



Insight



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UC Davis Genome Center Offers Unparalleled Expertise

Last year, when UC Davis Genome Center geneticists Isabelle Henry and Luca Comai began working with the MIRC, the Council brought into play many world-renowned researchers and an unparalleled amount of expertise in genetic research.

"I think the biggest advantage we have is having expertise right here in the building," Henry said. "Many of these scientists have been here for a long time, so we know each other very well. It is extremely convenient to be able to just walk downstairs and discuss experiments in person."

Formed in 2003, the UC Davis Genome Center harbors research laboratories, as well as core facilities that provide services to the research community at large and enable geneticists like Henry access to cutting-edge research equipment and associated expertise.

Specifically, there are four facilities hosted in the UC Davis Genome Center: 1) the DNA technologies core (broadly related to DNA sequencing); 2) the proteomics core (related to protein analysis); 3) the metabolomics core (aids in cataloging and characterizing

metabolites in samples); and 4) the bioinformatics core (dealing with analyzing large datasets, often produced by the other three cores). Each of these cores is managed by a technical director

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and staffed with experts in their specific fields.

The center enables Henry to brainstorm with scientists from other fields who also are housed at the center, she said. “We have access to incredible expertise in the Plant Biology Department, and we also have contacts within the Genome Center with faculty from other departments,” Henry said. “You could say we are ‘cross-pollinating’ our respective fields, which allows us to brainstorm together to solve similar problems, even though we are working on completely different organisms.”

Henry added that genetics research is moving very quickly, so it is nearly



Isabelle Henry

impossible for one person to be up-to-date on all the different areas of expertise and technologies. Members of the Genome Center are fortunate to benefit from so many experts on site, enabling the researchers to keep up on trends and protocols.

“The fields of genetics and genomics is vast. However, while scientists tend to focus on specific areas or work on certain organisms, they often use many of the same techniques and tools,” Henry said.

“At any point we can collaboratively determine the best path,” Henry added. “By discussing how much it will cost, how long it will take, the pros and the cons, etc., we can then quickly come up with a design and submit our samples.”

The center’s day-to-day operations are funded primarily from grants and outside sources brought in by the center’s scientists, of which a certain percentage goes to the operation of the Genome

Center. This includes occasional investment in expensive equipment.

“The administration has done well with its investments,” Henry said. “Many of these machines are very expensive, and turnover in those technologies is very fast, so these sorts of decisions are risky.”

“Overall, the Genome Center has had good foresight, investing early in technologies that have proven successful in the long run,” Henry said.

The MIRC funding for Henry’s research, incidentally, bypasses administration costs and goes directly to her lab, thanks to a special agreement with UC Davis administration.



Luca Comai

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State-of-the-Art Lab Coming to Parma Research Station

Researchers at the University of Idaho Parma Research and Extension Center, site of several mint research projects over the years, will have a new, state-of-the-art laboratory to work out of as early as next fall.

Station Operations Manager Mike Kiester said the Idaho Center for Plant and Soil Health will be a significant upgrade from current facilities, which were built some seventy or eighty years ago.

“Most of the labs on this research station were originally built in the 1940s and 1950s,” Kiester said.

Kiester said that the lab currently being used by nematologist Saad Hafez originally was a machine shed in the 1950s and was converted to lab space in the mid to late 1980s with an expected life span of only ten years.

“This new research facility will provide state-of-the-art technology, as well as a new opportunity for the future of Idaho mint research.”

Roger Batt,

Idaho Mint Growers Association

“This will update the facilities and bring in a state-of-the-art lab,” Kiester said. The new lab will house nematology, pomology and plant pathology, with other programs utilizing space when needed, he added.

“It will be a lot easier whether working in mint or potatoes or onions or other crops on the station to have everything available in one spot,” Kiester said. “It should be a nice facility for researchers to do their work.”



Architect rendering of the Parma Research Station



Architect rendering of the front entrance of the Parma Research Station

The building's cost, which was originally pegged at \$7 million but which has since increased, is being funded by a consortium of interests, Kiester said, including Idaho commodity commissions, private donations, university funding and state funding approved by the Idaho Legislature. The Idaho Mint Commission is among the funding sources, Kiester said.

Roger Batt, Executive Director of the Idaho Mint Growers Association, which lobbied the Idaho Legislature for funding for the lab, said the Idaho mint industry

is excited about the construction of the building.

“This new research facility will provide state-of-the-art technology, as well as a new opportunity for the future of Idaho mint research,” he said.

Workers began construction on the approximately 10,000 square foot facility in early August. Provided there are no problems with supply-chain issues, construction is expected to be completed in October 2023.

How Mint Attracts Researchers to Address its Issues

As a commodity, mint, grown on less than 70,000 acres in the U.S., is the poster child for a specialty crop. Still, despite its limited footprint, the industry has long been able to interest researchers in investigating production issues.

The MIRC Newsletter recently asked Oregon State University plant pathologist Jeremiah Dung, who also is the interim director at the Central Oregon Agricultural Research and Extension Center, how mint is able to compete with other crops for research.

In some cases, particularly in areas where mint is grown, mint attracts research simply because of proximity, Dung said. “From the perspective of an Agricultural Experiment Station, many times our research objectives are directly related to the crops grown in the area we are located in,” Dung said.

Still, Dung said, even within the three-county area covered by the Central Oregon station, which is home to a measurable amount of mint acreage, multiple crops, including high-value

crops, are produced, and attracting research can be difficult.

“At some point, there is only a certain amount of funding available and that can only support a certain amount of research,” Dung said. “So that is where the competition might start in terms of researchers looking at other commodities to work in.”

While the cost of supplies and consumables have gone up considerably over the last few years, much of the expense in research still lies in paying for personnel, Dung said, including paying for graduate students that help with projects or post-doctoral positions or, in some cases, a research assistant more permanent in their tenure.

One way that researchers can get around funding limitations, Dung said, is to look for federal funds that can be used to answer bigger questions than a targeted research project might offer up. The research could benefit the mint industry, but maybe also answer some questions that can be valuable for other crops as well.

“That is a good strategy that researchers often use,” Dung said. “And in many cases the research dollars that are provided by commodity commissions and grower groups are used to explore ideas that can be developed into these bigger grants.

“If you can leverage other crops, other states that grow mint, and work with other researchers that can help answer questions with their research priorities, that can enhance the research that we are already doing,” he said.

On the plus side for mint, according to Bryan Raudenbush, a physiological psychologist at Wheeling University in West Virginia, mint is used in a lot of products, a fact that can draw interest from multiple industries.

On the down side, there simply isn’t a lot of mint produced in the U.S., especially when compared, for example, to the 96 million acres of corn produced in the U.S.

Also, on the plus side for mint, according to Dung, is the work of the MIRC. “The MIRC is a really good model in my opinion,” Dung said.

“They are very committed to supporting and conducting research that is relevant to the growers. I think that is where they excel, because they have such a thorough review process that incorporates stakeholders at all levels of the industry,” he said.

“They are trying to address questions that might be production related or market related,” he said. “So, it is a nice model in terms of how democratic it is, who is involved and the voices that are heard.”

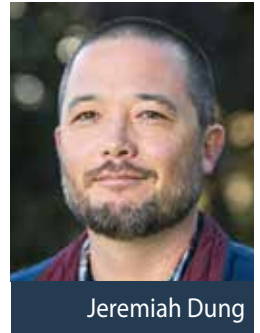
The production issues faced by the mint industry are not easily resolved, Dung said.

“The MIRC has been doing this for many years, and *Verticillium* wilt or some of the issues that they are trying to address are very difficult issues. Other commodity groups, larger commodity groups like potato, are still dealing with *Verticillium* wilt issues, so I think the issues the mint industry faces are not easy ones,” Dung said.

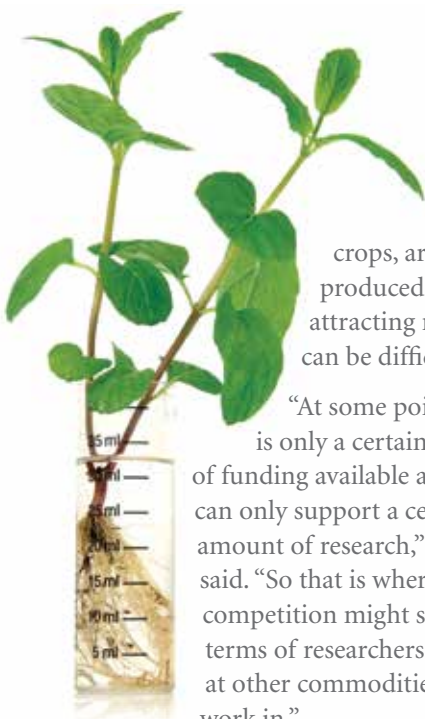
Dung, who has been researching *Verticillium* wilt in mint for many years, said mint is a significant part of his research portfolio at the Central Oregon Agricultural Research and Extension Center in Madras, Oregon.

“Our projects vary from year to year, but typically we will have between two to five projects related to *Verticillium* wilt in peppermint,” Dung said. “I consider it an important part of my program.”

Dung will provide an update on his research at the MIRC Annual Meeting, being held January 25 and 26 in Charleston, South Carolina.



Jeremiah Dung



The Many Benefits of Fragrance Research

Since 2018, the MIRC has funded research by Bryan Raudenbush, a physiological psychologist at Wheeling University in West Virginia, into the sensory effects of mint fragrance. Recently, MIRC administration hosted a Zoom meeting with executives at Colgate-Palmolive and Takasago International Corporation to determine what benefits they derive from the research.



Bryan Raudenbush

Tracy Bariexca, Principal Scientist at Colgate-Palmolive, said Colgate is intrigued by the information gathered from the research, though it has not used it in product promotion. But, she said, given more data, that isn't out of the question. And beyond that, she said, Colgate encourages research into different capacities of mint.

"Colgate, in general, likes to see research being done on mint in different capacities, because we do want the mint growers and the mint industry to thrive," Bariexca said.

"So, yes, we do want to see projects involving mint for our uses, but we also want to see it expanded elsewhere," she said. "We care about the mint farmers. We care that they continue to grow, and we would like to see them have the opportunity to grow for other industries as well."



Tracy Bariexca

Steve Pringle, Vice President of Global Mint and Sensate Group for Takasago International, said the New Jersey-based flavor house also could one day use information from Raudenbush's sensory research to promote mint to end users. To date, however, the flavor house is using it as a jumping off point for its own internal research. The research "is on par with some of the work we do," he said. "And it helps us think about connecting the dots between consumers' broader wellness needs and mint. It is a good jumping off point to do our own research. It gives us an understanding and basis from which we can dig in further."

In more than 30 years of research into the effects of mint scent, Raudenbush has uncovered multiple benefits from exposure to the fragrance, including in areas of cognition, athletic performance, emotional states and appetite suppression.

The research, according to Pringle, has added empirical evidence to long-held beliefs that the fragrance of different plants has positive effects.

"For example, we take a bath with lavender because our grandmother told us lavender is relaxing," Pringle said. "But this helps us put some kind of numbers behind the anecdotal and I think it is important to try and think about how we connect those dots in a more robust manner, rather than just anecdotally."

The data generated by Raudenbush, he added, helps Takasago "put mint in the best place to connect to well-being. This is really good data to build our own internal projects with or use to help us kind of connect to our customers," Pringle said.

Pringle noted that companies "don't have a problem convincing people that mint

is something nice to taste. What we are trying to do is expand the reasons why people should be using mint." And, he added, connecting to consumer

well-being, could be a key to expanding the use of mint. "Well-being has become a basic reason why consumers buy," he said.

Bariexca said Colgate-Palmolive needs more clinical data before it would consider promoting mint scent as a benefit to well-being.

"Yes, there is a story to tell behind an ingredient," she said. "For us, though, it is more important for people to know that our product prevents cavities, contributes to oral health and is flavored with natural mint."

Still, she said the research being performed by Raudenbush is important both for the short-term and long-term health of the industry. "It is good that Bryan is researching areas that we wouldn't necessarily focus on," Bariexca said.

"Oral care and confections are the two main drivers of mint," Pringle said. "But thinking about where to use mint beyond those two applications is something we at Takasago have tried to expand upon. And the work that Bryan (Raudenbush) does is really helpful for us."



Steve Pringle



Drought, ESA Protections Shrinking Water Supplies

Klamath Basin farmer Mike McKoen has always enjoyed growing mint. McKoen in recent years, however, has dramatically cut back on his mint production, going from approximately 1,200 acres in mint that he and his father produced at one point to just 61 acres today.

Part of that reduction stems from market conditions. But, he said, with better access to irrigation water, he and other growers in the Southern Oregon basin would be growing a lot more mint.

“If we had water like we should, I’m sure there would be a lot more speculation going on,” he said.

North of McKoen, in Central Oregon, mint production also is down dramatically due to a lack of irrigation supplies. “Our acres are definitely dropping drastically right now because mint uses quite a bit of water and we don’t have water,” said Mike Macy, Culver.

McKoen and Macy are among hundreds of farmers across the Western United States who have been forced to scale back their use of water in recent years as drought conditions have combined with efforts to protect endangered species to dramatically limit irrigation allocations.

Macy’s long-standing water allocation of two acre-feet from the North Unit Irrigation District started being cut in 2019. It was down to fifty-five hundredths this year.

“It has been rough for sure,” he said. “And right now, it is 80 degrees outside in October, and still not raining, so nothing is happening good for getting next year started.”

The water shortage in Central Oregon is compounded by efforts to protect the endangered spotted frog. “Instead of



storing water, they are releasing water all winter because of the frog habitat,” Macy said.

At one point, Macy said he was growing mint on 300 acres. Today, that is down to about 60 acres. A still that he and two other growers are involved with used to run two shifts a day for a month each year. “This year, it was a single shift for about nine days,” he said.

Similarly, the mint run at McKoen’s still in the Klamath Basin used to run for 45 or 50 days a year. Now, he said, it operates “about three days.”

“This whole water thing has manifested in the last two years I would say,” McKoen said. “Yes, it’s been dry, but if the system worked as it should, there would be plenty of water available, if we could just use it for irrigation.”

To protect two species of endangered sucker fish, regulators shut off water deliveries in August from the Upper Klamath Lake, which is where most of the basin’s growers get their irrigation, forcing growers to scramble to finish high-value crops. In McKoen’s case,

he had to forego the second cutting of a peppermint field because of the water shutoff. Fortunately, he said, by piping one of the few available sources of groundwater in the area over a mile, he was able to bring in his onion crop, another high-value crop he produces.

Like McKoen, Macy is doing whatever he can to bring in crops. “We are trying anything we can think of,” Macy said. “We use all drip tape in our carrots. We try anything we can do to save water.” Still, he said, the drought and the conservation efforts to save the endangered spotted frog are having a major impact on his ability to farm.

“It definitely is affecting us,” he said. “Two of our main employees are no longer working for us. One of them left voluntarily, which was a good thing because we were going to have to make some tough decisions because of our bottom line.

“When you are farming with a quarter or less of your water, your income level is going to be way down. And it is. It definitely is not a good thing right now,” Macy said.

Macy added that the normal allocation for his irrigation district is two-acre feet. “In 2019 we received. 1.7-acre feet,” he said. Then in 2020, we dropped to a foot-and-a-quarter. Last year we started at one foot but then the water started running out in July, so they cut us back to eight-tenths of a foot. This year we started at forty-five hundreds, so less than a quarter of our normal water.

Then, with the May and June rains, we ended up at fifty-five hundreds, which still isn’t much.”

Back in the Klamath Basin, growers are now producing crops on only around 100,000 acres, a smattering of the area where crops once were grown in the fertile basin. And even at that, growers are struggling to bring in their high-value crops.

Given more access to irrigation, McKoen believes mint is one crop that would see a significant increase in production.

“It is a pleasant crop to grow,” McKoen said. “It is certainly challenging, but there is something about mint that is kind of addictive. There isn’t one guy here that used to grow mint that is saying, ‘Damn, I never want to see that stuff again.’ There is interest, for sure.”

Mint Fragrance Continues Driving Raudenbush Research

Thirty years ago, while sharing a lab as a grad student at University of Cincinnati, Bryan Raudenbush stumbled onto the idea to study the effect of mint scent on cognitive response.

“I was doing some scent research and, just by happenstance, I had scent in the room left over when others were doing sustained attention tests, and the participants were commenting on, ‘It was easier to do this when that nice scent was in the air,’” Raudenbush said. “And here we are 30 years later.”

Raudenbush, a physiological psychologist at Wheeling University in West Virginia, has been researching the effects of peppermint scent ever since. Among areas he has studied are its effects on athletic performance and on keeping people motivated to a task.

More recently, in work he is doing for the MIRC, he’s been looking at the ability of peppermint scent to distract from hunger pains and analyzing if that distraction could lead to people eating less, and over time, if that could lead to weight loss.

Raudenbush, who has worked with the MIRC since 2018, believes that the research he has done in peppermint scent could have several benefits for companies, including the opportunity

to emphasize the benefits of mint in promotional materials.

“People have really pushed for more all-natural ingredients,” Raudenbush said. “And they are definitely trying to use more organic, rather than pharmaceutical ways, to improve performance or mental cognitive ability. So, having this all-natural mint should excite people in that they won’t have to take drugs or different chemicals to get the same effect.”

Among other research, Raudenbush has shown that peppermint scent in classrooms improves performance on exams. Also, he showed in a study that having scented pencils led to improved grade point averages.

On the athletic front, a field Raudenbush particularly enjoys studying, he has shown that mint scent can improve performance.

Going forward, Raudenbush said he would like to delve into mint scent’s ability to address depression.

“The next thing we would like to do is comparing alerting and pleasant scent to individuals who are suffering from some type of depressive disorder to see if that might be a secondary line of treatment for them,” he said.

Raudenbush has shared his findings both at academic conferences, such as at meetings of the Association for Chemoreception Sciences, as well as at MIRC meetings.

“The benefit of working with the MIRC is I get to meet with growers and other researchers,” he said. “The benefit when I talk at these more academic things is we sit around and have a beer and talk about, ‘Oh, have you tried this?’ or ‘Have you tried that?’ and it is also nice to be able to hook up with people who have expertise outside of my area. So, one of the questions we usually ask is what is going on chemically in the brain and there are people who are more adept at knowing the chemical structure of these mint substances and how they might react, whereas I am doing more of the emotional, behavioral and performance end of it.”

Raudenbush will update participants at the MIRC Annual Meeting on his most recent research, as well as discuss future directions for his research.



Bryan Raudenbush

Bioherbicide Company Looks to Mint, Joins MIRC

The MIRC's newest company member, Harpe BioHerbicide Solutions, is looking to mint, specifically its compounds, as a key ingredient in its product line. And it could come into the industry in a big way.

"We are talking about 20,000-plus metric tons per year of mint oil, those kinds of numbers," said Daniel Pepitone, co-founder, COO and director of Harpe BioHerbicide. "And if you look ten years out, that number could double or triple on a global scale."

Based in Raleigh, North Carolina, and still in its precommercial stage, Harpe is in the advanced stages of developing its plant-based herbicide options with plans to sell its technology to a major agricultural chemical supply company.

"We will be looking for a buyer to purchase the entire set of intellectual property, the know-how, the formulations, so that they can go ahead and move it into the marketplace at a greater pace than we ever could," Pepitone said.

The company's formulations have been tested in hundreds of field, greenhouse and home-use trials across a range of growing regions in the United States and South America with replicated trials being expanded into the United Kingdom and the European Union.

The formulations attack broadleaf and grass weeds at several sites, according to company literature, and use several modes of actions that, among other impacts, weaken a weed's capacity to hold or absorb water, causing weeds to wilt, and disrupting the membranes of plant cells in a way that impacts photosynthesis.

The herbicide's active ingredients have

been determined by the EPA to be minimum risk pesticides and as such are exempt from further review under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), which governs the registration, distribution, sale and use of pesticides in the United States.

The active ingredients in Harpe BioHerbicide formulations are derived from plant extracts, including many found in the wide variety of *Mentha*, or mint, plants, according to company literature.

"The base product that we are developing is utilizing mint as the lead plant extract," Pepitone said. "The compounds that are found in the extracts are formulated to become herbicidally active. The monoterpenoids are what becomes the herbicide when formulated."

The company's co-founder, Dr. Chad Brommer, has been working on the technology for about four years, Pepitone said. And the company now is developing the technology to a commercial-ready standpoint. "We are getting the range of formulations set for the final development phases," Pepitone said.

Pepitone added that the Harpe formulation can be used in organic operations and could have a fit in cases where weeds are showing resistance to certain synthetic herbicides.

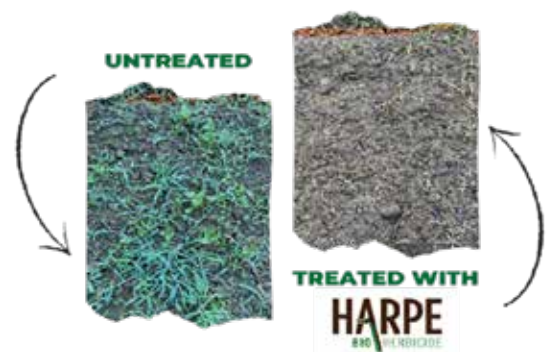
Proof Point

Part of Harpe's strategy is to launch its bioherbicide initially in the home-and-garden marketplace before taking it into the commercial agriculture arena. "We are talking with a couple of home-and-garden consumer leaders in the industry. That is more for us in terms of

Pre-Emergent Weed Prevention



Post-Emergent Weed Control



revenue generation and validation. The largest opportunity is in the commercial agriculture space, where the Harpe formulation would control a broad range of grass and broadleaf weeds, including those resistant to current synthetic chemistries."

He added that whoever purchases the technology could further advance the technology and the formulations.

"There is always more you can do with an active ingredient," Pepitone added. "The next company is going to shape it a little differently, enhance it in some way, make it fit in their portfolio to bring it to the marketplace."

Pepitone said Harpe joined MIRC both as a means to share with the mint industry what it is doing and to learn more about the industry.

“We looked at it from the perspective that we really want to and need to understand the mint industry,” he said. “And we’ve done this on a global scale. We spent time in India understanding the production cycles and the same can be said for the U.S. and Southern Canada where we got to spend some time meeting with some farmers and different players in the marketplace.

“So, the logical step is to further integrate ourselves into this world and meet

with the MIRC to better understand what their needs are in the marketplace because this has the potential to be very disruptive technology,” Pepitone said.

“If you think about some of what we are projecting in our numbers, we could potentially outstrip what is available in the marketplace when you think about plant extracts from mint.

“So really, more than anything, we want to share information with the MIRC and the farmers and companies involved so that they can also start to think about and prepare themselves for what is potentially coming, as well as ‘Hey how can we work together to possibly look at different hybrids of mint, different

varieties?’ Because what we are after is a much more industrial quality of mint. The smells and the flavors don’t matter to us. We want as much of the compounds as possible

“It is really a unique opportunity with great potential for the industry,” Pepitone said. “And we didn’t want to just in a year or two, when we divest this company, all of a sudden have this show up out of nowhere.”

A representative from Harpe BioHerbicide Solutions is scheduled to provide a presentation on the company to participants at the MIRC’s 2023 Annual Meeting.

Research & Regulatory Update

Steve Salisbury

Back in September, the Scientific Affairs Committee held its mid-year meeting to review the progress of current projects and approve 2023 priorities for our next research cycle. Most all of the current projects were progressing as expected with no major challenges or surprises cropping up that would prevent projects from reaching their annual goals. Like most programs, there are some unforeseen or uncontrollable situations and we have been able to address those in a constructive manner. Overall, project reports in September were well received and there were no substantial changes to the MIRC’s priorities for 2023.

The IR-4 Food Use Workshop was held in Minneapolis, Minnesota, back in September. This is the conference that pesticides for specialty crops get prioritized for the coming year. This was the first time since 2019 that this workshop was held in person. In my

opinion, the in-person meetings are much more productive and allow for valuable conversations, discussions and networking that benefits our industry.

This year there were fewer, only 312, national requests made to IR-4. Over the past several years there have been well over 400 requests to work through. Keep in mind that due to funding constraints and capacity, IR-4 has to narrow these requests down to approximately 40 residue projects that get prioritized and completed each year. These residue trials are the key to obtaining the required tolerances needed for pesticide registration on a crop such as mint.

Of course, funding limits are the main factor driving the number of researchable requests that IR-4 can commit to each year. Over the many years of flat federal funding, IR-4 has had to continually reduce the number of approved projects each year. For some

perspective, in 2009, IR-4 prioritized and funded 69 residue requests, whereas in 2021, only 38 residue requests could be completed.

As I reported to you last spring, with the help of the commodity liaison committee, of which the MIRC is a member, IR-4 received a bump in federal funding for this coming year. What does that mean for the number of requests to be tended to? This small increase allowed for 45 residue studies. This may not seem like much, but it’s huge for the seven or so projects that would have been cut from the 2023 plan of work. IR-4 is also funding several efficacy studies and specific research topics where there are



Steve Salisbury

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no known pest management solutions.

I tell you all this to get to the news that mint was the fortunate recipient of two residue project priorities for 2023. Typically, we only receive one. The priorities we received for 2023 include fluroxypyr herbicide and a fungicide combination product containing both pydiflumetofin and fludioxanil. The fluroxypyr, which you would recognize as Starane from Corteva, was a request that came to me from the growers as a tool that would be helpful to have available. The fungicide is known under the trade name of Miravis Prime from Syngenta and provides powdery mildew control along with other pathogens of interest that can impact mint. Keep in mind that these pesticides are just beginning their journey through the IR-4 and regulatory pipeline, so it will be several years before we will see these become available for use in mint production. But we do have these projects started.

In 2022, tiafenacil herbicide was approved for residue research in mint. This herbicide has shown to be a good fit for dormant applications. While we were prepared with data to proceed with residue work, we asked the registrant, ISK, to support use of tiafenacil between cutting of double-cut mint. Unfortunately, but understandably, they were reluctant until they were able to review crop safety data for that use pattern. So, we elected to pause the IR-4 residue work until double-cut data could be generated and reviewed.

The MIRC multi-state weeds project was tasked with including more tiafenacil treatments to help support the cause. This group of weed scientists were willing to go an extra mile for us to evaluate these treatments in addition to the planned trial protocol they already had made plans for. We certainly appreciate the group's willingness to take



on some extra work on an important piece needed. Also, we're pleased to say that Michigan State University has been added to our weed-scientist group, which now brings the project to six states (WA, OR, CA, WI, IN, MI). The importance of this wide range of regional research is that it provides more significance to the data we generate to support herbicide requests and uses.

Lastly, I wanted to mention that we are closing in on a new nematicide label. The EPA has posted a projected timeline of November 2022 for completion of their review for tolerance and registration for fluopyram for use in mint. This product is from Bayer Crop Science with trade name Vellum Prime. Once approved and registered it will be the first new nematicide material for mint in several years, possibly decades. That said, we should anticipate a possible delay at the EPA on their approval due to their

backlog of requests and current priority litigations. So, we will cross our fingers and find a little more patience in hopes that this all comes through before the 2023 crop season.

Of course, this new nematicide material would not be possible without the MIRC funding the research conducted by Dr. Saad Hafez at the University of Idaho's Parma Research and Extension Center. Dr. Hafez's efforts and diligence to generate the supporting data is what has made this pending registration possible. We appreciate his expertise and commitment to mint.

I look forward to seeing you during the winter meetings and providing further updates on the MIRC research program and pesticide regulatory topics. I hope that you can join us at the annual MIRC Conference in Charleston, SC. We have a great program put together for you. See you soon.

Chair's Report

Karla Farina, Chair of the Board

Despite the many challenges we are facing in the mint industry, there are many positives to report from the MIRC.

At the Scientific Affairs Committee meeting this past September we received updates on all of the excellent projects the MIRC is funding, and I'm happy to report that based on the mid-year reports, all are progressing and on track.

We also received a very positive report from MIRC Research and Regulatory Coordinator Steve Salisbury on his visit to the UC Davis Genome Center. As most of you know, we have decided to work with UC Davis geneticist Isabelle Henry to lead our varietal improvement research. We asked Steve Salisbury this past summer to visit the center and update us on his perceptions.

Steve noted that the Genome Center's mint plants are in exceptional shape, the facilities are impressive and that the center has wide-ranging capabilities

within their greenhouse, labs and personnel. I believe that this was a very good direction for the MIRC to pursue in its varietal improvement research.

Looking ahead, the MIRC Annual Meeting, scheduled January 25 and 26 in Charleston, South Carolina, also holds great promise. This will be the first in-person meeting for the MIRC since the 2020 Annual Meeting in Scottsdale, Arizona, and participants can expect many informative and interesting reports during the day-and-a-half of formal presentations.

These meetings are also a great chance to catch up with fellow growers and other industry members, and hear about how things are going in different parts of the country and in different sectors of our industry. So, be sure to register and attend.

Finally, I would like to end this Chair's Report with the announcement that I have resigned from my post as Chair

and plan to leave the mint industry sometime in 2023 to pursue other career opportunities. I have been serving on the MIRC Board of Directors since 2016 and it has been an absolute pleasure working with you all. I've always been impressed how, even though we all have different perspectives and priorities, the organization draws all industry players together to make decisions and fund projects to benefit us all.

I wish you continued success going forward and thank you for the valued relationships and experiences that I'll take with me.



Karla Farina





Mint Industry Research Council

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