

Country Folks **GROWER**

The one publication for all aspects of commercial horticulture
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Bulbs, tubers and bare roots

In this issue—

*Helping the worker and
the work in hot weather*

*Strep resistant fire
blight updates*





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Bulbs, tubers and bare roots

by Sally Colby

Pops of color in the garden are harbingers of several seasons for both home gardeners and commercial landscapers. The Berbee family has made it their business to supply high quality bulbs and other plant material to both local and nationwide customers.

Leo Berbee began bulb production and distribution in Holland, and in 1972, his son Henk opened a distribution warehouse in Ohio for the Leo Berbee Bulb Company. Henk's son Bob Berbee opened Dutch Mill Greenhouse in Marysville, Ohio, which he operates with his wife Mattie.

Mattie said her husband realized that since the family business had traditionally sold bulbs and other bare root products to other growers and garden centers, offering the public an opportunity to shop wholesale products on location showed that a retail store front would likely be successful.

"Not only would we be selling to other garden centers, we grow the product here in our garden center and learn the needs of wholesale customers," said Mattie. "That was 22 years ago, and the retail business has grown every year."

There was a learning curve as Bob learned to operate a business. "He was young, barely 21," Mattie said. "He had a degree in greenhouse management but realized it didn't fully prepare him for operating a retail business."

About a decade into running the business, the young Berbees figured out what worked best and which direction to take the business. "Anyone can open their doors, put price tags on things and sell them," said Mattie. "As time went on, Bob learned what he should grow himself and what to buy in, and what the market in the area needs."

Dutch Mill Greenhouse's location puts the Berbees in one of the fastest growing areas of Ohio, which has helped the family learn more about which direction to take the business. New construction means people need gardens, and like others, the Berbees saw a sharp rise in new customers during 2020 and 2021.

"Because of the new growth in the area, we didn't see the drop a lot of others saw," said Mattie, comparing current business to that of several years ago. "Some businesses had the best year ever but didn't retain customers. We're getting to know the people who are moving to the area and what they're looking for, and that has been beneficial for the business."

Their customers comprise two groups: Avid, experienced gardeners and young families who have never owned a home or had a garden. To

provide the best help for first-time gardeners, the landscapers at Dutch Mill Greenhouse offer staff consultations.

"A lot of people were coming in with pictures to talk about their yards on Saturday mornings but we couldn't focus on them," said Mattie. "We ask

offered an online pre-order program starting in February that allowed customers to pre-purchase their favorites and pick them up in May. This program helped determine the most popular colors year over year. This season, the Berbees didn't offer this service due to the space required to

"People are excited to have space in their garden to grow them." The garden center also stocks seed dahlias and grows unique dahlias from tubers in gallon pots.

For the many customers who like spring bulbs such as tulips, Mattie explains bulbs' lifespan is about five to seven years. While most homeowners leave bulbs in the ground, cut flower growers dig up bulbs each year to keep them in good condition for replanting.

"Bulbs don't like moist soil," said Mattie. "That's why they do well in the Netherlands and the West Coast where the soil is more sandy and wicks moisture. We recommend not planting bulbs in the same area as annuals because annuals are watered throughout summer. If the bulbs are underneath, they'll be drowned out or get a disease, or freeze in winter with so much moisture."

Because tulip bulbs attract deer, Mattie suggests homeowners plant tulips close to the house. She also explains to customers that alliums help deter wildlife. "Hyacinths are also not attractive to wildlife," she said, "and fritillarias have an odor most animals don't like so they help repel deer and small mammals."

Garden center customers can attend workshops on container bulb planting for optimal seasonal color. "We teach people how to plant in pots and how force bulbs," said Mattie. "Then they can plant bulbs in another pot to save yard space for annuals."

One of the garden center's best-selling items is the "Dutch Garden 50 Days of Blooming," which consists of 50 bulbs including tulips, daffodils, hyacinth, iris and crocus. "They can be grown in a pot or a small trench, layered according to bloom time," Mattie said. "Something is always coming up to hide foliage that's dying back. We also talk about co-planting, like with tulips and hostas. Tulips like a little shade when they're dying back, and hostas are coming up and hide and shade tulips."

In autumn, when it's time to plant bulbs, Dutch Mill has the largest fall bulb selection in the area. "We ship millions of bulbs all over the nation but we also carry them in our garden center," said Mattie. "We have at least 50 to 100 daffodil and tulip varieties. We don't pre-package them so people can choose the quantities and colors they want."

Mattie said Dutch Mill Greenhouse is known for being a family business that cares about families. "We like seeing generations and new families coming in," she said. "We have three young kids, so we know what it's like and try to create a welcoming atmosphere."

Visit Dutch Mill Greenhouse online at dutchmillgreenhouse.com.



Mattie Berbee showcases one of the hearty hanging baskets that is popular at Dutch Mill Greenhouse.

Photo courtesy of Dutch Mill Greenhouse

them to schedule a time to ask questions so our staff can be prepared when they come to the meeting, and to bring pictures or send pictures ahead of time." Customers pay a consultation fee but receive money back in the form of a voucher to use for their project or in the store.

The garden center starts a variety of hanging baskets, custom planters and porch pots from plugs. Each year comes with the challenge of coming up with the "right" color combinations. "Half will be sun-loving, half will be shade," said Mattie, describing hanging basket selections. "Of that mix, we'll have the tried-and-true colors, and the team comes up with new combinations. Each year we introduce two or three we haven't carried before."

In the past, Dutch Mill Greenhouse

stage pre-orders as well as growing the rest of the hanging baskets.

The Berbees grow about half of their own vegetable starts and bring the rest in. "The ones we grow are specialty items," said Mattie. "We bring in fast turnover items like cherry tomatoes because they move so quickly. We grow our own super-hot peppers in limited quantities, and those have become popular with some customers."

Dutch Mill offers a large selection of perennials, some of which are bare root, grown by their wholesale division. A variety of hostas, peonies, bleeding heart, canna, liatris and clematis are popular selections.

Mattie has seen a renewed interest in dahlias. "Everyone thought dahlias were all giant dinnerplate size, but now they see smaller pom-pom varieties in different shapes," she said.

The next generation shares best practices

by Courtney Llewellyn

The American Farm Bureau Federation says that “young” farmers and ranchers are those age 35 and under. Just because they have less years on this planet doesn’t mean they don’t have wisdom to share.

At this year’s NAFDMA Convention in Austin, Texas, an under-35 panel from three different agritourism enterprises shared where they’ve struggled, where they’ve succeeded and what others in agriculture can learn from they’re experiencing right now.

Representing Wickham Farms in Penfield, NY, were siblings Dale and Paige. Dale is in his first year as a farm owner, and Paige is in charge of the farm’s donut operation. Sisters Audrey Allen and Sarah Henning were from Long Acre Farms in Macedon, NY; Audrey focuses on winemaking, managing the corn maze and events while Sarah became a partner five years ago. She handles the bookkeeping and special events. From Huber Family Farm and Orchard & Winery in Starlight, IN, were sisters Allie Huber (director of private events) and Marcella Hawk (who’s been full-time for 11 years).

The six young farmers first shared what they believe they do well and what they struggle with. Generally, they think they handle special events well and grow and market exceptional produce (and in the case of vineyards, exceptional wines and spirits).

The Huber team said they think they handle communication well on their operation, but it can be a struggle at Wickham and Long Acre. Like many (if not most) farmers, all of them said finding a work/life balance is difficult as well. The Long Acre team also noticed a different work ethic between

the different generations – the older folks believe in the grind no matter what; the younger folks understand the importance of strategic time off.

No matter the age of the owners, finding solid employees is a struggle, as is the ever-changing market, both for produce and for tourist attractions. Without an outline, succession planning can be tough too.

“Strategic planning is one of the most fun things we do on our farm,” Dale said. “We’re very candid about our revenues and expenses.” Wickham Farms focuses on both creative and financial planning during the winter months – and they make sure to get staff feedback while doing so.

The Long Acre sisters said strategic planning is a “team process” for them as well. Wrestling this part of the business from their parents is a challenge for Allie and Marcella, however. They’re still making the big decisions at Huber Farms.

“The biggest strategic investment you can make is to travel, see other farms and attend events like NAFDMA” for inspiration, Dale said.

And as for the planning issues at Huber Farms, Allie said, “Hound that older generation relentlessly to make those tech advances or other upgrades. They can be little things to streamline things. Just let the old system fail once and see what happens.”

Bridging the gap in regard to work ethic, Allie said she had to explain that she’s a better version of herself when she has one day off a week – but it’s situational. If she needs to work, she’ll be there.

Division of duties can help here. “Look at your job, figure out what makes you happy and try only working that new schedule for three months,”



(L - R) Panelists Dale and Paige Wickham, Audrey Allen, Sarah Henning, Allie Huber and Marcella Hawk talked about what’s working for them as they work to establish their presence on their operations.

Photo by Courtney Llewellyn

Sarah suggested. “Nothing is permanent. Have that older generation give it a shot too.”

“We all overstate our own importance,” Dale added. “We have to learn to let go.”

Audrey noted that while delegating jobs can be tricky, it can be a very positive thing. She said the key is to have some faith in your employees. Allie added that it can be hard to collect your thoughts in a structured order to give whole areas to someone else, but it does help connect different generations and commit to some standards as you do. “Remember than done is better than perfect,” she said.

Sarah said it’s an ongoing conversation to figure out how to keep those good employees year-round. Paige at Wickham Farms said she and others are salaried year-round, and the pay balances out between the busiest part of the season and downtime during winter.

There seems to be a bigger focus on “company culture” with younger generations. “I love going to work,” Dale said. “It’s a fun business we’re in – and

we need to make it fun for our people.” All three operations show their employees appreciation with food and recognition.

Marcella added that there’s always room for improvement, though. They work with their HR for better employee engagement. For example, they use a wellness app which offers both competition and prizes for those who use it.

Dale boiled down one of the biggest differences between the generations. “With older generations, you tend to understand why each person is there. For younger seasonal workers, you need a boss they can connect with. It isn’t about rank – but you need to be competent and confident.”

“Older workers ask why we’re doing something; younger workers tend to ask how,” Paige added. “And if someone isn’t doing their job properly, that’s a reflection on me not preparing them correctly.”

The panel circled back to drive home the fact that clear and open communication is critical. “You grow from those tough conversations,” Marcella said.



MDARD director tours asparagus-focused facilities

Last month, Michigan Department of Agriculture and Rural Development (MDARD) Director Tim Boring highlighted the positive and dynamic impact of Michigan’s asparagus industry by touring Michigan Asparagus Research Farm, New Era American Asparagus, Michigan Freeze Pack and NJ Fox & Sons.

“Michigan’s crop diversity and rich soils are critical to the success of our expanding food and agricultural industry,” said Boring. “We are home to 100 Michigan families whose farms harvest nearly 9,500 acres of land, yielding 6,000 to 8,000 pounds of homegrown asparagus per acre with 60% of their harvest being sold fresh through May and June. The remainder is sold to processors who freeze or can

Michigan farmers produce an average of 20 million pounds of asparagus during the annual six- to seven-week harvest season.

the product for distribution throughout the United States. Governor Whitmer and MDARD are committed to investing in our specialty crops while supporting smart agriculture principles fortifying the future of our food and agriculture industry.”

Michigan ranks first in the nation for asparagus production because of the state’s unique, sandy loam soil. This soil, found most often near Michigan’s west coast, is dominated by sand particles, but also contains enough clay and sediment to provide structure and fertility.

“Asparagus is the first vegetable of the season and important anchor on many farms along Lake Michigan,” said Jamie Clover Adams, executive director of the Michigan Asparagus Advisory Board. “The board is aggressively promoting fresh asparagus on social media and at retail across the Midwest to remind

Photos courtesy of MDARD

Asparagus 6

Helping the worker and the work in hot weather

by Courtney Llewellyn

Heat stress happens when your body has excess heat it can't get rid of. Heat strain is how your body responds to the excess heat. And everyone is at risk when the temperatures climb.

The trend in recent years has been longer, hotter summers – so how do you protect yourself and your farmworkers? Talking about “Mitigating Heat Stress and Increasing Productivity” at the most recent Great Lakes Expo were Matt Solberg, BSc, and Bethany Boggess Alcauter, Ph.D., with the National Center for

Farmworkers Health (NCFH).

Heat sickness often starts with heat rash and cramps, and when that happens, farm laborers should rest in the shade and drink water. It's more severe if you're dizzy, are nauseated or are vomiting, have a lack of urination and/or extreme thirst.

“Nobody wants to go to the doctor for this; they think it's not a big deal, but it can be if left untreated,” Alcauter said. “It's always better to be safe than sorry.”

The sickness can become an emergency when the affected person shows con-

fusion and altered behavior, has slurred speech, loses consciousness, has a high body temperature, is sweating profusely or has stopped sweating and their skin is dry and hot. It can look like being drunk. In these instances, cool the person as quickly as you can while awaiting medical assistance.

It was noted that from 2011 - 2016, the median heat index of workplace heat fatalities was 91° F – but fatalities occurred as low as 83°. The heat index was under 91° in almost half of those fatalities. Alcauter added that in Washington State, 25% of heat-related non-fatal illnesses occurred when the heat index was under 90°.

The risk factors for heat illness number three: the worker, the work and the weather. No matter where you work, remember that direct sunlight adds 15° to the air temperature.

Another sobering statistic was that agriculture, forestry and fishing workers are 35 times more likely to die from heat than other workers. Men are 32 times more likely to die from heat than women. Age is not a significant risk factor, as young men can fall ill as well. The largest percentage of heat-related fatalities – 34% – occur during July. Most workers fall ill between noon and 6 p.m.

And 71% of workers who die from heat exposure die on the day they get sick. “These are fast-moving emergencies,” Alcauter warned.

Dehydration is a major problem too. It can cause permanent kidney damage and rhabdomyolysis (or rhabdo), which presents with dark urine, muscle pain and fatigue.

Alcauter outlined the following hydration tips: Drink at least half a liter of water before starting work. Drink around one liter per hour, but that will depend on the worker, the work and the climate. Drink watered down Gatorade (two parts water, one part Gatorade) or

make homemade Gatorade (1/4 to 1/2 teaspoon of salt plus one tablespoon sugar, stirred into one liter of water).

One big hurdle to overcome when addressing heat stress is the “tough farmer” mindset. “There's a stigmatization of heat-related illnesses,” Solberg said. To combat that, create a culture where they can come forward and not be retaliated against or made fun of. And don't leave workers alone – have some sort of buddy system.

“Remember that even if you don't have any risk factors you can still get sick from the heat,” he continued. “Supervisors can require everyone to take breaks and drink fluids at periodic intervals so that no one ‘looks weak’ for taking a break. Have a zero tolerance policy for people making fun of others for reporting symptoms or asking to take a break ... Workers need to know they will not face retaliation or lost wages for seeking medical care.”

Important prevention measures include water and electrolytes (not energy drinks) that are easy to access, as well as rest areas and shaded spots that are easy to access. Make sure that all levels of workers are trained on recognizing and responding to heat-related illnesses (office staff, foremen, supervisors and farmworkers). Also be mindful that you may need to increase prevention activities if workers are working extended hours due to labor shortages.

There have been a few studies looking at the impact of prevention measures on worker productivity, including one with Central American sugar cane cutters. The researchers gave workers three-liter Camelbacks, set up shade tents, implemented frequent rest breaks (resting 25% of the workday) and provided workers with improved tools. The results showed that the symptoms of heat stress decreased, especially serious ones like dizziness and increased urine output. Water intake increased by 25%. Most notably, workers went from harvesting about five tons to seven tons of sugar cane per day per worker post-intervention.

“A few more studies are under way now, mostly showing similar or slightly improved productivity,” Alcauter added.

Some good resources for heat stress training include the Susan Harwood Training Program (at osha.gov/harwoodgrants/grant-materials/fy2018/sh-05032-sh8) and the NIOSH-funded FRESCO education program for agricultural workers (at ncfh.org/store/p4/Project_FRESCO.html).

NCFH staff can also provide trainings on heat stress recognition and prevention in English, Spanish and Latin American indigenous languages (via interpreters) or connect you with local trainers.



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FEATURES

In this issue

Country Folks GROWER



Saving energy without sacrificing quality – 16



Help sniff out spotted lanternfly – 21



Finding the right herbal farm property – 24

Helping the worker and the work in hot weather.....5
by Courtney Llewellyn

Orchard Insights.....7
by Tamara Scully

Mindful communication during a farm transition.....8
by Sonja Heyck-Merlin

What has shifted in ag consumer engagement.....9
by Courtney Llewellyn

Cultivating Thoughts.....11
by Bill Lamont

Corporate efficiency for greenhouse operations?15
by Courtney Llewellyn

Focus on farmer physical fitness22
by Sonja Heyck-Merlin

The Seeds of Science.....23
by Courtney Llewellyn

New markets with nutraceuticals.....25
by Courtney Llewellyn

On the cover

Celebrating their Dutch heritage with some oversized wooden clogs, Mattie Berbee poses for a photo op in the Dutch Mill Greenhouse. She runs the business with her husband Bob, grandson of the farm’s founder.

Photo courtesy of Dutch Mill Greenhouse

– 3



Asparagus from 4

consumers about this delicious, locally grown vegetable.”

The Michigan Asparagus Program was established by Michigan’s asparagus growers in 1978 under the authority of the Agricultural Commodities Marketing Act. Their mission is to improve the economic position of asparagus producers by supporting research and creating greater marketing opportunities. Michigan Asparagus Advisory Board accomplishes this by supporting research for marketing and production practices and asparagus varieties, implementing advertising and promotion programs and assembling and disseminating market information.

New Era American Asparagus represents a grower base along the shores of Lake Michigan and grows over 300 acres of asparagus. They have developed a short process to increase their customers’ shelf

life and quality of asparagus – the product is cooled with a Hydrocooler immediately after harvest. The product is then placed in a cooler prior to packing inside a completely refrigerated packing room.

Michigan Freeze Pack is a multi-generational family company committed to providing the highest quality frozen vegetables. Michigan Freeze Pack is a leading processor of frozen vegetables for the ingredient industry. Established in 1988, the 100,000-square-foot facility is in Hart, MI, in the middle of Michigan’s premiere growing region for vegetables.

NJ Fox & Sons is a fifth-generation farm that produces wines from its orchards and vineyards, first planted in 2008. The farm is in Shelby, MI, on 2,000 acres of land.

Throughout 2023, MDARD will meet with Michigan’s food and ag-



MDARD Director Tim Boring toured Michigan Asparagus Research Farm, New Era American Asparagus, Michigan Freeze Pack and NJ Fox & Sons to highlight the impact of Michigan’s asparagus industry.

ricultural businesses to discuss how they can continue to succeed and how the department can best assist their continuous growth and expansion.

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Orchard Insights

by Tamara Scully



Fire blight's causal agent, the bacterium *Erwinia amylobora*, has shown resistance to the antibiotic streptomycin, which is one of three antibiotics utilized to control this destructive pathogen. While most commonly known as a pest of apple trees, fire blight also affects pears and other plants in the Rosaceae family.

The lab of Dr. Kerik Cox, Ph.D., of Cornell University's School of Integrative Plant Science, has been focusing on managing fire blight in apple orchards as well as researching the genetics behind streptomycin-resistant strains of the pathogen. A recent webinar provided growers with background and updates on the latest in best management practices to keep streptomycin-resistant *E. amylobora* (SmR Ea) out of the orchard, and the advances made in understanding how the pathogen gains resistance.

The greater the number of *E. amylobora*, the more likely a mutation is to occur which would cause SmR Ea. When there are larger microbe populations, there are more opportunities for resistance to develop. In small populations, any *E. amylobora* that might become resistant to streptomycin would readily be eradicated by an alternate antibiotic – oxytetracycline or kasugamycin – and prevent the selection of resistant strains. Mu-

Strep Resistant Fire Blight Updates

tations causing resistance can also occur randomly without prior antibiotic exposure, and it would also be much less likely for such a mutation to appear within a low population.

Paths to Resistance

In 2002, two neighboring orchards in western New York were found to have the first detected streptomycin-resistant fire blight infections detected in the state. The disease was eradicated, and no other instances of SmR Ea were found until 2011, when a handful of nursery blocks used for budwood were infected and died.

From 2012-2020, the Cox lab collected 3,000 isolates from 182 commercial sites, and numerous strains of SmR Ea were found. Those strains were 99.9% homologous.

Those small genetic differences seen in *E. amylobora* were found to occur within a plasmid – a small, circular DNA molecule which is physically separate from chromosomal DNA, and which replicates separately from chromosomal DNA.

The "fingerprint" of *E. amylobora* plasmid DNA has three distinct sections, or spacers, which can evolve, gaining or losing DNA. The original strain in New York has been identified as 41:23:38. Other strains have been isolated, including some with both sensitive and resistant *E. amylobora* present, and which share the exact same profile. This phenomenon has led researchers to hypothesize that such strains may be indigenous to the farms on which they are found.

From 2015-2018, Cornell researchers examined 72 SmR Ea samples from 11 farms. These samples contained 27 distinct profiles.

When the season's weather provided the optimal conditions for *E. amylobora* to thrive, the number of strains seen increased. All of the strains must compete against one another for dominance, so having a mix of strains is actually beneficial, Cox said.

When fire blight pressure is low, and growers didn't need to spray antibiotics as frequently, the SmR Ea can't gain a foothold, and bacteria lacking the resistant gene are not selected out. In conditions ripe for fire blight, however, growers spray more, which can

eradicate the competition and leave SmR Ea to survive and thrive.

Two genes, known as strA and strB, have been identified as causing resistance to streptomycin. Both work by making a protein which has the ability to inactivate the streptomycin molecule. But it isn't a single mutation which causes the bacteria to become resistant to streptomycin. The mutation involves large pieces of genetic material, with hundreds of base pairs.

Researchers in other regions have also uncovered a "jumping gene" which codes for streptomycin resistance and can move directly from bacterium to bacterium via certain types of plasmids. In Michigan, physical movement of bacteria themselves, rather than a gene fragment being transferred from one bacterium to another, was found to be the cause of widespread fire blight outbreaks.

A jumping gene which moves from plasmid to plasmid within a bacterial cell, but cannot be transferred from bacterium to bacterium, is the culprit. Similar to citrus canker, some strains of SmR Ea can be dispersed by strong winds or rains.

A plasmid which is able to jump from host to host is prevalent in New York now. The original strain 41:23:38 is passed through budwood and trees and is not spread via jumping genes. Thus far it remains confined to a few western New York counties, and it's being monitored to see if it eventually spreads.

In addition, a strain with a particular mutation found to have an "incredibly high level of resistance" to streptomycin has been identified, Cox said. So far, this strain has only been found once in New York, but it is prevalent in Utah, Idaho, Wisconsin and Oregon.

Stopping Resistance

"What do we do to beat this thing?" is the question researchers are hoping to answer, Cox said.

The exact answers will vary farm to farm, but general guidelines include pruning out cankers; applying copper several times from late silver to one-half inch green; appropriate use of antibiotics and/or biologics into bloom; and perhaps preventative applications of prohexadione-calcium growth regulator for blossom blight and early shoot blight at the "early pink" stage, particularly in young and high-vigor orchards.

At bloom, forecasting models local to your orchard should be utilized. In high risk conditions – and combined with strong fire blight pressures on the farm – antibiotic applications should be considered.

"You really just need one well-timed application," Cox said. But knowing just when that optimal time is can be tricky. "If something doesn't look right, don't make an application. Ask for verification."

Post-petal fall applications appear to help select for SmR Ea, Cox said.

Monitoring and managing the orchard, both to prevent and contain fire blight, is the first step in protection. For farms without any SmR Ea, mixing streptomycin and oxytetracycline at the full rate and applying at bloom only if high risk conditions exist is recommended. Alternate applications with kasugamycin. Another option is alternating oxytetracycline with biologics and copper.

Orchard Insights 8

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Mindful communication during a farm transition

by Sonja Heyck-Merlin

"During the farm transition process, we can feel frustrated, feel like we're grasping at straws to find solutions. We also become suspicious of other people. Sometimes we make negative assumptions about other people's motives. We start to experience a downward spiral. We feel stuck. This is how everyone reacts when there is a conflict," Claudia Kenny said during a recent NOFA-NY conference.

Kenny is the co-director of the New York State Agricultural Mediation Program. At the conference, she discussed techniques to improve communication during a farm transition.

Clarifying Decision Making

"A lot of conflicts come in the door because decision making is unclear and creates a lot of tension," Kenny said.

It may be possible to prevent conflicts if the stakeholders discuss ahead of time which type of decision making will be used in various situations. There are four types of decision making (consultative, democratic, consensus and delegatory) and it's common for all types to be used during a farm transition.

In consultative decision making, a decision is made by one person after the group has discussed ideas and potential solutions. In a democratic process, the whole group discusses, and then there's a vote and majority rules.

Consensus decision making requires that the entire group agrees, whereas in delegatory decision making one person makes the decision for the whole group.

In a farm transition, the senior generation may go through a process where they consult the junior generations, taking into account everyone's preferences and opinions about the farm's future. They have decided to use a consultative process, but the junior generation may be unaware of this and assume it will be a consensus decision.

This leads to a lack of clarity in who gets to decide

and may result in a conflict. "Getting clarity about how decisions will be made and how people will be involved can help avoid misunderstandings and conflict from the get-go," Kenny said.

Listening to Understand

Kenny said one of the most effective ways to prepare for a farm transition conversation is to become a skillful listener. To Kenny, this means bringing the full self – eyes, ears, hearts and undivided attention – to the person speaking.

It also means setting aside personal concerns and prerogatives while someone is talking. The listener should strive to listen for new information with curiosity and to withhold judgment.

When it's the listener's turn to respond, Kenny suggested they strive to rephrase and reflect back to the speaker their words and their perspective. An attempt should be made to use the speaker's exact words to make sure the listener is understanding the speaker's point of view. This is an important communication tool because more often than not, the listener's perceptions are incorrect.

Kenny also discussed the "Iceberg Theory" of negotiation. In a farm transition conversation, a person's stance can be thought of as the part of the iceberg sticking out of the water. Underneath this figurative iceberg, however, are the unseen hopes, fears, desires, expectations and concerns that are often left unarticulated. A listener should be aware of and seek to understand this "below the line" subtext.

"The goal about listening is not to be perfect in every conversation. We all respond in unhelpful ways at times. We jump in and tell our own story. We refute what someone's saying. We offer advice instead of listening," Kenny said. "The goal is not to do those things but to know the difference between skillful listening, so you can refocus when you start responding in unhelpful ways."

Asking Curious Questions

Asking open-ended questions is a technique that can be used to understand some of the "below the

Mindful 9

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Orchard Insights from 7

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What's Ahead For New York Research?

The Cox lab is focused on collecting samples for the 2023 season. Since 2020, when 189 samples from 15 counties found that SmR Ea was present only in two counties, resistant strains of E. amylorea showed up in samples from 10 of 12 counties in 2022.

The lab is offering farm history reports which will help track the status of sensitive and resistant strains in each orchard, allowing growers to adapt best management practices to control their specific situation.

"Knowing when and in which block can really help to optimize management" of sensitive and resistant strains, Isabella Yannuzzi, graduate student in the Cox lab, said. "The more consistently an orchard is sampled, the more likely we are to

catch the resistance before it is widespread."

Tissue samples or fresh ooze samples can be mailed to the lab. The lesion where the healthy and infected tissues meet is where bacteria are most active, and wrapping samples in damp paper towels before mailing is recommended.

More detailed fire blight information from the Cox lab can be found at blogs.cornell.edu/coxlab/category/newsletters/fire-blight.

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What has shifted in ag consumer engagement

by Courtney Llewellyn

About 10 years ago, farmers started to feel this pressure, this need to pay attention and be involved in consumer engagement. "It's a weird thing that we agreed consumer engagement is a thing we needed to focus on," said Janice Person of Grounded and Rising, a community and training platform focused on bridging the rural/urban divide.

She presented "Consumer Engagement – A Decade In, What's Shifting?" at the recent Farm Bureau Fusion event.

Person broke down how this shift came about. It started with the social

media boom of 2005 - 2007. Agriculture was a bit behind the curve then and only began to organize around 2009 - 2010, but once farmers did, they began connecting with all kinds of people. Farmers were also reaching out to new venues (such as the South By Southwest festival, partnering with museums and with promotions at baseball games) – and reaching out to other farmers.

This big leap into the digital space was led by technological leaps happening with cell phone cameras and biotech. The need to engage more online was also catalyzed by the deterioration of trust and lack of shared experience – urbanization and misinformation about ag were happening rapidly. The beauty of social media is that it provides the ability to reach people directly without huge marketing budgets.

"We saw a very different reality than before," Person said of this evolving shift. "Where was a premium for 'better.' There was less farm knowledge and more connection to similar people, and au-

thority was discounted if it was seen as a part of 'they,' the others."

But things continue to change. Person said we can take a lot of cues from the young adults of Gen Z (those born between 1997 and 2012). "They are the most diverse generation ever and globally thinking and making money and hustling, and they are happy to share how they're spending their money," she said.

In general, Gen Z places a high value on education, are politically active, see their food as a part of themselves and have a food philosophy. (Want to learn more about food philosophy? Check out foodintegrity.org.)

Consumer engagement is easier now with these young adults thanks to changes in technology. Think of the ubiquitous QR codes, now often seen as shortcuts to payment options at farmers markets. People are continuing to purchase groceries online post-pandemic, because some consumers don't mind paying for convenience.

For farmers, Person offered this tip: "With the social media explosion, focus on what works best for you instead of trying to do everything." Rather than try to be on every app, use the three that result in the best return on your time investment.

What do all these changes mean for outreach though? "People are actively making changes in how they live, work

and eat," Person said. "There are lots of new opportunities out there; there is no single way to approach things."

Being flexible can definitely be an advantage. For example, if a farmer offers a CSA but expects the entire share amount paid up front, try offering the cost in a few more manageable payments. Person noted that younger consumers tend to like smaller, regular payments versus using a credit card or carrying debt.

The culture will continue to shift, but what's working right now for engagement is offering experiences/participation (either on-farm or off – Person said openness is a prerequisite for trust). Younger Millennials and older Gen Z'ers like to learn while enjoying the process.

Focus on being easily found in the social space too. Younger consumers tend to search for things to do and places to visit through social media apps and not search engines.

Person also recommended partnering with someone who is already more engaged on social media – perhaps an "influencer," perhaps someone who just knows how to utilize it better than you do.

"You don't have to do everything yourself. It may be worth it to get that one big experience [and have it go viral] rather than develop your own entire channel," Person said.



Mindful from 8

line" subtext. Open-ended questions invite people to reflect and share their ideas in more depth. Using them also demonstrates a sincere interest in understanding others' needs and creates a sense of validation for the speaker's opinions.

Kenny suggested using short, concise questions – no more than seven words – such as "What's really important to you about this?" and "What matters most to you about this?"

"The questions are di-

rect. They're not too complex. The idea is that they are invitations, not probes," Kenny said.

By using this type of questioning, farm families can seek to better understand each other's perspectives. According to Kenny, the human mind is hardwired to egocentric thinking, creating a barrier to understanding another person's perspective.

"Recognizing someone else's point of view is not simple. It's not intuitive. It takes a little

bit of intention. It takes hard work and practice," she said. "If you put in the effort, it's a skill that anyone can learn."

This conscious attempt to understand another's point of view is worth the effort in Kenny's opinion. It can create real learning and reshape interactions and relationships.

Finding Support

If a farm family is struggling to communicate during a farm transition, Kenny recommended getting support from a mediator. Mediation and

arbitration should not be confused. A mediator is a neutral party who helps to create dialogue and promote understanding between the participants; they are not decision makers. An arbitrator acts more like a judge, handing down a decision after listening to the positions.

Mediation is voluntary, with all participants agreeing to participate. A mediator works for all of the parties involved, helping each person to be heard. They offer a neu-

tral process so everyone gets the time they need to bring up the points important to them.

People can call upon the mediation process at any point of a farm transition. "People reach out for mediation when they want support in promoting understanding, preserving relationships and coming up with creative solutions. So, usually it seems like there is no solution and there is no way forward. People are often at an impasse when they come to mediation.

Sometimes they're looking to make clear agreements and to prevent future disputes," Kenny said.

There are 44 mediation programs in the U.S. funded by the Farm Bill. In 2018, ag mediation programs were authorized to offer services to farms in transition. These programs are free or low-cost and may be conducted in person or virtually.

Producers can reach out to one of the programs and discuss if the situation is appropriate for the mediation process. If so, all participants go through an initial interview. In some situations, conflict coaching is used before the initial interview to help participants gain clarity about what they hope to achieve before sitting down as a group.

"People usually reach out for mediation after a specific situation has escalated," Kenny said. "It's fine to reach out before a situation escalates as well. Really, any time a supportive dialogue would help create a safe space is a good time to get some help."

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Cultivating Thoughts

by Bill Lamont



Thoughts on Weather

I just finished an excellent book, "Mountain Man: John Colter, the Lewis and Clark Expedition and the Call of The American West" by David Weston Marshall; now I am reading "Guardians of the Valley: John Muir and the Friendship that Saved Yosemite" by Dean King. The breadth and intensity of the weather events highlighted in both these books is truly breathtaking.

Both books take place in the western U.S. in the rugged mountainous regions – and highlight Muir's appreciation of the natural beauty and spiritualism of the outdoors and his awe and appreciation of weather of all kinds.

Webster's defines weather as "the state of the atmosphere with respect to heat or cold, wetness or dryness, calm or storm, clearness or cloudiness." The mountain men, like their Native American counterparts, had an innate sense of the changing weather and could read the signs that indicated a change in it. Today we have meteorology, concerned with the processes and phenomena of the atmosphere, especially as a means of forecasting the weather.

I have been in grower's offices that sport sophisticated monitors tracking the weather both nationally and locally. They may even have weather stations set up in their fields that help them in scheduling farming operations from planting to timing application of sprays for

disease control based on weather data.

If we consider all the calamities that can befall a grower, weather is still the one that is not in their control. One can try to escape the effects of weather by farming indoors (in a greenhouse or high tunnels), but even so I have seen weather prove overwhelming with severe storms that bring high winds, baseball-sized hail, heavy wet snow or maybe a tornado.

If we look at the different facets that make up our weather, we first think of heat and cold – the temperatures of the soil and air. For centuries, growers have attempted to get a jump on the growing season by using windbreaks, glass cloches, hot caps, plastic mulches, drip irrigation, low tunnels, high tunnels, transplants and row covers to hopefully get in the markets earlier.

In many cases, this works fine, but sometimes a killing cold snap can come roaring down from Canada and kill or stunt their crops. Then the normal orderly progression of harvests up the coast is disrupted, and harvests overlap one another (and the price of produce can tank). I think of the cabbage market as a classic example.

Another example of trying to outwit Mother Nature is the hoops sweet corn growers go through to have sweet corn on the Fourth of July using clear plastics over direct-seeded corn to hasten its emergence or transplanted corn.

Growers try to avoid extremely high temperatures, especially for crops that are susceptible to a decline in quality (such as some leafy greens, broccoli or tomatoes) by planting date modification or by breeding new varieties resistant to such quality issues brought on by high temps.

Wetness or dryness can be real problems, especially for vegetable growers where all they're really doing is selling water packaged in a vegetable-shaped container. Rainfall can be spotty and growers who watch the sky hoping for rain are going to lose out in the long run. We've seen the development of many types of irrigation systems to mitigate the lack of moisture at critical times in the development of crops. We've had solid set aluminum sprinkler systems, moveable aluminum pipe, traveling guns of various sizes and capacity, large circle pivot irrigation systems, furrow irrigation and drip irrigation.

I have observed more adoption of drip irrigation throughout the country which provides more precise control over the application of water and fertilizer and a reduction in the amount of water being applied. There is a real push to refine the precision of drip irrigation through enhanced instrumentation in the field.

I believe most growers would rather have a dry year where they can control the application of moisture than a wet year. Let the rain that falls fill the ponds, wells, creeks, etc., that are the water sources for irrigations systems.

Wetness can also cause problems with diseases and interfere with harvests. One advantage of high tunnels is that they keep moisture off a crop and lessen the impact of diseases and permit activity inside to continue even though it is raining.

Cultivating Thoughts 12



Red sky in morning, sailors take warning/red sky at night, sailor's delight.
Photo by Bill Lamont



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Research shows the future of UV for managing mildews and bacteria looks bright

by Nick Skinner, John Bullough and Mark Rea, Mount Sinai Light and Health Research Center

The anti-microbial properties of ultraviolet (UV) light have been known for more than a century, and its use for water and air sterilization has been commonplace for at least 50 years. However, using UV to control plant diseases in field crops is a relatively new concept.

Our research team, along with others at Cornell and the University of Florida, have found it to be an effective and economical treatment for many, but not all, plant pathogens. Additionally, UV does not share some of the drawbacks of pesticide treatments, like the development of resistance or pre-harvest interval and restricted entry interval limitations that can be problematic for growers' field work and harvest schedules.

Understanding UV Application

UV dose is quantified in terms of joules per square meter (J/m²) and represents the UV energy delivered to a given area. Joules are calculated from the output power of the UV lamps in the treatment device (in watts) multiplied by the plants' exposure time (in seconds). Joules are then divided by the area treated (in square meters) to obtain the dose (J/m²).

Cultivating Thoughts from 11

Next, we have calm or storm. Give me calm (although storms do bring moisture). Big storms – sometimes called “super cells” – can spawn tornadoes that can damage homes, farm buildings, woods and fields.

There is another weather event that can be very localized and devastating in a matter of minutes to a crop – a hailstorm, with hail that can range from pea- to softball-sized. I have seen the sky turn greenish with puffball clouds (signs of severe turbulence) and then had hail rain down. I have visited fields of staked tomatoes previously full of beautiful, large green fruit with hail embedded throughout. The plants were stripped bare. I have seen devastation to fields of other vegetables in various locations over the years. The only thing you can do if you think you can salvage the crop is spray a fungicide to lessen the impact of diseases on the exposed plant tissue.

In a matter of minutes, one's entire crop can be lost. Hail can also damage glass greenhouses and damage, shred or ruin the plastic on greenhouses or high tunnels – not to mention roofs, cars and machinery.

When we think of clearness or cloudiness, it

tends to be a local/regional phenomenon. The Northeast is often cloudy. If we go southwest, we'll find that that region has a preponderance of sunshine. A lot of large greenhouse operations are located there for that reason.

The reason that this component of the weather is important is that plants grow well in sunshine and the sun tends to warm things up. After a rain the sun comes out and begins to dry things off. Another factor is that if it is always cloudy and rainy, we humans tend to become depressed. I vote for sunshine for both crops and those who grow them.

Weather is a big factor in the lives of farmers and humans in general. Having served in the Navy, I have a healthy respect for weather and storms and for the power of wind and water. We can try to mitigate the effects of weather on our crops, our farming practices and on its unpredictability at times, but as the adage goes, “Keep your eye to the sky” like the mountain men, Native Americans and others have throughout history.

You can contact me with feedback on my columns or ideas for future columns at wlamont@psu.edu.

Different combinations of UV power, exposure time and treated area can be used to obtain the same dose. Alternately, changing one variable, like exposure time (by altering ground speed, for example), can produce different doses with the same treatment device.

Research has shown that UV treatments applied during dark hours are more effective because some wavelengths in visible (day) light can reverse the damage to the pathogen. Accordingly, all UV applications

were made after sunset in our studies.

Squash Trials

Powdery mildew (PM) is a perennial problem for growers of summer squash and related cucurbits. In a 2019 field study of yellow squash, we compared weekly UV doses (200 J/m²) to conventional fungicide applications and no treatment. UV treatments used

Research 13

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Research from 12

an array of tubular glass UV lamps mounted to a high-clearance tractor and were made after sunset. Our results demonstrated that UV controlled PM but not as effectively as the grower's fungicide program.

In 2021, a follow-up field trial with yellow squash and zucchini compared two UV dose levels (240 J/m² and 480 J/m²) applied once or twice weekly to conventional fungicide treatments. While none of the UV conditions delayed disease onset as well as fungicide treatments, two applications of UV per week performed better than one. Increasing the dose level above 240 J/m² didn't provide any additional benefit.

The dense nature of a squash canopy can block the UV from providing an effective dose at the base of the plants. To counteract this effect, in 2022 we investigated the use of air jets to agitate the canopy during UV treatment. We compared disease severity in plants treated with weekly fungicide, UV and UV with

foliage agitation (all UV doses were 240 J/m² applied twice weekly). The UV treatments alone delayed PM onset longer than the treatments of UV with agitation, which performed very similarly to weekly fungicide treatments.

Despite the agitation's improvement of UV penetration into the canopy, the air jets likely spread PM spores to healthy leaves, outweighing the benefits of higher UV levels near the plant bases.

In addition to PM, angular leaf spot (ALS) can also affect squash. During the 2021 trial, the zucchini plants treated with fungicide (including weekly applications of a copper fungicide labeled for ALS) had the highest disease severity and were noticeably stunted compared to the plants treated with UV only.

Cucumber Trials

Downy mildew (DM) is another fungal disease which affects all vine crops but is particularly devastating

to cucumbers. Management of the pathogen for this disease is challenging and is currently limited to chemical fungicides and planting resistant varieties. A 2020 field study of field-grown cucumbers compared different doses (120, 240 and 480 J/m²) and frequencies (once or twice weekly) to conventional fungicide and to no treatment. The following growing season, UV (at 480 J/m²) provided twice weekly was compared to conventional fungicide and to no treatment. Treatments were all made after sunset using three-point hitch mounted UV lamp array.

While none of the tested treatments controlled DM completely, fungicides outperformed all of the UV combinations. UV applied twice weekly generally performed better than once weekly, and higher dose levels offered a modest improvement over lower dose levels, a logical trend given that the dark pigmentation of DM spores helps to protect them from damage caused by UV energy.

Research 14

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Demonstrating how the UV treatment is applied to the crops.
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Left – fungicide only. Right – with the UV treatment.

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SAF to honor next gen floral pros with new award

The Next Gen Rising Star Award is a new award created by the Society of American Florists, which honors forward-thinking young professionals. Nominees must demonstrate creativity, innovation, tenacity and leadership in their work – and potential to make a positive impact on the floral industry. The recipient will be announced in September at SAF Phoenix 2023, the organization's 138th Annual Convention in Scottsdale, AZ.

Renee Tucci, AAF, AIFD, PFCI, who sits on SAF's awards committee, helped develop the award to celebrate outstanding next generation floral professionals for their achievements and commitment to the industry.

"This kind of growth is exactly what our young leaders should be doing to advance design and product development in floristry," Tucci said. "Bringing attention to these individuals will only encourage others to do the same, which will be a win for all!"

The award builds on the work SAF has been doing to cultivate the next generation, a vital initiative for the future of the floral industry. In 2022, SAF hosted its inaugural Next Gen LIVE! event in Miami for floral pros in all segments 45 years old and younger. The event gathered more than 160 attendees from the U.S., Colombia and Ecuador for two days of education, networking and a tour of floral importing facilities.

SAF has continued to foster the relationships formed at last year's event through a monthly virtual happy hour, an active Facebook page and a quarterly book club.

Next Gen LIVE! 2023 will take place June 11 - 13 and include educational sessions that focus on consistent five-star customer service, digital marketing, communication best practices and leadership styles. Plus, attendees can choose between two tour options:

a behind-the-scenes look at progressive floral retail operations or importing and distribution facilities at the Miami International Airport.

To nominate a young professional in any segment who represents a promising future for the industry visit safnow.org/about-saf/awards-certifications/next-gen-rising-star-award. Nominations are due by June 30.



Research from 13

Common Themes

As part of both the squash (2021, 2022) and cucumber (2021) trials, combinations of fungicide and UV treatments were explored, with very similar findings: weekly fungicide treatments combined with twice weekly UV treatments were more effective at controlling disease than either treatment alone. This was especially true

for the treatment of squash PM, where the disease onset was delayed seven to 14 days compared to fungicide treatment alone, but the effect was also observed with cucumber DM.

The result was also consistent with earlier studies of UV treatment of PM on strawberries, which found that UV applications boosted the efficacy of fungicide treatments. The

ability to improve fungicide efficacy may be particularly important for growers struggling with hard to manage diseases like DM.

Future Work

While UV is demonstrating value in the field, an exciting technological advancement taking place is development of UV-producing LEDs. Advancements focused on increasing

UV output are rapidly making UV LEDs a viable replacement for the traditional glass tube-based fixtures, which are approaching obsolescence.

As electrical efficiency improves, the UV light fixtures can become more compact and lightweight, allowing for integration into other equipment, such as sprayers. The marriage of UV sources with equipment

like sprayers could allow growers to easily and economically accomplish the combination treatments that have consistently outperformed fungicide or UV treatments alone, which is a big win for growers struggling with difficult to control diseases.

Stay tuned – the future of UV is bright.

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Corporate efficiency for greenhouse operations?

by Courtney Llewellyn

Many are familiar with the phrase “stop and smell the roses,” which encourages us to take a break from our usual hustle and bustle. A presentation at Cultivate’22, however, flipped that notion on its head. Cathryn Fageros, the business process improvement manager at Ball Seed Company, spoke about using the fast-paced and structured roles of the corporate world and integrating them into horticulture.

(Fageros admitted that while 2022 was her first year in the horticulture industry, she has a valuable career history in operations.)

Lean is often used as a synonym for efficient, and so Fageros began by asking which practices can make your businesses leaner. She said at Ball, they have distilled them down to four:

- Understanding the customer and what they value
- Building deep understanding of the process
- Reducing waste, process unevenness and overburden
- Continuously improving the process and outcomes

“Because this industry is seasonal, evenness for staffing is key,” Fageros said about the third point.

But how does an organization approach these practices, which can appear a little vague at first glance?

A tip Fageros provided is to attack your organization’s biggest problem first, whether that’s the customers, the processing, the waste or not improving.

To understand the customer, talk with them to understand their needs and then clarify the priority of those needs and where your process isn’t meeting expectations. Then, make a plan and take action to deliver measurable improvement. “The secret sauce is to quantify things,” Fageros said. “Get numbers.”

For a deep understanding of your process, she suggested taking a Gemba walk. As described by author James P. Womack, a Gemba walk is “an opportunity for staff to stand back from their day-to-day tasks to walk the floor of their workplace to identify wasteful activities.” Fageros said the walk is an opportunity to “get out of the chair or greenhouse to understand before you try to change something.”

Document your processes and double check with staff to see if what you observed matches with what they do. Once you have that information, create a value stream map, noting how much value you add at each step of your process, with measurements, to look at your big picture.

According to the model Fageros works under, there are eight forms of waste, often abbreviated to TIM-WOODS: Transport, Inventory, Motion, Waiting, Overproduction, Overprocessing, Defects and Skills. Waiting and Overprocessing are great first places to look for waste.

“The number one waste form is waiting,” Fageros said. “Number two is wasting skills – everyone in this industry is an expert in something, so share that knowledge. Number three is wasting inventory, including your time.”

Once your wasteful areas are identified, prioritize and implement process changes to eliminate that waste.

Fageros suggested using the Kaizen cycle for improvement. Kaizen is defined as an approach to creating continuous improvement based on the idea that small, ongoing positive changes can reap significant improvements. Kaizen is usually based on cooperation

and commitment – in contrast to approaches that use radical or top-down changes for transformation.

“Measure what makes sense so we can track our improvement progress over time,” she said. “And communicate your successes broadly so that others can learn too.”

Joining Fageros for the presentation was Tom Wheeler, director of growing operations for Bell Nursery USA.

“With nine sites, logistics create challenges and positives,” Wheeler said. “Transport has a huge opportunity for savings, and does overproduction, especially coming off the COVID spike and gardening fever and things going back toward normal.”

He mentioned wanting to become more lean with overprocessing too. “We’re all focused on quality but also on making money – and we’re our own biggest critics of our products,” he said. “Consumers might not be as discerning as we are.”

Wheeler also said his operation is always looking at efficiencies, even with the number of plants per pot. “We like to minimize plants per pot when we can – and adjust our production schedule based on the time of year,” he said.

To help him and other operations with their goals, Fageros said key performance indicators (KPI) are needed. “Have workers be responsible for key measures,” she said. “Put targets down so you can try to fix the gap between where you are and where you want to be.”

Another tip Fageros gave: Figure out your needs on your own if you can, because consultants are expensive, both with your money and your time.

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Saving energy without sacrificing quality

by Sally Colby

Energy costs are a concern for every greenhouse grower, and it can be difficult to cut corners. Dr. Garrett Owen, assistant professor, sustainable greenhouse nursery systems, Ohio State, discussed energy saving options during a greenhouse management workshop sponsored by Ohio State.

Owen described the work he did in collaboration with USDA-ARS. The case study, which was based on accumulated simulation data, looked at spring flowering bedding plants to determine the water and carbon footprint of floriculture crops.

The study examined three different environments including an unheated, unlit high tunnel; an unlit, heated greenhouse; and a 68° F heated greenhouse with supplemental lighting to manipulate the photoperiod to maintain 16 hours of light.

The temperature in the high tunnel averaged about 12 to 15 degrees lower. “When we compared the environmental data to the greenhouses,” said Owen, “we saw a higher daily light integral – the amount of light plants received in 24 hours. Once we take environmental data into account, we can see how it significantly manipulated plant growth and development and marketability of two Coleus cultivars.”

Although theoretical simulation data is useful, a subsequent real-time study

that measured energy and water use for snapdragons and petunias allowed researchers to put hard data behind carbon and water footprints. Data points began at the time of transplant and were collected until plants were marketable (about 21 days later).

Owen wanted to examine variations in greenhouse lighting. “The greenhouses were still heated to 68°,” he said, “but we wanted to simulate a grower that didn’t have supplemental day extension lighting.”

One house had industry standard high-pressure sodium lamps and two greenhouses had commercially available LEDs – one with a higher proportion of blue light, one with more red light.

“In general, all crops looked marketable,” said Owen. “However, under the high tunnel we had faded flowers, which is an indication of heat stress in an environment without fans to exhaust accumulated heat. Snapdragons grown under high tunnel conditions were not marketable compared to greenhouse-grown crops. Even with greenhouse-grown, we saw a delay in marketability or time to flower with or without supplemental lighting.”

He added that there were more superior plants under LEDs compared to those grown under sodium lamps. Petunias were all the same size under various growing conditions, but there

were differences among snapdragons.

Horizontal airflow fans required the most energy compared to inflation blowers. “We understand horizontal airflow fans can be set to be on and off,” said Owen. “They needed to maintain a constant, and that’s where increased demand was seen compared to other components that help manipulate the environment.”

The study showed that horticultural lighting units accounted for 69% of to-

tal electricity. “This allows us to think about where to be more efficient in implementing strategies to help reduce electrical or heating costs associated with crop production,” said Owen.

“We’re looking at \$2,800 to \$3,200 to produce 4.5-inch snapdragons or petunias,” said Owen. “If you have a greenhouse that has about 78% ditching (space use) efficiency, then you will

Saving energy 17



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Saving energy from 16

have about 38 cents per pot of energy and carbon costs associated with heating the greenhouse for producing snapdragons or petunias. Adding lighting adds about 43 [cents] per pot for 21 days. That excludes substrate, pot, labor and any chemicals.”

He described several energy-saving strategies for various production methods, including production delay if it isn’t worth starting a crop early. Plugs or root-ed liners can be transplanted later, then greenhouses can be heated for seed production, plugs or cuttings.

Consolidating production areas is another strategy. “It’s putting together crops that are cold temperate, cold intermediate or cold sensitive so you aren’t heating multiple greenhouses or bays,” said Owen. “Alternative growing areas can be low tunnels with retractable covers that provide cold protection and manipulate the photoperiod.”

In some cases, a high tunnel is a viable alternative. However, such structures may lead to heat stress which can affect plant growth, development and marketability. Heat stress can result in faded flowers, flower bud abortion and reduced aesthetic value.

Other strategies include repairing damaged parts of a greenhouse structure such as glazing material. Owen said this sounds simple, but glazing is often not intact. Growers should also address air infiltration under doors or through gaps where additions have been made, or air leakage around exhaust fans. Temporary plastic on doors can help growers manage greenhouse temperatures.

Cultural practices are influenced by reducing air temperature. Under cooler greenhouse conditions, applying fertilizer with excess ammoniacal nitrogen may induce ammoniacal nitrogen toxicity, resulting in plants that appear chlorotic.

Phosphorus deficiency can be induced at lower air temperatures because the substrate temperature is also cooler. Reduced root activity means roots are un-

able to take up sufficient phosphorus and deficiencies appear. However, some crops express different pigments or intensify foliage color or flower color under reduced air temperatures. It’s important to conduct nutrient/substrate testing to verify phosphorus deficiency related to air temperature.

Iron deficiency can occur under reduced air temperatures in relation to irrigation. Waterlogged substrate results in reduced root activity and induced iron deficiency. This can be overcome by increasing air temperature, reducing irrigation frequency and duration or providing fertilizer with iron chelate.

Thermal blankets over crops help create a microclimate to maintain a desirable temperature. Root zone heating provides heat precisely where it’s needed and can be done under benches or across the greenhouse floor. Root zone heating can also be done in high tunnels.

Root zone heating can improve plant quality and enhance marketability. In a cold tolerant genus such as *Osteospermum*, root zone heating had no positive effect. However, with a cold sensitive genus such as *Vinca*, the negative effect was overcome with 80° root zone temperature.

Air temperature has a significant effect on crop development and flowering. Owen explained that all plants have a base temperature at which crop development progresses, and as temperature increases, plant development increases to the optimal temperature.

“As we continue to increase temperatures, we’ll see a negative effect on the plant up until the plant stops developing,” he said. “That’s considered the maximum temperature.”

Plants can be grouped based on their base temperature: cold tolerant, cold temperate (intermediate) and cold sensitive. Grouping plants according to base temperature allows growers to make energy efficient decisions on reducing air temperature in different

houses, such as for cold-sensitive tropicals.

“If we know how to group plants according to their base temperature,” said Owen, “we can make energy efficient decisions on reducing air temperature in different houses.”



Routine greenhouse repair and maintenance can help cut energy costs.
Photo by Sally Colby





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Various ventilation options for tunnel growers

by Sonja Heyck-Merlin
Chris Callahan and Becky Maden of University of Vermont Extension discussed high tunnel ventilation during a Vermont Vegetable & Berry Growers Association webinar. Callahan is an agriculture engineer and Maden is a vegetable nutrient management specialist. According to Callahan, excessive temperature and humidity are often responsible for plant molds and mildews in high tunnels, including botrytis, gray mold, tomato leaf mold, powdery mildew and downy mildew. Growers should be

shooting for less than 85% humidity in their high tunnels to help prevent these issues from occurring. It's important to differentiate between circulation and ventilation. In high tunnels, circulation is usually generated by horizontal airflow (HAF) fans. HAF fans mix the air in the space, helping to provide consistent conditions in high tunnels. "If we don't mix that space well, oftentimes what happens is the corners will have dead spots. You might see increased disease there because the air

is stagnant and has more of an opportunity to condense and promote molds and mildews," Callahan said. Ventilation is the actual exchange of air – bringing fresh air into a space and exhausting the humidified air or excessively warm air from inside the tunnel to the outside. Callahan said, "HAF fans circulate the air. They mix, they stir, they distribute, so adding more HAF fans is not going to ventilate the tunnel." Passive systems – ones not requiring electricity – are the simplest ways to

improve high tunnel ventilation. Rolling up the sides and opening the doors are examples of passive ventilation. If these are the only methods a grower uses, Callahan feels that it's critical the high tunnel is built in a spot with reasonable crosswinds. Sometimes, he sees situations where passive ventilation is inhibited by hedgerows or woods. Another form of passive ventilation is to add gable vents on the endwalls of the tunnel or a ridge vent. "This leans

Tunnel growers 19

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Military veteran farmers invited to AgrAbility Regional Workshop

Military veteran farmers, or those interested in starting a career in farming, are invited to join National AgrAbility for a Veterans in Farming Regional Workshop in Indianapolis June 6 - 8.

Sessions will include veteran farm programs and resources, farming with a disability, business planning, land access and estate planning. Veterans, service providers, ag professionals and occupational and physical therapists are encouraged to join for educational sessions and to network with other peers and professionals. The last day will consist of tours of

veteran-owned agricultural businesses.

"Veterans have served the nation in uniform and many of them want to serve on farms now," said Joe Ricker, AgrAbility veteran outreach coordinator. "Farming allows them the opportunity to be challenged and provides some therapeutic values after service. Tied with AgrAbility and their passion to help people with physical challenges, we expect this workshop to be valuable to both the veterans and those that help them."

Registration and additional information can be

found at agrability.org/rtw/check-back-for-upcoming-regional-workshops. The three-day conference costs \$125, or attendees can attend the first two days for \$75.

The workshop will take place at the Hilton Garden Inn, 8910 Hatfield Dr., Indianapolis, June 6 - 8.

The National AgrAbility Project (NAP), hosted at Purdue University's Breaking New Ground Resource Center, works to enhance the quality of life for farmers and other ag workers with disabilities.

Tunnel growers from 18

on the fact that essentially any vertical structure is a chimney. If you have hot air inside something and you give it an opening up high, if that air is hotter than what is outside, that's going to

drive ventilation," Callahan said.

Gable vents can include wax cylinders which open and close louvers without electricity. These sealed cylinders are filled with wax that expands and

contracts as the temperature changes.

On Maden's vegetable farm they've taken a unique passive approach to ventilation by moving toward using higher ground posts with a slightly narrower overall width. She feels that the extra height has made a huge difference on ventilation.

She said, "The airflow just feels drier. They grow

a nice tall crop. For tomatoes, it feels like a game changer."

Callahan said that with this design, growers get more roll-up side height and also more height to drive the "chimney effect." The moisture that is generated inside the tunnel has more space to occupy.

Unlike passive systems, active systems use electric motors to spin fans and move air. An example of an active system includes two endwall exhaust fans, two inlet louvers on the opposite endwall and a thermostat that opens the louvers and turns the fans on when the temperature is above 85° F.

An alternative to exhaust fans are ridge vents operated by a motor and a rack and pinion. These are sections of the roof designed to open and close, allowing warm, humid air to escape out the top. The drawback to ridge vents is the upfront cost; exhaust fans cost between \$2,000 and \$3,000 in a 90-foot tunnel, whereas a ridge vent is closer to \$5,000. The electricity usage for the ridge vent, however, is much lower than exhaust fans. And ridge vents are quieter.

Another type of active ventilation is using HAF

fans inside of the tunnel in conjunction with other ventilation methods. According to Callahan, HAF fans should be placed at least every 50 feet. If the crop in the tunnel has a lot of vegetation, like tomatoes and cucumbers, he recommended placing a HAF fan every 20 to 30 feet. HAFs are usually placed in a "racetrack" pattern. Unfortunately, in this system, the air in the corners tends to stagnate.

Vertical airflow fans are another option. They pull the air up vertically and send it down the side, where it hits a curved shroud and exits out the side. They are commonly found in commercial chicken houses.

"We really like vertical airflow fans," said Maden. "With the HAF fans, it seems like when you have a really thick canopy of tomatoes, it might not be moving air the way we want. Vertical fans seem to be doing the trick." She uses three in a 30-by-90-foot tunnel.

Another ventilation option is positive pressure ventilation – instead of pulling air out of the tunnel, a fan blows air in. Sometimes the air passes through a heater, and it is delivered through a sock with little holes distributed throughout it.

They're typically located up high, but some growers have found benefit from them lower, especially for early season or winter production.

Tom Akins of USDA-NRCS added that there is cost sharing available for existing tunnels through EQIP. For example, EQIP may cover retrofitting tunnels with ridge vents, adding HAFs and installing end ventilation units. The first step is to participate in an energy audit, which NRCS can also cost share.

Finally, Callahan believes that growers need more quantitative data to help inform their decision making about what ventilation practices are working and where they can make improvements. He thinks growers should measure humidity in their tunnels in a few different locations.

"I would encourage everybody to consider increased measurement and monitoring in both temperature and humidity. Remote monitoring, particularly for tunnel and greenhouse conditions, has become much more accessible," he said.

For more information about high tunnel ventilation, go to go.uvm.edu/tunnelventilation.

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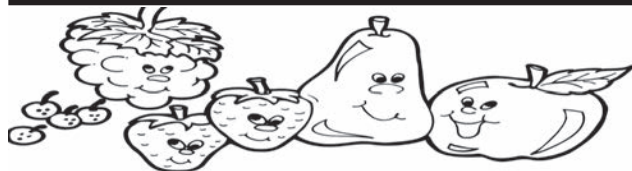
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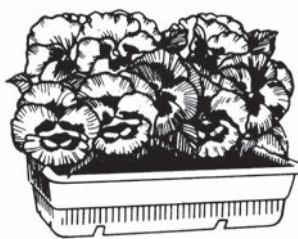
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Calling all canines: Help sniff out spotted lanternfly

From New York to North Carolina and as far west as Illinois, the invasive spotted lanternfly (SLF) is causing chaos in many states where ag and forestry industries are essential to the economy. It has been estimated that crops and forest production losses caused by insects and pathogens are close to \$40 billion a year.

SLF, native to mainland China, preys upon 70-plus host plant species, stealing their nutrients with their piercing snouts, called stylets. They are often characterized as “hitchhikers” for their ability to move long distances through human-assisted movement. Envision logging trucks traveling back and forth across the country with a few unwelcome pesky passengers braced to the back.

Officials in infested states have brainstormed different approaches to stop the spread of this deadly leafhopper. Stomp, squash or smash the dastardly bug, they say.

Now, researchers in Virginia Tech's College of Agriculture and Life Sciences are experimenting with a new approach and calling upon dogs in the fight against SLF.

With a four-year, \$475,000 grant from the USDA's Agriculture and Food Research Initiative, Erica Feuerbacher, an associate professor of applied animal welfare and behavior in the School of Animal Sciences, and Mizuho Nita, a Virginia Cooperative Extension specialist and an associate professor in the School for Plant and Environmental Sciences, have partnered with researchers at Texas Tech University to combat both SLF and the deadly fungal disease powdery mildew with the help of canines and their citizen-scientist counterparts.

The project, unofficially called the Canine Citizen Science Study, began two years ago in an olfactory lab at Texas Tech and has recently expanded to the East Coast, where Feuerbacher and assistants are asking dog owners to unite and utilize their pets' scent work skills to sniff out SLF eggs.

The Nose Knows

Flint is an eight-year-old border collie. He is energetic, playful and very well-trained, thanks to the efforts of his talented owner and trainer, Sally Dickinson, a doctoral candidate in the School of Animal Sciences and a student of Feuerbacher's.

Both women share an affinity for four-legged animals, especially dogs. Feuerbacher has a vested interest in dog welfare and behavior, while Dickinson has a strong background in training dogs for odor detection. Flint has been trained in emergency situations as a cadaver dog. More recently, he's become an expert at finding SLF eggs.

For decades, dogs and their impeccable noses, which possess up to 300 million olfactory receptors, have been used to detect missing people, narcotics and explosives. Nose work has also become an increasingly popular dog sport, Feuerbacher said.

“Every day, average dogs are competing and finding these scents, and that speaks to their potential ability to detect ecologically and agriculturally relevant targets,” Feuerbacher said.

One afternoon, Flint showed off his

impressive sense of smell at the Alson H. Smith Jr. Agricultural Research and Extension Center in Winchester, VA. The center is well-known for its contributions to the commercial fruit industry, including wine grape research. Dripping with clusters of sugary fruit, grapevines are especially prone to SLF.

This was Flint's first foray into the field. Up until this point, Dickinson had only trained him at home using SLF egg samples.

“To train a dog to detect an odor, we use a pairing mechanism,” Dickinson said. “The dog has to learn that a particular odor is of value to them. We present the odor and pair that with something that is pleasurable or edible – whatever is reinforcing to the dog. That creates a message in the dog's mind that ‘If I look for that thing, and I find it, something really good happens in my life.’”

For Flint, the reward was handfuls of treats as he worked his way through the grapevines, sniffing, stopping and even pointing with his paw when lines of tiny eggs were detected.

Nita, who operates a grape disease management research and Extension lab at the Alson H. Smith Jr. Agricultural Research and Extension Center, watched from afar with excitement. He saw firsthand the detriment of SLF.

He recalled flying the drone when the fly was first detected at the research

center about two years ago. “There were thousands,” he said.

As part of the canine detection project's partnership with Texas Tech, Nita sends egg samples to the university's Canine Olfaction Research and Education Lab. Under the leadership of Associate Professor Nathan Hall, the lab has conducted multiple behavioral and olfactory research studies. Nita and Hall have been at the forefront of the study for the past two years.

Early detection is critical to stopping and destroying SLF, Nita said. Their eggs are very small and often laid on the underside of plants. As they develop into adults, the flies start feeding on the plants and stealing their nutrients. What they don't digest, they discharge on the leaves of the plant, inviting another issue: mold.

“Naturally, my fear is the risk to the quality of the grapes and the wines they produce,” Nita said. “I worry that growers will be overusing insecticides. While they have proved effective in killing the spotted lanternfly, they also cause harm to beneficial insects; therefore, it may bring other issues to our crops.”

Nita said he is hopeful that with early detection, SLF will be effectively managed, and thus, it will slow down the rate of spread to farther south, the path they are currently projected. And as the “dog detectives” master their craft, the

research group will be challenging them to detect additional harmful predators, like powdery mildew.

Stomp, Squash, Smash & Sniff

Partnering with the National Association of Canine Scent Work, Feuerbacher and Dickinson will recruit teams of dogs and their owners to help detect SLF eggs.

“This is a great opportunity for people to have fun with their dogs while also contributing back to their communities in a meaningful way,” Feuerbacher said.

Dickinson encourages dog owners to ignore the myths that certain dog breeds aren't suitable for scent detection.

“There is plenty of research out there that indicates that all dogs can smell,” she said. “Maybe the ‘smooshy’-nosed dogs aren't as good in the really hot weather to work for five hours straight, but they can definitely do it.”

Research has shown, Dickinson said, that scent training may also contribute to positive behavioral changes in dogs.

“At the completion of the study, we hope to have a strong network of handlers able to locate spotted lanternfly egg masses as a proof-of-concept program, with the intent to create an enduring citizen-based detection program for this and other invasive species,” Dickinson said. “Put your training skills to work and help protect our vineyards, fruit orchards and flower gardens.”



Sally Dickinson and Flint search a vineyard for spotted lantern fly egg masses. They are beginning to recruit other people with their dogs to do the same. It's a four-year project funded by the USDA.

Photo courtesy of Luke Hayes for Virginia Tech

Focus on farmer physical fitness

by Sonja Heyck-Merlin

“Bending, squatting, grabbing, twisting, pulling, pushing, cutting, walking, running, jumping, dragging, digging, pounding, lifting, tossing, catching, reaching. These are all examples of ways you’re likely incorporating physical activity into your farming duties regularly,” said Kate Graves.

Graves is a registered dietitian working for University of New Hampshire Extension. She discussed the importance of physical health and physical health guidelines as part of the UNH Women in Agriculture Wellness series, sponsored by Annie’s Project, Northeast Extension Risk Management Education and USDA.

While it cannot be disputed that farming is a physically demanding occupation, Graves said research shows it is not as physically demanding as it was 100 years ago, due to the assistance of tools and mechanization. This, of course, depends on the equipment being used and the type of agricultural business. Farmers and farmworkers are likely to have gaps in the physical health recommendations as set by the CDC.

According to CDC guidelines, adults ages 18 - 65 should get at least 150 minutes a week of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity. This is different from anaerobic exercise, which includes short bursts of intense activity such as weightlifting, sprinting, Pilates or yoga.

Only one in four adults in the U.S. is meeting the CDC guidelines for aerobic activity. Aerobic activities, also referred to as “cardio,” are those that increase breathing and heart rates, such as brisk walking, swimming, cycling and rowing. The CDC also recommends muscle strengthening activities of moderate or greater intensity that involve all major muscle groups on two or more days per week.

“Oftentimes when we’re discussing physical activity, people think of things like reduced weight gain or increasing their muscle mass, but the benefits of physical activity actually extend far beyond that, including benefits on brain health, which studies show happen immediately after a session of physical activity,” Graves said.

Another reason farmers and farmworkers should assess their physical well-being is that studies show physical and mental well-being are interconnected. Research shows that major depressive disorder is more likely to occur among people in agricultural occupations. Farmers and farmworkers should be aware that meeting the CDC’s physical activity guidelines may reduce short-term feelings of anxiety, reduce the risk of developing dementia including Alzheimer’s disease and reduce the risk of depression.

Graves said symptoms of depression may be two to 10 times more common for individuals who have a disability or chronic illness. Meeting the guidelines may also help people who have a disability or chronic illness cope with their increased risk of depression.

Meeting the CDC’s physical activity guidelines can also provide myriad other benefits. They can help reduce the risk of heart disease, stroke, type 2 diabetes and many types of cancers. In addition, they can increase bone strength, help with balance and coordination and improve independence during aging.

“This is a moment I would encourage you to self-reflect and look at what you’re already doing,” Graves said. “See where your job is already physically demanding and where there are those gaps, so that you can get at least those 150 minutes of aerobic activity and those two or more days of muscle strengthening activities for all the major muscle groups.”

She suggested consulting with a healthcare professional, especially when the farmer or farmworker plans to add a new physical activity. This is especially important for someone who is farming with a disability, chronic illness or while pregnant because it’s easy to overlook that certain physical activities may exacerbate those conditions.

She also encouraged people to listen to their bodies and understand their limits as they undertake new physical activities. “No one knows or understands

your body better than you do,” she said. “If something is not feeling right to you, especially in a moment where you’re being active, listen to that.”

It’s also important to find the proper space. Graves said, “I think finding a location where you’re comfortable being physically active is really important. Some people enjoy being outdoors, others like the comfort of their own home or some people want to go to the gym.”

Auditing physical activity goes hand in hand with an eating audit. Graves shared the most recent U.S. dietary guidelines referred to as MyPlate (myplate.gov).

The goal of MyPlate is to signify the amount of each food group – fruits, vegetables, grains and proteins – that people should be eating each day in the visual form of a plate.

“Focus on what you can be adding to your plate rather than all of the negatives. I think a lot of us, when we come to health and wellness, we get in this place of all the things we think we’re doing wrong. Focus on what we can add to our day to make it more balanced,” Graves said.

Calendar of events

NOTE: Calendar items must be submitted by the second Monday of the month to be included in the Calendar of Events. Listings are free for associations and non-profits. Entries may be emailed to jkarkwren@leepub.com or mailed to Lee Newspapers, PO Box 121, Palatine Bridge, NY 13428 Attn: Editor

June 16

2023 OEFFA Sustainable Farm Tour and Workshop: Organic Apple Orchard Tour Walk through a start-to-finish experience of Charlie’s Apples’ yearly operations. Charlie’s Apples, 1740 Sportsman Club Rd., Newark, OH. Visit <http://news.oeffa.org> to learn more.

June 24

2023 OEFFA Sustainable Farm Tour and Workshop: Elderberry Farm Tour This tour will explore their elderberry field, visit with the ducks, and enjoy a syrup sample. Mucky Boots Farm 630 Davis Memorial Rd., Peebles, OH. Visit <http://news.oeffa.org> to learn more.

July 1-6

AIFD 2023 Symposium “GROW” Hear from experts in the industry will impel you to higher levels of inspiration, creativity and design. Hilton Chicago, 720 S. Michigan Ave. Chicago, IL. Visit <https://aifd.org> for more information.

July 6

Grow the Trees, Not the Weeds 12:30 to 3 p.m. Join MSU Extension for a field day demonstration on weed identification and management and a pruning and shearing demonstration. Wahmhoff Farms, 22330 M-40, Gobles, MI. Contact Bill Lindberg, at lindbe35@msu.edu or 616.438.2738 for more information.

July 15-18

Cultivate’23 Learn best practices and foster business connections so you and your business can perform better, grow faster than ever, and are prepared for the future. Greater Columbus Convention Center Columbus, Ohio. Visit www.cultivateevent.org for more information.

July 17-18

2023 Agritoursim Learning Retreat Stepping out of the classroom and onto the farm, NADFMA’s ALR offers immersive, hands-on education in best operational practices for farms and attractions. Helene’s Hilltop Orchard, Merrill, WI. Learn more at nafdma.com or call 855.623.3621, email info@nafdma.com

July 24-28

PPA 2023 National Symposium This event features an array of exciting tours, educational sessions, and networking opportunities. Sheraton Fallsview, 5875 Falls Ave, Niagara Falls, Ontario. Visit <https://perennialplant.org> for more information.

July 24-August 4

Michigan Garden Plant Tour Expect to learn about a wide range of ornamental crops, including popular commercial brands of annuals and perennials. This is a terrific way to observe plant performance at different locations and grown under various landscape

conditions, both in the ground and in containers. Learn more at www.canr.msu.edu/planttour

July 26

MSU Viticulture Field Day This all-day event with steak fry and wine tasting will be at the Southwest Michigan Research and Extension Center, 791 Hillandale Road, Benton Harbor, MI. Contact Mike Reinke at 269.944.1477, ext. 210 or email reinkem3@msu.edu.

July 27

Purdue Small Farm Education Field Day 9 a.m. - 1:30 p.m. Visit the Purdue Student Farm and connect with other small farmers to learn about topics like drip irrigation, organic pesticide options, high tunnel production, raised garden beds and postharvest food safety. Purdue Student Farm 1491 Cherry Lane, West Lafayette, IN. Email Lori Jolly-Brown at ljollybr@purdue.edu for more information.

August 3-4

2023 NCTA Board Meeting & National Tree and Wreath Contest Meeting will be held at the Best Western Plus Isanti 409 Main Street East Isanti, MN. The contest will be held at Wolcyn Tree Farms & Nursery, Cambridge, MN. Contact the NCTA at realchristmastrees.org, 800.975.5920 or visit <https://realchristmastrees.org> to learn more.

August 12

2023 OEFFA Sustainable Farm Tour and Workshop: Chestnut Production and Packing Farm Tour During this tour, guests will see a mature chestnut orchard with and without deer fence, younger plantings of chestnuts, and the harvested nuts’ packing facility. Route 9 Cooperative Farmers, 4300 Germano Rd. SE (Route 9), Carrollton, OH. Visit <http://news.oeffa.org> to learn more.

August 23 - 25

Farwest Show The biggest green industry trade show in the West Oregon Convention Center Portland, OR. More information at farwestshow.com

August 24-25

Dirt to Glass: Elevating Michigan Wine from the Ground Up Dirt to Glass aims to connect growers and producers each year and provides information to support the Michigan grape and wine industry in understanding the critical relationship between better farming and world class wine. Kirkbride Hall, Traverse City, MI. Visit www.canr.msu.edu/dirttoglass for more information.

September 5-8

2023 AAS Summer Summit Vancouver, B.C. Host Hotel is the Westin Wall Centre right at the Vancouver Airport. Register at <https://all-americanselections.org/aas-meetings-events/>



The Seeds of Science

by Courtney Llewellyn

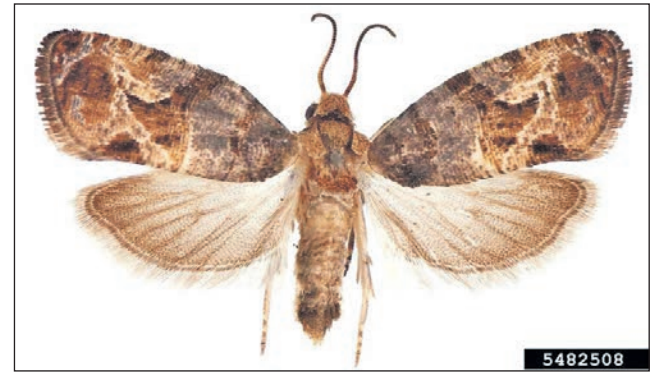
Great Scott, it's grape berry moth

Per a very educational poster presentation at the last Great Lakes Expo, grape berry moth (GBM) remains a major pest management challenge for grape growers across eastern North America, causing economic losses and driving many of the insecticide applications in the region's vineyards.

There is an urgent need for strategies to improve

control and reduce the financial and environmental costs of managing GBM, according to Michigan State University's Jacquelyn Perkins and Rufus Isaacs, from the Department of Entomology.

Their research trials have been evaluating different IPM programs to determine how they perform in Michigan vine-



Grape berry moth
Photo courtesy of Todd M. Gilligan & Marc E. Epstein, USDA-APHIS PPQ, Bugwood.org

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yards against GBM, including testing monitoring methods and newer insecticides.

Their goals were to determine if lures with different GBM pheromone loads could improve monitoring and to compare spray programs to determine which insecticides were most effective on GBM at particular application timings.

Four farms in Van Buren County growing Concord, Niagara and/or Chancellor grapes were part of the trial and weekly scouting took place between May and September. The vineyards received either the grower's standard insecticide program or an MSU-developed IPM program based on regular scouting updates.

Researchers looked at the number of GBMs caught in traps, the percentage of grape clusters with moth damage, the number of damaged berries per damaged cluster and other notable insect pest damage.

Specifically, the GBM lure trial took place at four vineyard sites in Lawton, MI, close to stands of woods. The traps were placed along the vineyard edge and had one of six different pheromone concentrations or the commercially available standard lure from Great Lakes IPM.

Each week during the trial, the number of moths in each trap was counted, the trap liners were replaced and trap locations were rotated. Lures were replaced every four weeks during the span of the trial.

The traps caught the most GBMs in June, but infestation levels increased throughout the growing season. The

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Finding the right herbal farm property

by Courtney Llewellyn

You can do so much on so little, especially with herbs. That was the message Michael Kilpatrick, founder of Growing Farmers and the Farm on Central in Franklin, Ohio, an eight-acre urban farm, provided during the recent Herbal Entrepreneur Conference.

Kilpatrick addressed what to look for when finding an herbal farm property. “The yield you can get off a very small space is tremendous, especially if you pick the right type of soil,” he said. “Don’t feel like you can’t do this if you don’t have 100 acres. You don’t even need an acre. Just test it and see if it’s for you before you expand.”

Much like a house-hunting

reality show, there are certain must-haves a property requires if you’re considering turning it into an herbal farm. Kilpatrick outlined these six key principles:

- Access – for power, water, vehicles and anything else that needs to physically reach the property. At his first farm in downstate New York, the terrain was very hilly and challenging for some trucks to climb (including firetrucks).

- Also consider access for sewer or septic systems, as well as mail and delivery service, especially if you’re planning on shipping any product. Look at proximity to needs too, such as hardware or farm supply stores.

- Water Source – Growers defi-

nately don’t want contaminated water for herbs, which are generally seen as healing plants. Kilpatrick said a well or spring is generally safer than a municipal water source.

Water-testing labs are widely available in the U.S. – and he suggested talking to people in the community to see if there’s any issues with the local groundwater. How much water is available is key, as are any conservation efforts. Kilpatrick noted many herbs are very hardy, but water still needs to be a concern.

- Market – Where are you going to sell your product? “Herbs a little more difficult than vegetables,” Kilpatrick said. “It depends

Herbal farm 25



Seeds of Science from 23

number of moths captured in traps each week was negatively correlated with percent cluster infestation in the same week, meaning monitoring traps are not the best way to predict GBM risk.

It turned out the commercially available GBM lure was the most effective for capturing the pest through most of the season. The lures with a range of pheromone concentrations were not more effective at capturing GBM during any moth generation in 2022.

When the research team compared the average percentage of clusters with GBM damage in two Niagara vineyards at the same farm that received different spray programs,

the biggest difference was seen toward the end of the trial.

In that grower’s standard spray program, 10% of clusters sprayed with Mustang Maxx had GBM damage on Sept. 2 while only 5% did in the MSU program. Likewise, at harvest on Sept. 28, 13% of standard program clusters had damage; only 7% did in the MSU program.

The MSU program spray demonstrations indicated that Verdepryn, Voliam Flexi and Intrepid Edge are effective reduced-risk insecticide options for controlling this pest.

Overall, high pressure vineyards had an average of 15% of their grape clusters with GBM damage

at harvest time in 2022. The researchers suggest using degree day models for insecticide timing and ensuring good coverage with effective products for GBM control.

They concluded that it’s highly recommended grape growers conduct visual GBM damage assessments in their vineyards throughout the growing season to figure out what their current pest pressure is and how well their spray programs are performing.



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New markets with nutraceuticals

by Courtney Llewellyn

Let's begin by defining "nutraceutical." It is a product isolated or purified from foods that is generally sold in medicinal forms not usually associated with a food. A nutraceutical is demonstrated to have a physiological benefit or provide protection against chronic disease.

That's how Evan Elford, Ontario Ministry of Agriculture, Food & Rural Affairs new crop development specialist, explained the concept at the most recent Great Lakes Expo. He presented "Adding Value to Nutraceuticals and Other Alternative Market Crops" – or, he said, how to take advantage of "specialty cropping opportunities."

In some further definitions, Elford explained that nutraceuticals are different from functional foods, which are similar in appearance to (or may be) conventional food, are consumed as part of someone's usual diet and are demonstrated to have physiological benefits and/or reduce the risk of chronic disease beyond their basic nutritional functions.

Also different are natural health products (NHPs), which include probiotics, herbal remedies, vitamins and minerals, homeopathic medicines, traditional medicines (such as traditional Chinese medicines) and other products like amino acids and essential fatty acids. These are more like value-added products.

"A good example of a nutraceutical is Aronia/chokeberry," Elford said. "It's high in antioxidants."

Aronia is often lumped into that amorphous "alternative crop" category, which Elford defined as a niche crop not covered by mainstream horticulture/agriculture. It is typically a low acreage/high value

crop. An alternative crop may be new to your region or an underutilized species there. It could also be a re-emerging crop – such as hops.

Other examples include elderberries, which can be sold fresh, processed (in jam, juice or syrup) or for dye, and its flowers can be used for elderflower cordial.

Haskap (or honeyberry) is often touted as a functional food. Growers can sell fresh and frozen berries, juice, wine and preserves. Sea buckthorn is very high in vitamin C and omega fatty acids; it is used as a functional food and in cosmeceuticals (cosmetic products that have medicinal or drug-like benefits).

Hops have culinary value for brewing (beer and hard cider), for non-alcoholic beverages (hop water), as hop asparagus and for flavorings. Elford noted that sparkling hop water has grown a lot in popularity recently. The crop has medicinal value (as a sleep aid) as well as a place in some cosmeceuticals.

Hops also have ornamental value (as potted plants and trellises). "One brewery captured more value using hops as decoration for events than harvesting them for beer," Elford said.

Nutraceuticals, functional foods and NHPs can all be sourced from alternative crops. However tempting the market may be, though, alternative crops are not for everyone or for every farm.

Challenges for Alternative Crop Producers

Elford outlined the following as challenges a grower may face with alternative crops:

- Markets: There's often no established market; a lack of consumer knowledge may limit market development; niche markets are easily saturated; your idea may not be novel; and there's a cyclical nature to the

popularity of alternative crops

- There's often unknown or limited production information; they can be capital intensive; and it may be difficult to finance a start-up

- Unique growing conditions/requirements – Growers may need season extension tools (plastic mulch, low tunnels, high tunnels, etc.); and the new crop may be labor intensive

- Difficulty obtaining desired cultivars/genetic material – This can be true for seeds, vegetative propagules and plants or improved cultivars

- There may not be the money – or desire – for research on a specific crop

Benefits of Alternative Crops

On the other hand, those willing to make the leap have a few things going for them:

- The crops are typically high value and grown on small acreage – and can be great for new farm and small farm businesses

- They provide a new challenge for those eager to learn

- The crops draw customers to increase revenues – this can create a better financial situation/risk management plan for some growers, who can gain more control of the market chain; they can improve cash flow and off-season income (through storage or value-added products); and they can even finance expanded on-farm employment (for farm family members and/or the next generation)

Figuring out the "next big thing" is tougher than ever these days, as it can take several years to grow a crop and consumers deal with shorter and shorter attention spans. In trying to identify alternative crop

New markets 26

SAF shares resources to implement sustainable practices

The Society of American Florists' Floral Education Hub has a collection of resources to help floral businesses implement sustainable practices – and learn about innovations that are helping to secure a sustainable future for

the industry.

The resources include:

- "Sustainability: Have We Reached a Tipping Point?" In this free webinar, Jeroen Oudheusden, executive officer of the Floriculture Sustainability Initia-

tive, provides an overview of the progress FSI has pushed for, what comes next and the costs, effectiveness and demand for sustainably grown flowers.

- "The Sustainability Spotlight" This special Floral Management supplement showcases the work of floral industry companies that have committed to environmental, social and economic sustainability. It also includes an overview of sustainability in the floriculture industry; a guide to certifying organizations and their labels; and a profile of the Floriculture Sustainability Initiative.

- "The Floral Management Sustainability Issue" is filled with articles addressing sustainability practices, innovations, and more.

- "Paper or Plastic?" This Floral Management article outlines how the use of paper sleeves has grown in recent years as some retailers look to the past to create a more sustainable future.

These resources are available to SAF members for free. If you are interested in learning about SAF membership, contact Justine Seas at jseas@safnow.org.

Herbal farm from 24

what your product list is too – elderberry syrup is pretty ubiquitous right now, for example. It does help to move online and do e-commerce."

But, as mentioned above, think about the logistics of shipping. One strategy Kilpatrick has seen succeed is selling a product that's physically very dense – it saves on shipping and moving more product to special events and sales. Leafy and dried things can take up a lot of space.

- Soil – "Soil can be changed," he said, if it's not ideal at the outset. You can bring in amendments and beneficial fungi, and even grow in raised beds. You can do remediation with compost, cover crops and pre- and probiotics.

"Definitely test your soils," he added. "Don't overwork your soil with tillage either. And avoid floodplains and super heavy clay soils."

- Weather – Kilpatrick noted there are definitely areas in the U.S. that have specific weather patterns, even locally. That presents another reason to reach out to the people in the community. "If you can, live in an area for a year before you buy farmland there," he said. "Do your due diligence."

- Community in the Area – "It's more and more important every single day," Kilpatrick said of community. "You want a community that's welcoming and agriculturally focused. And be invested in your community so that you're welcomed."

His final bit of advice when looking for herbal ag land was doing a little more research before falling in love with a property. Be sure that you'll be allowed to do what you want to do before signing any paperwork.



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New markets from 25

trends, Elford suggested looking at your personal situation and what health food/nutrition stores are selling as well as organic stores/specialty grocers. What are media outlets saying in regard to the crop in food, restaurants, medical blogs and TV programs? What about the demographics and statistics of your market?

“Personal health issues are often a catalyst” for growers attempting a new crop, Elford said. Demographic shifts are an indicator but it can take a long time for trends to emerge.

Steps to Follow

For those willing to risk the time, effort and funding to trial an alternative crop, Elford presented the steps below to help begin the process.

First, find and understand the markets. What is the market need – and is there one? Do your research and look into nearby competition. Also consider the specific varieties or growth stages of the crop that the market would need. Customer and end user expectations should be a part of market considerations.

Next, consider your objectives and the fit for your farm. Can you grow the crop for the market need? Can you actually grow it in your climate or on your farm? And it will it just survive there, or will it thrive?

As for the crop type, look at its agronomic requirements for soil type, irrigation, season extension, rotation, nutrition, harvesting system and storage.

Look at your farm resources and sales/distribution requirements (time, labor – including detailed recordkeeping – and equipment). Will you need special equipment? Will you need licensed or specialized facilities? Typically, the more processed the product, the higher the investment costs.

There may be some legal requirements for the crop itself, such as for those growing hemp. Rules and laws can cover sales, labeling, pricing, farm market regulations, liability, equipment and transportation. Do your research to know what you can put on a label.

“While there can be some steep hills to climb, opportunities exist,” Elford said. “Understand there is no silver bullet, however.”



Elderberries are one example of an alternative crop that has seen a recent surge in popularity. Photo by Courtney Llewellyn

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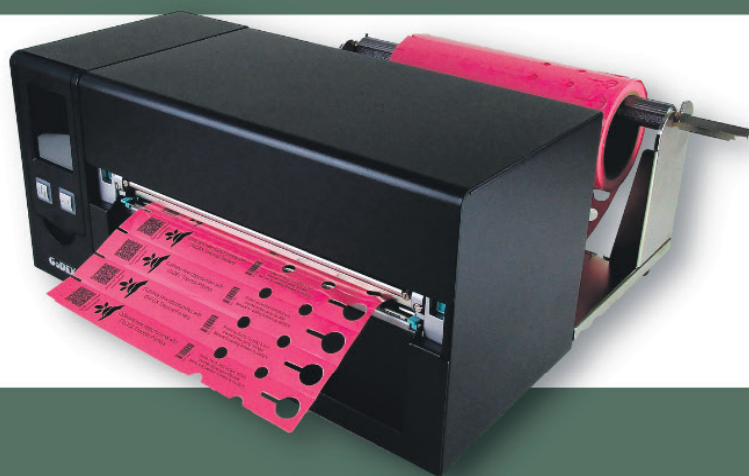
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