



Insight

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New Distillation Technology Generating Interest

A new method for generating steam for mint distillation is generating interest from MIRC members.

The method, developed by VSG Associates out of Boise, Idaho, is being looked at as an improvement over traditional steam generation methods on several levels.

"It has merit if for no other reason than it is way safer than what we traditionally use," said Canadian producer Dale Thacker. "And, on top of that, it has the capability of producing wetter steam, which is beneficial for distillation, and you can generate the steam where you need it. It eliminates steam headers, which I think is the weakness of most distillation facilities."

The technology evolved from an effort to capture waste heat energy in large diesel engines, according to Ted Weigold, head of VSG Associates.

"As we did that work, we built a variety of different configurations aimed at trapping energy," Weigold said, "and, eventually, we had a device that was generating steam off the heat in the diesel exhaust. The idea was that you would take that steam and use it to drive a turbine connected to a generator."

Weigold said at one point he was talking about his work with a person who sells steam equipment for use in the Northern Alberta oil-sand fields when that individual made a sudden declaration that changed the focus of his work.

"As I talked with him, and we discussed what they did and how they did it, he literally just blurted out, 'I wonder if you built a better boiler.' And I went away from that phone call thinking, 'Gee, I've got a lot on the test bench right now. All I need to do is turn the heat up.'"



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Weigold said it took about two years of reconfiguring equipment, enlarging it and instrumenting it and eventually he started generating interest from people in diverse fields, including food processing, power generation and even a manufacturer of agricultural chemical application equipment.

VSG Associates now is looking to install a beta project in Idaho to further test its use in mint distillation. Weigold came to the MIRC with a request for funding, but was turned down with the caveat that the Council is interested in the technology and wants to keep in touch, said Steve Salisbury, research and regulatory coordinator for the Council.

“We don’t feel at this time that it is in our scope to look for a capital venture type of project,” Salisbury said. “But we are interested in it and we want to stay in contact. If VSG can get this beta project off the ground, that could generate the need

for some further distillation research and the MIRC may be interested in helping fund it.”

Salisbury, too, said he believes the technology has merit.

“I believe there is potential energy and water savings within this technology,” Salisbury said. “I think it will potentially be easier maintenance and more efficient than our current technology, in that it doesn’t take as much energy but it is still accomplishing the same or better volume of steam.”

“If you look at the number of years that the mint industry has gone with the traditional boiler steam generation, and to have something like this come along ... to me, this is a big deal,” Salisbury said.

“It generates steam in a fashion that traditionally we haven’t even considered,” Thacker said. “And it appears to have good science behind it.

“I am somewhat excited about it,” Thacker said.

Weigold, meanwhile, said he is interested in finding investors to help fund what he envisions as a two-phase scale-up project to bring the technology to a point where it can be implemented in mint distillation.

“Until we build it, I am not sure that I’ve got all of the variables, the parameters worked out for what exactly the configuration would be,” Weigold said, “but we’ve done enough of these, so that we know pretty much what we need to shoot for and we can do scale ups.

“It is very likely that when we finally do this,” he said, “we will be doing a two-stage development, where we build a model that is halfway to what the Idaho beta demonstration site wants and then size up from that.” ♦

Save the Date! Annual Meeting January 22-23

The MIRC’s 43rd Annual Meeting will be held January 22-23 of next year at the DoubleTree Resort by Hilton – Paradise Valley – in Scottsdale, Arizona.

The meeting will include an Executive Board meeting and sessions on research reports, industry updates and other presentations of relevance to the mint industry.

Reservations can be made by calling the hotel at 866-866-8107. Reference the group code MIR when making reservations by phone. Room rate for the meeting is \$209 (plus tax) for single or double occupancy.

Deadline for hotel reservations in December 27.

The resort is located at 5401 N. Scottsdale Road, Scottsdale, Arizona, 85250-7090.



MIRC Helping Coordinate IPM Project

The MIRC is helping coordinate an IPM Strategic Planning project that could better position the mint industry for research and regulatory support. The project also could provide both direct and indirect benefits to growers, according to Steve Salisbury, research and regulatory coordinator for the Council.

Key to the project is the development of a document that identifies pest management priorities for Pacific Northwest producers. The last time such an exercise was done was 2002.

To date, the project has involved surveying producers and crop consultants, developing a Mint Pest Losses Impact Assessment and drafting a document, which is now being circulated for industry feedback.

The final document will be published through the Oregon State University Extension Service later this year and made available to the USDA and the EPA through the National IPM Database, according to Katie Murray of OSU's Integrated Plant Protection Center.

Murray adds that the university "will work with the industry and university faculty on ways to leverage this work toward targeted funding for top management priorities, including increased research, education and regulatory support."

The project is funded primarily by the Oregon Mint Commission.

In January, OSU researchers and attendees of the Oregon mint industry's annual meeting conducted a Crop Pest Losses Impact Assessment survey to kick off the project. Twenty-three people attended the meeting, according to Murray, including thirteen OSU faculty.

"This was a great opportunity for the industry to discuss and reflect on the economic impacts of specific pests and



Pacific Northwest mint IPM strategy planning meeting in Portland, Oregon.

management activities on production outcomes," Murray reported.

Nine Oregon-based crop consultants helped complete the survey process, Murray reported. She added that data from

"This was a great opportunity for the industry to discuss and reflect on the economic impacts of specific pests and management activities on production outcomes."

Katie Murray,
*OSU Integrated Plant
Protection Center*

the assessment will be summarized and made available to the industry in coming months and that faculty will work with industry representatives to best utilize the

data in targeting IPM solutions.

Thirty-five Pacific Northwest mint industry representatives, including growers, consultants, buyers, university faculty and other industry representatives then formed a workgroup to support the development of a formal IPM strategic plan document for Pacific Northwest mint.

Thirteen members of the group, including representatives from Oregon, Washington and Idaho, met March 8 in Portland to complete the draft document.

"This workshop helped the industry refocus on the current IPM issues and the management tools available and to identify what is needed," Salisbury said.

Salisbury noted that while growers are battling some different weed and insect pests than when the last IPM strategic document was developed, many of the production issues growers faced in 2002 are still in play today. ♦

Chairman's Report

Greg Biza

As time passes, the one constant is change. There are a number of changes that have occurred in recent months within the MIRC, folks changing companies, faces and board members changing, new committees formed, old ones rejuvenated and thus is the nature of our world. So, while the faces change our mission is consistent: to promote research and activities that benefit the North American Mint Industry.

Responsiveness

During our meeting in January we accomplished a tremendous amount in my opinion. Thank you to all the volunteers in the organization (which is almost everyone). The meeting and venue were successful by all accounts thanks to the hard work and planning of The Ostlund Group (Bryan, Shawn and their team).

When I spoke about change in the last newsletter and what we must do to grow and continue to thrive as an organization, I mentioned focus and deliverables. That is the important first step. Step two is the responsiveness and execution of the plans that are decided upon.

During the SAC meeting there were quite long discussions on research goals, objectives and priorities. The SAC put forth to the board a strategic view that was voted on and ratified by the board.

Integrated Pest Management

- Chemical registration
- Current threats (*in order of priority*)
 - Verticillium wilt
(*and other fungal diseases*)
 - Weeds
 - Nematodes
 - Insects/mites

Superior New Cultivars (*previously called "Varietal Improvement"*)

- Developing genomic resources for mint
- Breeding for improved cultivars
(*non-GMO*)
- V. wilt resistance, oil yield and quality

Agronomic/Sustainability Improvement (*previously categorized under "Other"*)

- Irrigation/water use
- Distillation
- Nutrient Management

New Markets (*previously categorized under "Other"*)

- Identify/promote alternative uses/
markets for mint oil

While these are the basic guidelines, I should mention that these will be regularly reviewed and research measured against these with the idea that future works should be submitted against these priorities. I say with renewed confidence, that although we reissue the objectives and priorities intermittently that this is an invaluable process, we should be looking at each year to hone in on the things the MIRC can and will deliver.

Furthermore, the Risk Mitigation Committee has issued its first report and it was quite an eye opener in terms of breadth and depth of the issues we, as an industry, are managing. There is literally not one agency that the members of the MIRC don't deal with and not one



global issue that does not affect what we can do. To name a few, Climate Change, REACH, CA PROP 65, EPA regulations on chemical use, FEMA (Flavor Extract Manufacturers Association) labeling, consumer groups looking for “Clean and Clear labeling” and more. Our response is to, as much as possible, get in front of these issues as they arise and insert reason in to the solution.

Steve Salisbury, MIRC Research and Regulator Coordinator, continues to do a superlative job and guiding the day to day work the MIRC is funding and continues to seek out new opportunities for the MIRC. His activities and timely response to queries are critical to the response we get at the USDA and EPA in particular.

Financially the MIRC is quite sound compared to other groups similar to ours. We have held a reserve that more than adequately could support the needs of the MIRC. Having said that, we have been running a deficit for the last couple of years (*as an example, there is deficit spending of 6.88% of our budget for 2019*) and the executive group is looking for solutions that will allow us to maintain our fiscal health and afford us the ability to continue to fund the valuable research the MIRC supports. Not the least of these is finding cost effective venues for the MIRC to hold its SAC and Annual meetings. While the large meeting venues like Anaheim, Austin and Orlando are great places, they also command budgets much grander than

ours. The Ostlund Group and our executive group is responding to these pressures accordingly. Being good stewards of your resources is important and you can trust that the MIRC takes it seriously.

Lastly, as I do, I'd like to thank you all for the privilege of allowing me to serve the industry. It is both personally and professionally rewarding to work with all of you and continue to bring value to the North American Mint Industry. ♦



Greg Biza

Multiple Moves on MIRC Board

As part of multiple moves on the MIRC Board of Directors, Srikanth Ramachandran of Mars Wrigley Confectionery, has taken over the director's position formerly held by John Buckley, who has retired. And Steve Pringle of Takasago has taken over Carter Green's position. Green also has retired.

In other movement, Melis Cakirer, who formerly served as Green's alternate, has left the Board after leaving Takasago. And Dana Wendel, who formerly was secretary/treasurer and in line to become vice chair, now is serving as an alternate to chair Greg Biza. The move was made because Biza has left Callisons and taken a position at RCB International. According to MIRC guidelines, two people from

the same company cannot serve on the executive committee simultaneously.

Biza appointed Jason Stromme of Norwest Ingredients, a past chair of the board, as vice chair. Stromme will serve as vice chair until the MIRC's annual meeting in January, at which time the Board of Directors will elect a new slate of officers and Karla Farina will move into the vice chair slot.

In other news, the Board has added six members to the Scientific Affairs Committee, including four dealers and two flavor and fragrance house representatives, bringing the total membership of the committee to eighteen. ♦



Center Pivot Modifications for Improved Efficiency and Mint Oil Yields on Mint

R. Troy Peters, Professor of Irrigation Engineering, WSU and Behnaz Molaei, PhD student, WSU

It has been generally observed that rill irrigated fields often get better oil yields per acre than sprinkler-irrigated fields. Some of the mint oil yield differences may be due to decreased lodging of the mint in surface or drip compared with sprinkler irrigation. It has also been hypothesized that since the oil is held on the mint leaves, surface water from sprinklers may be washing the oil from the leaves. This has been supported to some extent by research showing that using low elevation precision application (LEPA; Peters, 2016; Peters, 2014), a method where water is dribbled directly onto the soil surface instead of being applied through a sprinkler, may increase the overall oil yields from center pivot irrigated fields. It is also hypothesized that LEPA results in less mint hay lodging (falling over) than traditional over-canopy sprinklers prior to harvest.

In 2018, the first year of a two-year study was completed comparing LEPA using drag hoses, with typical mid-elevation spray application (MESA) sprinkler heads, the typical sprinkler heads that are about 5-8 ft from the ground surface. Studies have been done comparing the irrigation application efficiency of LEPA and low elevation spray application (LESA) with MESA and have shown that LEPA/LESA is able to get 15-20 percent more water to the ground per gallon pumped than MESA (Peters et al., unpublished).

We proposed to demonstrate the water savings of the LESA/LEPA method and to measure its impact to mint oil yields. This was done on a large scale using a full-sized center pivot and included many samples across a larger area. Every other span of this pivot was converted to LEPA/LESA and was designed to emit 15 percent less water per acre than the MESA sections.



Fig. 1. Converting three spans of center pivot in mint field in Toppenish from MESA to LESA/LEPA.

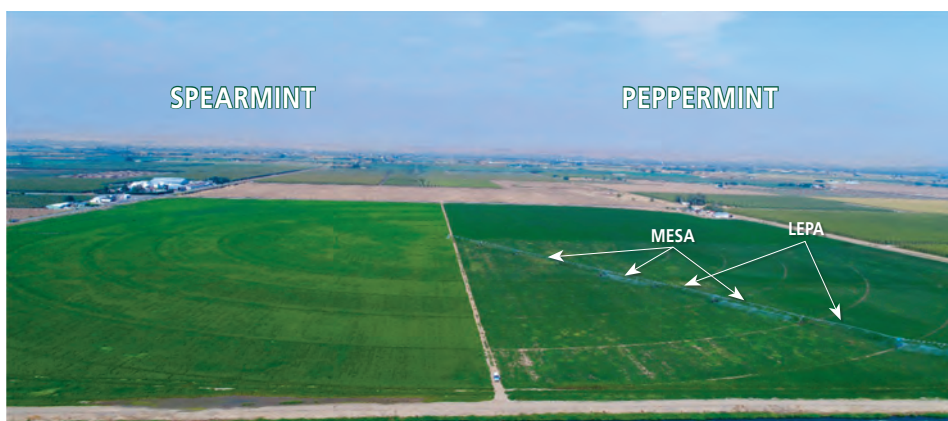


Fig. 2. Mint field in Toppenish, three spans LESA/LEPA and the other spans MESA



Fig. 3. Irrigating the mint with LESA (on the left) for the early part of the season and following the first harvest. Then converting to LEPA drag hoses (on the right).

Soil moisture measurements and hay and oil yields and lodging was measured underneath each of these and compared with the MESA spans. We also compared all of these to the pivot corners, which were irrigated with hand lines.

There was no significant difference between soil moisture content underneath the LEPA/LESA spans and that under the MESA spans. Although the peppermint oil yields in the LEPA/LEPA treatments was slightly greater than the MESA

sections in the first and second harvest, those differences were not statistically significant. This was despite using 15 percent less water than the MESA sections. In the spearmint there was a much greater (very close to the 0.05 level

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Fig. 5. Hay and oil yield results from the first harvest on peppermint and spearmint. The shown P-value is the probability that differences between the means shown is due to natural variation.

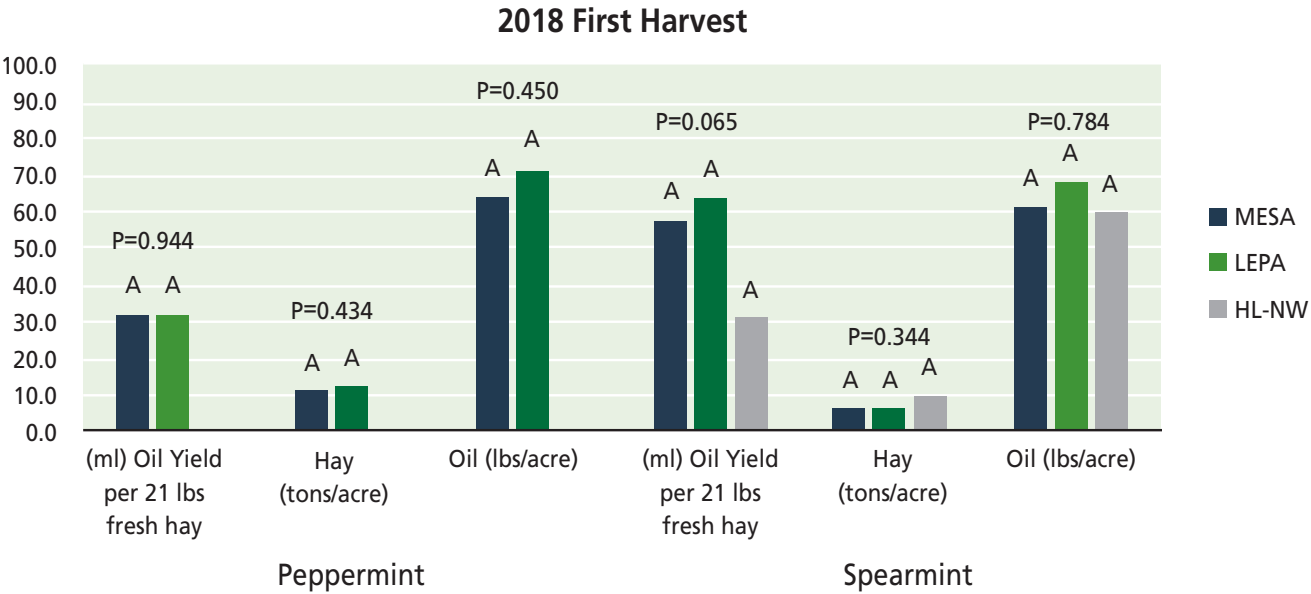
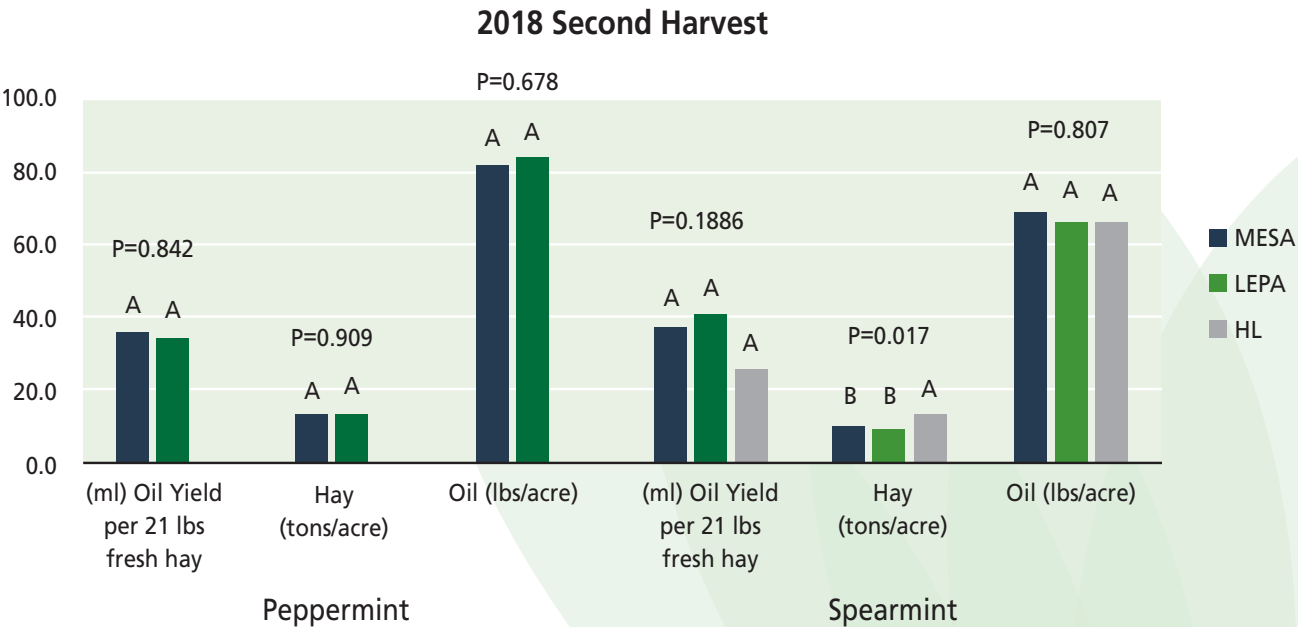


Fig. 6. Hay and oil yield results from the second harvest on peppermint and spearmint. The shown P-value is the probability that differences between the means shown is due to natural variation.



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of statistical significance) concentration of oil per pound of mint hay in the LESA/LEPA than there was in the MESA. Although the hand-line areas produced a much greater amount of hay (statistically significant differences in the second harvest), that hay didn't have very much oil on it and it had the lowest overall oil yield per acre of any of the treatments. These oil yield differences may have been due to chance, however, since the P-values for those mean separations were high. There was a large oil concentration difference in the first harvest, but not in the second harvest. This result has been seen in past studies as well. There may be something associated with hot and dry weather before harvest that enhances this oil concentration separation between the different methods of irrigation.

Lodging was also studied using aerial imagery from a drone and some sophisticated image analysis. The results show that the percentage of lodging in the MESA spans is significantly ($P=0.03$) greater than the LESA/LEPA section (Fig. 7).

Conclusion

We converted every other span of a full-size pivot to LESA/LEPA and compared it with MESA. Despite 15 percent less water coming from the sprinkler nozzles (gpm/acre) in the LESA/LEPA spans than in the traditional MESA spans, equivalent or greater oil yields were obtained. There were not significant differences in the soil water content between LESA and MESA. This shows that large water savings are possible by using LESA/LEPA. It also indicates that LEPA leads to increased oil concentration on mint hay, especially during the hot parts of the summer. Aerial imagery was also used to show that there was statically greater lodging (mint falling over) under spearmint in the MESA spans than there was in the LESA spans. This was the first year of at least a two year study and we plan to collect additional data to make sure that the results were not due to year-to-year weather and climate variation and to help understand the differences between spearmint and peppermint. ♦



Fig. 4. Taking mint samples and distilling them for hay yield and oil yield measurements.

Irrigation Project Funding

The Washington Mint Commission and Mars Wrigley Confectionery are the top contributors to a research project on center pivot modifications that could provide dividends for mint producers.

The Washington Mint Commission put just over \$15,000 into the project, while Mars Wrigley through its AdvanceMint program contributed \$14,500.

Other contributors include the Alberta Mint Growers Association, the Idaho Mint Commission and the Oregon Mint Commission, all of which contributed \$5,000. The MIRC pitched in \$665.

The project, which is being led by Troy Peters, professor of irrigation engineering at Washington State University, is measuring impacts to mint oil yields of different irrigation technologies. ♦

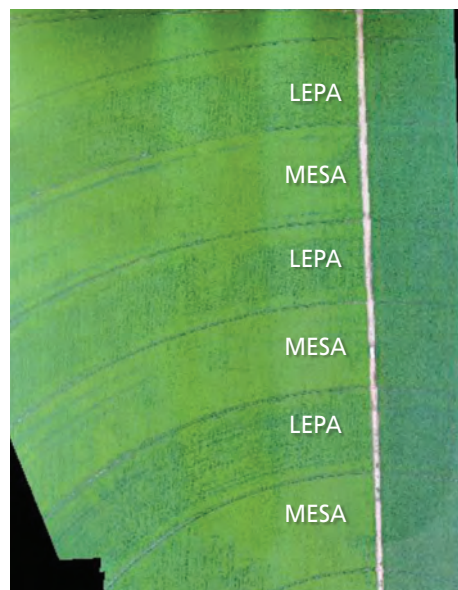


Fig. 7. A composite of aerial images that were collected from a drone just before harvest and shows lodging of the mint under the MESA sections (lighter green) compared to the LESA/LEPA spans (darker green).

Research & Regulatory Update

Steve Salisbury

Over the past few months I have had a few separate conversations with growers from the Midwest to the West regarding the topic of sustainability of agriculture and farms. I enjoy these conversations as they provide an opportunity to discuss the meaning and share philosophies of sustainable agriculture from the farm's perspective. I am also hopeful that these conversations help growers and our industry to tell the good story of production agriculture to our "non-ag rooted" friends and neighbors and ultimately the consumers of the products produced on the farm.

The concept of telling our story was presented to us at the MIRC meeting last January by Jerry Bowman, Executive Director of the Flavor Extract Manufacturers Association. He commented that the mint industry has a good story to tell and we need to continue to educate people on the field-to-product practices. Every day you all are conducting your businesses in ways that ensure and improve the sustainability of the mint industry. That is true for all parties involved: growers, buyers, flavor houses and manufacturers. In summary, you have a good story to tell.

I would like to take a moment and elaborate on the word "sustainable." What is sustainable agriculture? I've always said that you will likely get as many different answers to that question as the number of people you ask. So, I guess I'm providing my answer, opinion, thoughts and

philosophy on that question. I hope you can find something in my thoughts that will help you tell your good story.

What does sustainable agriculture mean to me? Sustainable agriculture is the practice of utilizing the farm's natural resources and inputs with the highest level of responsibility and efficiency to produce a commodity of value that will ensure the longevity and viability of the farm through foreseeable future generations.

To elaborate on that statement, sustainable agriculture is a style of production agriculture that farmers inherently practice. Sustainable farms conduct farming operations by making both natural and conscientious decisions on employing the most sensible agronomic methods and techniques that apply to their specific situation. These decisions and strategies are based on sound agronomic principles applicable to the given circumstances, which result in the most desirable short-term and long-term outcomes.

Furthermore, these strategies result in a superior level of responsible stewardship of natural resources, the surrounding environment, the farm operations and business as well as the communities that these farms reside and support. It is a true multi-disciplinary approach to production agriculture that emphasizes a perspective that accounts for and considers all elements involved resulting in optimum outcomes and secures the farm's durability into the future.

I feel that it is important to note that this philosophy is farm-centric in that each farm's situation, values and beliefs will determine the best path to its own sustainability. Too often groups, both agriculture and non-agriculture related, want to quickly pass judgment on what is right or wrong in terms of sustainability on the farm without paying

any respects to each operation's unique situation.

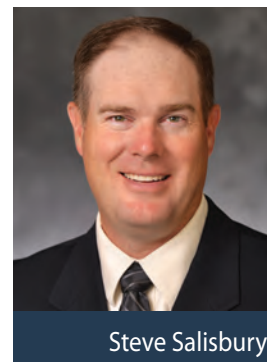
It is not about large vs. small, conventional vs. organic, commodity crop vs. specialty crop, irrigated vs. dryland or

even region vs. region. All of these can be sustainable. Sustainable agriculture is not a competition. It's really a conscientious choice within a farm's own ideals.

Throughout all the years I have been in agriculture and worked with and alongside growers, contractors, buyers and others I have yet to meet anyone who wants a farm to fail or not persevere into future generations. Furthermore, I have observed that growers and the industry are tirelessly looking for ways to improve upon the current status of management practices, agronomy, technology, natural resources and business. I believe these unwavering efforts are motivated by the strong desire to maintain a truly sustainable farm and agriculture industry.

The fact that all interested parties in the mint industry are involved in these efforts is truly commendable. The growers, buyers, flavor houses and end-user manufacturer members are helping lead the charge to ensure a sustainable North American mint industry. This shows the passion and dedication to a sustainable industry.

As mentioned earlier, you have a good story to tell. Tell it. Help others understand not only what you do, but why you do it. Educate your consumers on your field-to-product practices and how your philosophies, decisions, and values make your industry truly sustainable. ♦



Steve Salisbury



Researcher Eyes Alternatives for Controlling *Verticillium* Wilt

A Midwest researcher is looking at the potential for adapting an alternative to fumigation for controlling *Verticillium* wilt in mint.

Petrus Langenhoven, a horticulture and hydroponic crop specialist in the Department of Horticulture and Landscape Architecture at Purdue University, is launching research this summer into utilizing anaerobic soil disinfestation, or ASD, in mint production.

Langenhoven, who holds a Ph.D. in agronomy from Stellenbosch University in South Africa, said the method has proven effective at controlling soil-borne pathogens in Japan and The Netherlands, where it was first used. And, in strawberry production in California, the technique is considered an environmentally friendly and economically sound alternative to fumigation.

“We would like to get an environmentally sustainable and economically sustainable solution for the vast number of acres in mint out there that are affected by *Verticillium* wilt,” Langenhoven said.

The principle of ASD is to create a temporary soil environment to stimulate growth of organisms that under certain anaerobic conditions decompose available carbon, producing organic acids and other volatile organic compounds that suppress soil-borne pests and diseases.

Langenhoven, who is working with soil microbial ecologist Lori Hoagland on the project, is launching the work on four farms this summer. The team is utilizing funding from a USDA Sustainable Agriculture Research and Education Program grant, or SARE grant, to conduct the study. The team was awarded the grant late last year.



Langenhoven plans to look at several treatments to achieve anaerobic soil disinfestation, including casein, composted poultry manure, ethanol and a mustard cover crop to determine which are best at creating conditions that can eliminate *Verticillium* wilt from fields.

Researchers will conduct the study in fields already infested with the wilt and will apply treatments in July or August, before replanting the fields to mint in either November or March, Langenhoven said.

In a meeting this spring, Langenhoven said he found that growers were encouraged by the potential of the research. “I think the growers are excited,” he said. “They understand how important it is to have healthy soil and they are very interested and intrigued by the idea we proposed.”

Langenhoven plans to conduct the research at locations in Northwestern Indiana, as well as in a greenhouse.

“We will do potted plantings in the greenhouse,” he said, “but you have to have it outside in the field to really see what the effect of nature is on these kinds of interventions.”

Plans are to compare a check strip, where no control strategy is utilized, to chemical fumigation and the anaerobic soil disinfestation treatments. He will utilize plant material that is certified free of *Verticillium* wilt.

The time needed for the ASD treatments can be as little as four to six weeks in ideal conditions, Langenhoven said.

Langenhoven, who also is researching efficacy of broadleaf weed herbicides at controlling redroot pigweed in mint, said he hopes the *Verticillium* wilt research is the first of many large-scale research projects he performs in mint.

“This is the first big project in mint in several years here in Indiana and I hope it is going to be the start of many,” he said.



AdvanceMint Accepting Applications for Round Three

AdvanMint, the sustainable Agriculture awards project from Mars Wrigley Confectionery that promotes and encourages sustainable farming and distillation practices, is preparing to accept applications for its third round of awards.

The program, which awards a maximum of \$150,000 annually, is designed to improve the sustainability of growing and distilling mint. It has been used to implement sustainable production practices on farms, by distillers and researchers.

According to an information kit provided by Mars Wrigley, examples of farming practices that could qualify 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, pesticide- and fertilizer-management plans.

The program, which is administered by the MIRC, is accepting applications from September 1 through December 31. Individual awards are capped at \$25,000. 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 have submitted information on their farm and farming practices to FieldRise, a national program that measures farm stewardship across commodities, or agree to submit information to the program during the next assessment period.

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 or researchers located in the U.S. and Canada are eligible for the awards.

"We are dedicated to promoting sustainable agricultural practices within mint farming communities," wrote Mars Wrigley.

For more information, contact the MIRC or Jeremy Schifeling at Jeremy.schifeling@effem.com. ♦



Mars Wrigley Confectionery is offering sustainable agriculture awards to growers in the United States and Canada up to a combined maximum of \$150,000 for use during the 2020 planting season to fund sustainable farming and distillation practices.

Examples of farming practices that could qualify include:

- Distillation efficiency improvements
- Water footprint reduction
- Water irrigation efficiency improvements
- Cover crops
- Till vs. no-till
- Water conservation plan
- Install natural gas lines; liquid propane vs. diesel fuel
- Soil testing/pesticide/fertilizer management plans

Proposal Deadline:	December 31, 2019
Awards Distributed:	January 21, 2020
How to apply:	usmintindustry.com/Advancemint
Financial Awards:	Total program budgets: \$150,000 Maximum per individual project \$25,000
Proposal Submission:	info@ostlund.com
Application Review:	A committee of four



Mint Industry Research Council

P.O. Box 4059, Salem, OR 97302

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