



Insight

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New Entomologist on Board with Mint Projects

In an introductory article available on a University of Idaho website, Assistant Professor Justin Clements said his research focus is on entomological concerns of cropping systems in the Treasure Valley.

Fortunately for mint growers, mint production is one of those cropping systems.

Clements, now in his second year at the Parma Research and Extension Center, is working with Washington State University Professor Doug Walsh on two mint projects in 2021 and he expects to be involved in many more in the future.

"It is a good thing for the mint industry when you have an early-career scientist like Justin who is interested in mint and wants to do research that is pertinent to the industry," said Steve Salisbury, research and regulatory coordinator for the MIRC.

"Also, Justin has some experience working in mint while he was a graduate student at the University of Wisconsin. So, it is exciting to have somebody who has mint in their research background come out West, particularly to Idaho, which is one of the hot spots for mint production right now, who wants to do more work in the crop," Salisbury said.

Walsh, whom Salisbury describes as "the go-to researcher" when it comes to entomological concerns in mint, said he too was excited to have Clements on board.

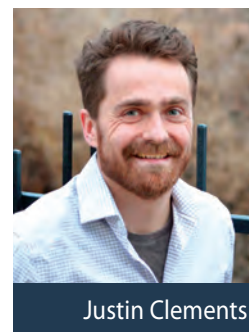
"Justin brings a unique skill set that fills a need that we have here in the Northwest," Walsh said. "He has strong skills in molecular methods.

"It is a perfect partnership between the two of us," Walsh said.

In his first two mint projects, Clements and Walsh will be looking at spider mite

management in peppermint and working on the development of a novel pheromone mating disruption pest management strategy to proactively control mint root borer.

Clements, who holds a doctorate in molecular and environmental toxicology from the University of Wisconsin-Madison, said pheromone disruption has been relatively successful at controlling other species of moths in crops such as apples. He and Walsh thought developing a novel pheromone mating disruption program for mint root borer could provide a new pest management approach for mint producers.



Justin Clements

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“Doug (Walsh) has a lot of experience with pheromone disruption, and it is something that he is interested in working on,” Clements said. “So, we started talking about would it be practical to develop a pheromone confusion model in mint in both Washington and Idaho in collaboration with Trece, Inc., who is going to generate the pheromone lures for us.”

The researchers will be placing lures at different concentrations in multiple producer fields in hopes of understanding if the concept works and, if so, what concentration and number of lures is necessary to disrupt mating.

The researchers are using trap counts to determine the success or failure of the experiment.

“At some point, there should be enough lures to where the insects will become

confused and we won’t be trapping anything,” he said.

“It is an interesting model,” he said, “and if it is something that seems practical and if it shows promise in the first year in this smaller test set, we are going to look for more funding through multiple state USDA block grants to figure out appropriate rates and timing.”

He added that mint root borer can be a hard pest to tackle because of its life history and its sporadic distribution in a landscape.

In the second project, aimed at spider mite management in peppermint, he and Walsh are looking at miticide resistance in spider mite populations in mint.

“Mites collected from hops and other cropping systems have shown resistance to miticides and we would like to see

if the same is true in mint,” Clements said. “We are trying to figure out if we are seeing similar phenotypes in mint and looking for similar patterns of what could be considered resistance.”

Clements’ part of the experiment involves genetically screening different mite populations in Idaho and Washington for known markers of miticide resistance to commonly used miticides.

“We are trying to be proactive and make sure that all the chemistries in mint still work effectively,” he said.

As in the first project, Clements said he and Walsh will analyze results after the season is complete and determine next steps. “If we can find some unique data, I think we will apply for more years of funding,” he said.

SAC Meeting Virtual; 2022 Annual Meeting In-Person

Ongoing concerns over coronavirus have prompted the Mint Industry Research Council (MIRC) to go virtual for the fall meeting of the Scientific Affairs Committee, but then things open up and the Council is going in-person for the 2022 Annual Meeting in January.



“At this point, being unclear about the travel availability of some of our corporate members, we decided to hold tight for one more meeting,” said Bryan Ostlund, administrator of the Council. “We decided we can do the SAC meeting virtually, and then we will be back all together for the annual meeting come 2022.”

Ostlund said he is disappointed not to be meeting in person in September but is looking forward to getting back together as a group in January.

“Part of the beauty of these organizations is bringing companies and individuals together,” Ostlund said. “And I learned a long time ago not to discount the social aspect of that.

“It is just so important for those who are involved in groups like the MIRC to actually have those conversations that are

not part of a Zoom call, but are sidebar conversations in the hallway; friends keeping up with friends or just talking about industry issues that are not in front of a roomful of people,” Ostlund said.

“The face-to-face contact is very important,” he said, “and, yes, we can get through one more SAC meeting by Zoom, but boy, looking into January 2022, I think the vast majority of those involved with MIRC will welcome coming together again in a single location.”

The 2022 Annual Meeting is scheduled for January 26 and 27 in San Diego at the Kona Kai Resort and Spa, 1551 Shelter Island Drive, San Diego, California.

For more information on rooms, rates and other meeting information, go to www.usmintindustry.com/meetings.

Researcher: Continuous Flow Distillation System Has Merit

A continuous flow distillation system for mint developed by Scott Sanford, a retired agricultural engineer for University of Wisconsin-Madison Extension, has merit. But it will take some additional work before it is ready to be rolled out for commercial use.

“It works as far as extracting the oil,” said Sanford, emeritus distinguished outreach specialist for the university’s Extension service. “The problem we found – and it took us a long time to figure out what was going on – is that we are getting dust or small particles exiting with the steam and it acts like an emulsifier. So, it makes the water and oil mix into a sludge and then you can’t separate the stuff.”

The issue, Sanford believes, could be resolved with something as easy as a minor tweak. But he won’t be the one to resolve it.

“I think it can be overcome,” he said. “It may require some kind of trap system or a redistillation system, but we ran out of time and money to try to solve that issue and since then, I have retired. So, it is probably going to be in somebody else’s court to work on it in the future.”

Sanford said the system has many positives, including that it distills mint at a rate similar to existing systems but

with less energy. And, he said, the harvest moisture of the mint is less crucial than in standard systems, because the auger is moving and turning the hay as it passes over the steam inlets. “We processed green cut mint without a problem. This could be a big advantage because the crop doesn’t need to lay for days to dry with the risk of getting rained on,” he said.

Also, he said, “Comparing with what the grower (involved in the experiment) was getting in oil yield with what we were getting, we were looking at about at least a 15 percent energy savings over that grower’s conventional method,” Sanford said. “So, there is a possibility that it could save some energy, which was the main reason we were trying it.”

Sanford’s system utilizes a Groen screw conveyor that was modified with a steam tight cover and inlet and outlet augers that block steam vapor from escaping. The feed rate into the unit, as well as steam pressure, temperature and rate and mint hay throughput rate can all be adjusted to match crop conditions, he said. The Groen screw conveyor features an 18-inch ribbon auger that mixes the hay as it translated through the chamber to get good steam contact, he said. A Newhouse Manufacturing condenser unit with a PY-250 pyramid separator was used for oil separation.

He first tested the system on a university research farm in 2016, 2017 and 2018 before taking the system to a local mint farm for testing in 2019. Along the way, he made several changes.

Early on, for example, hay was wrapping around the inlet feed and ribbon augers and so he adjusted the length of the cut on the hay. He also tried some screen filters to try and eliminate the issue with the oil and water mixing, but wasn’t able use a screen with a fine enough mesh to solve the problem.

“And then, by the time we figured out our problem, we basically ran out of harvest,” he said.

To date, the research has been

conducted with a specialty crop grant from the National Institute for Food and Agriculture, which, at the time that he secured the grant, wasn’t requiring matching funds. NIFA today is requiring matching funds for its specialty crop grants, which could present a hurdle for anyone trying to move the research forward.

The MIRC has provided no funding for the research, but submitted a letter in support of the project as part of Sanford’s application to NIFA.

Sanford said he hopes to sell the materials he has developed for the system.

“It has a Newhouse condensing unit and the continuous flow distillation unit all ready to run,” he said. “If somebody is interested in it, they can contact me and we can probably get a whole package together for them.”

He added, “It took me two years to get the thing to work. We had to upgrade motors and chain drives. It takes time to figure some of this out.”

A paper on the system titled, Essential Oil Extraction Process Engineering for Improved Energy Efficiency, can be accessed on the website of the American Society of Agricultural and Biological Engineers, www.asabe.org. Search for Paper Number 2001174.

Interested parties also can contact Sanford by email at sasanford@wisc.edu.



Scott Sanford



States, Alberta Back Research Projects

Financial backing from mint-growing states and a Canadian province this year is helping advance several research projects that could be beneficial for the mint industry.

Projects looking into spider mites, mint root borers, weeds, nitrogen management, water management, nematodes and *Verticillium* wilt are receiving backing this year from individual state commissions and the Alberta Mint Growers.

In addition, the Oregon Mint Commission fully funded the national research project proposed by Oregon State University scientists Kelly Vining and Jeremiah Dung to inform mint-breeding for *Verticillium* wilt resistance through use of DNA.

The funding is over and above what the states and the province already provide the Mint Industry Research Council (MIRC), a fact that is resonating with mint researchers, according to Steve Salisbury, research and regulatory coordinator for the MIRC.

“These local organizations are basically showing the research community that they are very passionate about their industry and they are very willing to engage the research community to improve their industries by offering

funding above and beyond what they are already providing to the MIRC,” Salisbury said.

“Even in lean times, these folks are still saying we want to help more than what we are already providing through our standard assessments to the Council (MIRC),” he said. “And the research community, they certainly sense that passion and they appreciate that support.

“I think that helps contribute to not only accountability, but also to the level of engagement that the research community feels they have with the industry,” Salisbury said. “Because of that, I think the researchers are going to be more apt to have those candid dialogues and conversations with growers to get their input and make sure they are proposing projects that are practical and directly applicable to the industry.”

The Washington Mint Commission, Idaho Mint Commission and Alberta Mint Growers are jointly supporting two projects led by Washington State University entomologist Doug Walsh and University of Idaho entomologist Justin Clements. The first involves development of a novel pheromone to disrupt mating activities of the mint root borer. The second involves spider management options in peppermint.

The Washington Mint Commission is backing a project put forward by Walsh and fellow WSU researchers Troy Peters and Ray Baker on nitrogen and water management on spearmint. And, along with the Alberta Mint Growers, the Washington commission is funding a project on weed research in mint. The Alberta Mint Growers also are funding a project on management of nematodes and *Verticillium* wilt in mint grown in Eastern Oregon and Idaho, which is being led by University of Idaho nematologist Saad Hafez.

“It is always refreshing to see such commitment and cooperation between the states and Alberta,” said Bryan Ostlund, administrator of the Oregon Mint Commission and the MIRC. “By pooling resources and working together, we have a better chance of ensuring we can produce top-quality mint in an economically and environmentally friendly fashion.”

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*Bryan Ostlund,
Administrator, MIRC*

Four New Directors on MIRC Board

The 2021 MIRC Board of Directors includes two new corporate members and two new grower members.

On the corporate side, Sean Li, Global Category Director for Mars Wrigley Confectionery, has replaced Srikanth Ramachandran as his company’s representative, while Marcus Smith is now representing Norwest Ingredients.

On the growers’ side, Scott Setniker is replacing John Reerslev as the Oregon Director, while Scott Kempley is replacing Dennis Zeloski as the Wisconsin Director, a post Zeloski held for more than 40 years.



Seven Projects Tabbed for AdvanceMint Awards

In Indiana, a mint grower is looking to eliminate all electricity usage on his irrigation through an investment in solar energy. In Washington, a grower is looking to improve nitrogen and water management in an environmentally and economically beneficial manner.

Both of these ventures are receiving backing from the popular Mars Wrigley AdvanceMint program in 2021. The program, which is designed to encourage and promote sustainable mint farming and distillation, awarded funding to seven projects this year.

In the Washington project, grower Todd Wheeler has been working for two years now with Washington State University on a project to study the interaction of nitrogen fertility and irrigation quantity.

The idea is to see if a grower can reduce irrigation and nitrogen inputs without compromising oil yields and oil quality, while producing increased amounts of oil yield per ton of mint hay, according to the project application. If that is the case, a farm may be able to improve net revenue by decreasing costs for fertilizer, as well as reducing the amount of hay that needs to be moved from the field to the still.

Environmental benefits from the project include a decrease in the potential for groundwater contamination with nitrates, which is a concern in the lower Yakima Valley site of the farm. And, if successfully implemented, the strategy will lower carbon emissions by reducing the amount of hay moved from the field to the still and the amount of propane needed to distill the mint oil.

"This project will provide both the realization of immediate short-term benefits, as well as long-term benefits to the sustainability of spearmint oil in the Pacific Northwest," wrote Wheeler in his AdvanceMint application.

In Indiana, Randy Matthys was looking to get to net zero on Shady Lane Farms'

mint irrigation. The project, which was scheduled to be in place for the 2021 growing season, will cover irrigation systems that currently irrigate 172 acres of mint, with the potential to irrigate 774 acres.

"Through the investments of solar panels on acres with all electric irrigation systems, we will be off-setting our electricity usage via a renewable clean energy," Matthys wrote on his application. "The 25-30 year life span of the panels will allow Shady Lane Farms to run our irrigation systems for the next several decades with little to no carbon footprint on our environment. In addition, the economic impact for us to produce our own electricity will lower our cost per irrigated acre over time. This will not only save us money on electricity usage, but also make us more competitive in terms of production costs.

"Furthermore," Matthys wrote, "as fourth generation mint farmers, we can combat climate change in a positive way for the next generation."

Jeremy Schifeling, of Mars Wrigley, said this year's program had a record number of applicants, providing an indication the program is moving in the right direction.

"To me, the goal was to push the industry, to get the industry thinking about sustainability, and I think it definitely is going in a good direction," Schifeling said. "There have been some very interesting projects."

He added that prior to starting the program, he talked to several farmers who had expressed an interest in adopting sustainability practices, but were hesitant to do so because of initial cost layout and the time involved to implement the projects.

"So, our idea was if we could take a little of the cost out, would they do it, and a lot of growers said they might," Schifeling said.

He noted the program had been getting about a dozen applications a year for its first four years. This past year, it fielded more than 20.

In all, the program has provided more than \$500,000 to the industry over its five years.

AdvanceMint will be accepting applications for 2022 from September 1 through December 15 of this year.

**2022 AdvanceMint
Applications Accepted
September 1 Through
December 15, 2021**

**VISIT:
usmintindustry.com**

According to a Mars Wrigley information kit, examples of farming practices that qualify for the awards include: distillation efficiency improvements; general water-use reduction; water irrigation efficiency improvements; cover crops; till vs. no-till; water conservation plans; natural gas-line installation; liquid propane vs. diesel fuel; improved soil testing; and pesticide and fertilizer management plans.

As part of the eligibility requirements, award recipients agree to report on impacts on farming practices within one year after the practice has been implemented. Successful applicants also must agree to submit information on their farm and farming practices to FieldRise, a national program that measures farm stewardship across commodities.

Among other criteria, a team of four judges will evaluate applications based on the proposed project's environmental, social or economic impact; ability of the practice to be adopted; and whether the entry provides sound methods for achieving tangible results.

Only farms located in the U.S. and Canada are eligible for the awards.

For more information on applying, contact the MIRC or Schifeling at Jeremy.Schifeling@effem.com.

Chairman's Report

Dana Wendel, Chairman of the Board

As we start to move through what we hope are the final stages of COVID, I just want to make sure MIRC membership is aware of a couple of things.

First, even with relaxed CDC guidelines there remains uncertainty about individual travel and travel restrictions within the corporate environment, including questions over whether folks will even be allowed to travel due to continued corporate restrictions. We've chosen to again go virtual for one more meeting, the Scientific Affairs Committee (SAC) meeting in September this year. After that, plans are to return to in-person meetings, starting with our 2022 annual meeting, January 26 and 27 in San Diego at the Kona Kai Resort and Spa.

Secondly, I think that what we have been through with this whole unfortunate

situation with COVID, including the disruptions we have encountered both here in the U.S. and among our global partners, makes us appreciate the value of the MIRC. We are looking forward to getting back to our normal role of bringing people physically together to our meetings; not just doing things virtually, but actually having time to interact, talk to each other in the hallways, interact at the committee level and the board level. It has become so very clear how important that is to the inner workings of the industry and our members and the business of mint, and what we all do and what all of our roles are.

I also just wanted to say thank you to Mars Wrigley Confectionery for continuing to fund Advancemint and the grant awards that were announced earlier this year. For many years now, that program has brought tremendous value

for growers to upgrade equipment and do some innovative, progressive things on the farm. It is all about sustainability and lowering our footprint in water and carbon, based on fuel, and Mars Wrigley has done an outstanding job of helping us meet those goals.

You'll find a story on the 2021 Advancemint awards on page 5 in this newsletter.

Have a safe second half of 2021, and I look forward to seeing many of you next January at our annual meeting.



Dana Wendel

Mint Industry Research Council

Save the
DATE

^{44th}
Annual Meeting

San Diego
CALIFORNIA

JANUARY 26-27, 2022
KONA KAI RESORT & SPA

Visit usmintindustry.com
for more information

Hotel Reservation Deadline: December 30, 2021

Research & Regulatory Update

Steve Salisbury

One of the critical tasks that the MIRC is committed to is maintaining the industry's mint motherbeds. The purpose of the motherbeds is to maintain an original source of disease-free cultivars to ensure the genetic integrity of root starts that are used by propagators and ultimately mint growers. This program has been successfully in place for several years. Jolene Brush, JB Lab in Montana, continues to do a great job managing our motherbeds and we appreciate all of her efforts to provide meticulous care for the mints.

Each year Jolene tests all the plants and tissue cultures for diseases to ensure disease-free materials. An interesting development occurred in 2020 while carrying out the lab diagnostic testing. Let's begin by stating that the samples were sent to a "new" lab at Montana State University (MSU) rather than the regularly used diagnostic lab at MSU who has the most familiarity with mint diseases. This change was necessary due to changes and logistical reasons with the original lab. So, this year's samples were analyzed in the new diagnostic lab.

The results came back that several samples from potted plants tested positive for *Verticillium*, which of course sent a shockwave through everyone. However, all the plants were asymptomatic. There were no changes made in the management and/or supplies and protocols that have been in place for many years. The one variable was the lab. We decided to send samples

of the pots in question to Dr. Jeremiah Dung's lab at Oregon State University – Madras. Jeremiah was willing to run diagnostics, which would confirm if we truly had a problem.

The samples in question were both plated out and sent for qPCR DNA analysis. The good news was that most all were negative for *Verticillium*. There were two, M-83-7 and Scotch 770, that were positive for *Verticillium*, but plate analysis did not indicate it was *V. dahliae*. The qPCR results confirmed that this was not *V. dahliae*. The motherbed plants continued to be asymptomatic.

Diagnostic results indicated that this was *Verticillium tricorpus*. The DNA analysis matched the results of the lab as *V. tricorpus* as well. An additional *V. dahliae*-specific qPCR test was conducted and came back negative.

Therefore, we confirmed that there was no *Verticillium* issue in the motherbeds, which is what the plants continued to indicate by remaining asymptomatic. So, in the end, there is no problem in the motherbeds and this was a misrepresentation of the diagnostics from the new lab. Good news. Happy ending.

Going forward, we are discussing switching the motherbed disease testing to the Dung lab for future testing. While this may result in a little more time in sample shipments and possibly a little more expense, the tradeoff is that we have a great deal of confidence in

Jeremiah and his lab. His expertise in plant pathology, *Verticillium* and mint are really ideal for our industry to have help in caring for our motherbeds.

With the retirements of Drs. Bill Grey at MSU and Dennis Johnson at WSU, Jeremiah is certainly the go-to pathologist for our crop. Fittingly, Jeremiah completed his Ph.D. under Dr. Johnson's tutelage. We appreciate his expertise and enthusiasm.

So, the question from all of this, "What is *V. tricorpus*?" Jeremiah looked into this species to answer that question. Interestingly, *Verticillium tricorpus* has been documented as a potential biological control agent for plant pathogens such as *Verticillium dahliae*. No kidding! The fact that both the M-83-7 and Scotch 770, both known for their improved growth and yield performance in the presence of *V. dahliae*, may in fact have something to do with the presence of *V. tricorpus*. They were the only two cultivars that tested positive for *tricorpus*, while also testing negative for *dahliae*.

Jeremiah is interested to look further into this and may do some preliminary work in his lab to study this interaction. This exercise may lead to a future MIRC proposal for research. It is certainly something worth looking into.

At the end of the day, our motherbeds are still in excellent shape and in good hands. Furthermore, due to a misinterpreted lab analysis which triggered extra testing, we found a potential new vein of research in the world of *Verticillium*.



Steve Salisbury

MIRC is now on Twitter

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P.O. Box 4059, Salem, OR 97302

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Research & Regulatory Coordinator

Steve Salisbury
PO Box 483, Sublimity, OR 97385
503-551-3747 • steve@pacificagresources.com

Administrators

Bryan Ostlund & Shawn Anderson
P.O. Box 4059
Salem, OR 97302
503-371-5936 • bryan@ostlund.com • shawn@ostlund.com