Jacob Toth jat363@cornell.edu Cornell
Jamie Crawford jln15@cornell.edu Cornell University
Jay Noller jay.noller@oregonstate.edu Global Hemp Innovation Center - OSU
Jessica Lubell-Brand jessica.lubell@uconn.edu University of Connecticut
John McKay jkmckay@colostate.edu Colorado State University
Jonathan Wengerwenge020@umn.edu University of Minnesota
Jorge da Silva jorge.dasilva@agnet.tamu.edu Texas A&M AgriLife Research
Larry Smart lbs33@cornell.edu Cornell University
Lauren Kurtz lauren.kurtz@uconn.edu University of Connecticut
Sadanand Dhekney Sdhekney@umes.edu University of Maryland Eastern Shore
Samuel Haiden samuel.haiden@uconn.edu University of Connecticut
Shelby Ellison slrepinski@wisc.edu University of Wisconsin Madison
Stephen Snyder sis4@cornell.edu Cornell University
Ted Gauthier tgauthier@agcenter.lsu.edu LSU Ag Center
Terri Arsenault terri.arsenault@ct.gov CT Agricultural Experiment Station
Vickie Felder vickie.felder@usda.gov USDA Domestic Hemp Program
Virginia Moore vm377@cornell.edu Cornell University
Wayne Swink weswink@tamu.edu Texas A&M University
Yi Ma yi.ma@uconn.edu UNIVERSITY OF CONNECTICUT
Zachary Stansell zachary.stansell@usda.gov USDA-NPGS
Alyssa Collins aac18@psu.edu Penn State University
Christine Smart cds14@cornell.edu Cornell University
Emily Febles emily.febles@usda.gov USDA

Emma Aronson emma.aronson@ucr.edu University of California, Riverside
Heather Grab hlc66@cornell.edu Cornell University
Joel Felix joel.felix@oregonstate.edu Oregon State University
Kateyn Kesheimer Kesheimer@auburn.edu Auburn University
Kim Leonberger kimberly.leonberger@uky.edu University of Kentucky
Marguerite Bolt mbolt@purdue.edu Purdue University
Marion Zuefle mez4@cornell.edu NYS IPM Program
Nicole Gauthier ngauthier@uky.edu University of Kentucky
Rebecca Engel rebecca.engel@usda.gov USDA/AMS/Hemp Production Team
Rodrigo Werle rwerle@wisc.edu University of Wisconsin
Silvia Rondon, silvia.rondon@oregonstate.edu Oregon State University
Walter Krol walter.krol@ct.gov The CT Agricultural Experiment Station
Zach Hansen zhansen1@utk.edu University of Tennessee

S1084 AGRONOMIC BREAKOUT SESSION MINUTES

Bob Pearce began with discussion points from the national cultivar trial presentation. A number of issues are being faced in the agronomy of hemp and there were questions about the value of large, multi-state multi-variety trials.

Heather Darby expressed support for ongoing evaluations, with new companies given opportunity to see how their plant resources perform.

Several participants spoke to conducting fee-for-service trials, with broad differences in the fee structures and (trial management?)

Bob noted that to be more effective, we need better communication and coordination on trials and

- We are currently not at the point where we can get significant industry funding for varietal evaluation.
- We need to demonstrate success to show more value of such a program to industry partners.
- to that end, uniformity of protocols is needed

Heather made a pitch for a pre-season meeting with a webinar to discuss our research activities/protocols. Bob agreed to get such a meeting coordinated within the next few weeks.

Calvin Trostle noted that lack of industry understanding around photoperiodicity and the performance of different plant materials by latitude. The group agreed that having industries “at the table” in discussion and collaboration to explore GxE with respect to photoperiodicity would be valuable.

Heather noted that some of our difficulties in understanding hemp variability in the field may come down to plot-to-plot variation that is masked when measuring variables such as soil nutrients and pH at a field scale.

The agronomy group needs to keep some consideration of what varieties need “tossing” from evaluation after a period of poor performance. In general, we need a process for determining how to

accept entries into cultivar trials. How many entries will we accept? We also need to have better measures of plant emergence and seedling vigor and its relationship to seasonal productivity.

These factors will be part of the “hard conversation” needed/to take place regarding plans/methods/and evaluation.

Primary goals for our group are to:

1 – Publish 2019/2020 data – with some significant reflection on what didn’t work and why

2 – Meeting in Feb 2021 among collaborators to determine steps forward

3 – Standardization of protocols as much as possible. Develop a secondary set of protocols for agronomic management (seeding rates, seed depth, planting dates etc.) to help in establishing BMPs for trials.

- Richard Roseberg noted it’s critical to get our protocols well-honed before we trying to engage larger evaluation efforts
- There also was a suggestion that we work with Zachary Stansell to have some conformation of our measures and descriptors with the phenotypic data used with GlobalGrin

4 – Engage with 1890 and 1994 Land Grant Institutions

Two systems that may be useful to look at (discussed in the afternoon general session) include:

Decimal code for hemp growth stages:

<http://www.internationalhempassociation.org/jiha/jiha5201.html>

Description of flower development:

<https://www.authorea.com/users/360584/articles/483690-the-cream-of-the-crop-biology-breeding-and-applications-of-cannabis-sativa>

Plant Protection Breakout

Attendance, introductions, and state updates/challenge areas

Christine Smart – Cornell University. Pathology. Downy mildew in field trials. Fewer leaf spots than most states report. Disease surveys across 60 host genotypes. Research area: genetics of downy mildew and powdery mildew, requests isolates. cds14@cornell.edu

Alyssa Collins – Penn State. Pathology and agronomy. Stem rots and establishment issues problematic, stem borers. Research projects: damping off (grain and fiber), spotted lanternfly susceptibility. Collins@psu.edu

Marion Zuefle – Cornell University. IPM and entomology. Scouting of all hemp statewide. Common identification of downy mildew, Bipolaris, Septoria, gray mold, white mold, damping off, cannabis aphid, flea beetle, common stalk borer, corn earworm. A lookalike “earworm” *Heliothis phloxiphaga* was identified in 17% of the populations. mez4@cornell.edu

Silvia Rondon – Oregon State. Entomology. Eastern OR where conditions are dry. Wireworms a major pest. Research area: pesticide screening of organic products, esp for mites, aphids, and corn earworms. Interest in beet leafhoppers, which transmit phytoplasma and beet curly top virus. silvia.rondon@oregonstate.edu

Marguerite Bolt – Purdue @ Indiana. Entomology and agronomy. Commonly identified corn earworm, Eurasian hemp borer (esp in feral hemp), cannabis aphid, caterpillars, mites, root rots, downy mildew, and rust. mbolt@purdue.edu

Nicole Gauthier – Univ of Kentucky. Pathology. Fusarium bud blight are increasingly more widespread. Mycotoxins have been identified but not quantified; research ongoing. Increased monitoring of leaf spots and root rots: Septoria leaf spot and southern blight caused the most disease losses. Other interests are molecular diagnostics to confirm and validate reports and study of cross infections in crop rotations. ngauthier@uky.edu

Kaitlyn Kesheimer – Auburn Univ @ Alabama. Entomology. Study of corn earworm/cotton bollworm; trapping experiments, need thresholds for hemp. Other losses by bud rots, fire ants, southern blight, yellow stripe armyworms, and soybean loopers. kesheimer@auburn.edu

Rebecca Engel – USDA @ DC. Public face of hemp programs, reporting. rebecca.engel@usda.gov

Emily Febles – USDA. State hemp programs. Emily.febles@usda.gov

Action Items

Determine priorities by cataloging pests and diseases. Evaluate frequency, distribution, and impact of arthropods and pathogens/diseases. This is an ongoing project. Timeline: survey to growers and diagnosticians April 1; analyze data July 1; draft reports and manuscripts Sept 1; submit manuscript(s) Dec 1. Point of contact N. Gauthier and A. Collins.

Cultivar susceptibility to pests and diseases. Standardize protocols and rating for pests and diseases. Make available for uniform trials (aka multi-state trials) and eventually for all trials. Work with agronomic and breeding groups. Earliest planting dates Feb-March; make available as soon as possible (target April 1?). Point of contact C. Smart, M. Zeufle, K. Kesheimer.

Future

Next 5-year plan due for multistate group. Consider objectives for future and how we will collect metrics for those objectives.

Resources mentioned

<https://pnwhandbooks.org/insect/>

<https://agbio.agsci.colostate.edu/people-button/faculty/punya-nachappa/>

<https://apsjournals.apsnet.org/doi/full/10.1094/PDIS-01-19-0098-PDN>

<https://apsjournals.apsnet.org/doi/10.1094/PDIS-91-2-0227C>

<https://scialert.net/fulltext/?doi=ppj.2011.161.167>