



U.P. Ag Connections Newsletter

July 2019

Agricultural News from MSU Extension and AgBioResearch

Volume 23 Issue 7

Weighing the Risk of Cannabis Cross-Pollination

Industrial hemp and marijuana growers must work together to ensure a bright future for all sectors of the budding cannabis industry

When passage of the 2018 Farm Bill legalized industrial hemp, many people in agriculture celebrated the new opportunity that this crop symbolizes for our industry. The spring day when we planted our first hemp plots at the Upper Peninsula Research and Extension Center also had an aura of historic significance. Hemp had not been legal to grow for over sixty years in Michigan, and today we are initiating research and outreach to support the potential (re)development of an entire value chain surrounding this multipurpose plant. Now that our first hemp crop is up and growing, a new concern is emerging with it that could threaten the future of Michigan's cannabis industry.

For those less familiar, industrial hemp is cannabis cultivated to produce fiber, grain, or non-intoxicating medicinal compounds, such as cannabidiol (CBD). As defined by law, industrial hemp has less than 0.3% THC (tetrahydrocannabinol), the psychoactive component in marijuana. In fact, the primary difference between hemp and marijuana is this legal THC threshold, which results from selective breeding for different uses. Yet as members of the same species, the two crops have more in common than not, including the vexing ability to crossbreed.

Cannabis is what's known as a dioecious species, meaning that male and female flowers are borne on separate plants. There are some monoecious varieties of cannabis, with male and female flowers on the same plant, and stress can also induce the production of male flowers on female plants, but these are exceptions to the plant's normally dioecious nature. Flowering is induced when day and night lengths become equal. Male cannabis plants flower for a period of 2-4 weeks, and a single male flower can produce 350,000 pollen grains. Pollen is carried to female plants on the wind, and can travel great distances when conditions are favorable. Bees will collect cannabis pollen, but are not attracted to the female flowers to contribute to pollination.

In the 1970's, marijuana growers found that preventing pollination by rogueing out male plants or producing only females (through clonal propagation or sowing of feminized seed) could greatly increase the yield and potency of their crop. This works because cannabis is one of the few plant species that can actively increase the number and size of its female sex organs in response to prolonged virginity (Small and Naraine, 2016). The longer female plants go unpollinated, the more flowers are produced and the larger they get. Cannabinoids, including the valuable end products THC and CBD, are concentrated in the female flower tissue. One study found that pollination decreased the yield of essential oils in cannabis by 56% (Meier and Mediavilla, 1998). Today, most marijuana is sinsemilla (Spanish for "without seeds") and seeded crops are considered inferior, commanding a lower price in the marketplace. The same strategy is now also being applied by industrial hemp growers producing CBD.

Industrial hemp grown for grain or fiber is a different story. Male plants and pollen are required to create hemp grain used for food, feed and oil. Fiber hemp does not require pollination, but the prohibitive cost of planting feminized seed or female clones means that fiber fields will usually include male plants. As a result, the recent introduction of hemp grown for grain and fiber in Michigan increases the risk of pollination for marijuana and CBD hemp growers. I say that industrial hemp *increases*, rather than creates, this risk because cannabis pollen has been blowing across the Midwest long before 2019. A study conducted in the year 2000, years before hemp and marijuana were legalized, found that cannabis pollen comprised up to 36% of total airborne pollen counts in Midwest states during the month of August (Stokes et al., 2000). This pollen likely came from wild hemp or illicit marijuana fields where male plants were not controlled, minor sources that could be greatly compounded by legal hemp production.

Mitigating the risk of cross-pollination in cannabis presents a unique challenge. The most straight forward strategy involves geographic or physical isolation. Industry experts recommend a minimum distance of ten miles between outdoor cannabis fields. Research has shown that pollen can travel much further than ten miles, but the amount of pollen transported decreases logarithmically with increasing distance from the source. Therefore, the risk of pollination should be negligible beyond ten miles from a pollen source. Important variables related to pollen transport and viability include wind speed, direction, precipitation and humidity, topography, physical barriers, time since release, etc. For example, one study on pollen dispersal in cannabis found that a 3 mile isolation distance downwind was equivalent to a 0.6 mile distance upwind in terms of the amount of pollen deposited (Small and Antle, 2003).

While geographic isolation may be a technically feasible strategy, accomplishing it in the field is more complicated. Maintaining isolation distances requires identifying where cannabis is being grown. Marijuana growers in Michigan are currently regulated by the MI Dept. of Licensing and Regulatory Affairs (LARA). Industrial hemp producers are regulated by the MI Dept. of Agriculture and Rural Development (MDARD). Although these agencies maintain records on where cannabis is produced, there is currently no coordination between the agencies regarding this issue and the location of cannabis fields is not public information. Maintaining geographic isolation would therefore require voluntary sharing of location information by growers. Even if growers could be encouraged to share this sensitive information, enforcement of isolation distances would be difficult. Physical isolation achieved by growing marijuana or CBD hemp indoors with air filtration systems could achieve the same result as geographic isolation, but also dramatically increases the cost of cannabis production.

As a result, other states and local units of government are responding to the risk of cross-pollination in cannabis by simply banning marijuana, industrial hemp, or male cannabis plants specifically. In Michigan, Ballot Proposal 1 of 2018 legalized both recreational marijuana and industrial hemp, so it is unlikely that either would be banned at the state level to address cross-pollination. Municipalities in the state can legally restrict where marijuana is grown, so that may offer some flexibility for hemp production in communities that opt out of marijuana. Local governments do not currently have the power to control where industrial hemp is grown, but MDARD could potentially implement such a policy in the future as part of their hemp regulatory plan.

That said, cooperation and a little creativity should hopefully make it possible for all sectors of the cannabis industry to coexist. One potential solution to cross-pollination that captures this spirit of cooperation is temporal isolation. As noted above, flowering in cannabis is controlled by day length. Artificial shading can therefore be used to induce flowering at almost any time of the year. This technique would be feasible for marijuana and CBD hemp growers who often produce these valuable products on a relatively small scale. Forcing flowering via controlled light regimes is likely not a realistic option for grain and fiber hemp grown in field crop systems at a larger scale. However, auto-flowering cannabis cultivars that flower based on age rather than photoperiod do exist. If the auto-flowering trait could be bred into elite hemp or marijuana cultivars, it could be used to off-set the release of pollen in hemp from flowering in female marijuana and CBD hemp plants.

Until more research can be conducted to assess the risk of cross-pollination in cannabis and policy created to mitigate that risk, the best advice I can offer is for cannabis growers to start an open dialogue. After so many years of prohibition, it would be a shame to see factions develop within the industry that limit potential growth by favoring either marijuana/CBD hemp or grain and fiber hemp. Together, with cooperation from forward thinking regulators, we can identify equitable solutions to the problem of cross-pollination.

Training for Safety and Success

Have you ever visited the first farmers market of the season after the long, cold, dark reprise of winter? If you haven't had the fortune, let's just say that the pulsing, joyous, busy energy of eager shoppers and proud growers is enough to pollinate an entire local food community. As U.P. produce farmers begin to harvest the first of their salad greens and radishes, local eaters are poised and ready to snag up whatever is offered in an act of true seasonality solidarity.

Along with farmers markets, local growers are hustling their goods between grocery stores, restaurants, Community Supported Agriculture shares, U-Pick operations; you name it. With so many mouths to feed, many farms recruit additional hands to lighten the load. The Food Safety Modernization Act's Produce Safety Rule (PSR) has a few training requirements for farms who employ paid or unpaid workers. Training to ensure everyone is exercising consistent food safety practices is a critical component of maintaining on-farm food safety and must occur before new employees (or volunteers) are permitted to harvest fresh produce.

Depending on how a farm is operated, there are several topics on which the PSR requires workers to be trained. Perhaps most obviously, all workers must be trained for the specific tasks they are expected to complete. The relationship between food hygiene and food safety must be communicated, including protocol for sick or injured workers, when and how to wash their hands, and dress code etiquette. For harvest crews, specific training should include how to monitor for wildlife contamination (and what to do if contamination is found), and cleaning and sanitizing procedures for harvest tools, equipment, and containers. Cross contamination risks and precautions relating to wild and domesticated animals, toilet facilities, and hand-to-mouth contact, such as eating, drinking, or smoking must also be demonstrated.

Ultimately, an effective training program must educate workers on how to identify produce safety risks, what they are supposed to do about those risks, and who on the farm they should report those risks to. As part of the PSR required record keeping, documentation of who was trained, topics covered, and the date of training must be kept by the farm owners. Lastly, a worker training must be scheduled at least once annually, or more as needed. Even experienced farm workers can benefit from a yearly review of your farm's food safety procedures, and your customers can eat easy, knowing that your produce is fresh, tasty, and – most importantly – safe.

To learn more about assessing produce safety risks on your farm and to earn a produce safety certificate from the state of Michigan, contact your local Produce Safety Technician.

Landen Tetil, Produce Safety Technician
Marquette County Conservation District
Call: (906) 226-8871 x 105 or Email: Landen.mqtcondist@gmail.com

Marquette County Conservation District Workshop Series to Focus on Gardening in the City

The Marquette County Conservation District (MCCD) was awarded a \$30,000 grant in March of this year from the National Association of Conservation Districts (NACD) to host a series of workshops on agriculture in an urban setting during the 2019 growing season. The workshops have been set for the second Saturday in July, August and September and will cover the following topics: low-tech ways to extend the gardening season, raising chickens and rabbits, proper composting practices, and native and invasive plants and pollinators.

New land use ordinances in Marquette County provide residents with the opportunity to raise small livestock including bees, chickens, and rabbits and allows the construction of raised garden beds and season extension structures such as hoop houses. The workshops will provide technical, hands-on assistance to city residents and participants will be given the opportunity to take home materials to begin projects in their own backyards. The workshops will be held at outdoor venues throughout Marquette and Ishpeming.

Partners that make this project possible include the Natural Resources Conservation Service (NRCS), Michigan State University Extension (MSUE), Upper Peninsula Food Exchange (UPFE), Marquette County, and the Lake to Lake Cooperative Invasive Species Management Area (CISMA).

Registration is available on the MCCD website, www.marquettecd.com, or call 906-226-8871.

Jaime Beranek
Urban Agriculture Assistant Coordinator
Marquette County Conservation District
jberanek.mqtcondist@gmail.com

Wet spring, wet soils, and wet hay...what should a dry hay producer do?

Tips for helping dry hay producers when faced with difficult harvest conditions.

Philip Kaatz, Michigan State University Extension

Farmers who want to produce dry hay will be faced with the challenge of wetter than normal conditions due to the increased rainfall during the spring. The methods and principles for getting hay dry have not changed in the past decade or two, however, our weather patterns have changed. Unfortunately, it's not for the better.

Storms now have become more intense increasing the potential for flooding and saturated soil conditions. Consequently, farmers who are faced with less than ideal drying conditions should consider the following tips to increase the likelihood of getting dry hay baled at the appropriate moistures.



Round bales of first-cutting alfalfa hay rest in the field before being hauled into storage.
Photo by James DeDecker, MSU Extension.

Tip #1 – Cut hay after the morning dew dries.

There is enough water that must leave the plants already without adding additional water from the nightly dew. Wet fields will also add to the moisture content of drying hay. Moisture gets soaked up from the soil into the bottom of the windrow if it is contact with wet soils, so keep drying hay off these soils.

Tip #2 – Wider is better.

Swath width is a critical to faster drying of hay. Swaths that are 80% of the total width cut will dry faster than a narrower swath. (See Figure 1.)

According to Dan Undersander, Forage Agronomist Emeritus, University of Wisconsin, hay will need half as much pan evaporation (dry twice as fast) when it covers the entire cut area as compared to covering one-fourth of the cut area. This is the **most important thing** a farmer can do to make hay dry faster.

Tip #3 – Adjust harvest equipment for proper conditioning

Proper alignment and adjustment should be done on the rollers or crimpers on harvest equipment to ensure forage is crushed or crimped evenly. This allows water to exit the forage at a faster rate. The best crimp will crush without pulverizing the stems. Over time, harvesting rollers or crimpers can become worn, especially in the center, which allows stems to go through the machine without the proper crimp or crush. For additional video discussing alfalfa harvesting, see: Comparing two haybines with and without Wide Thin Fins.

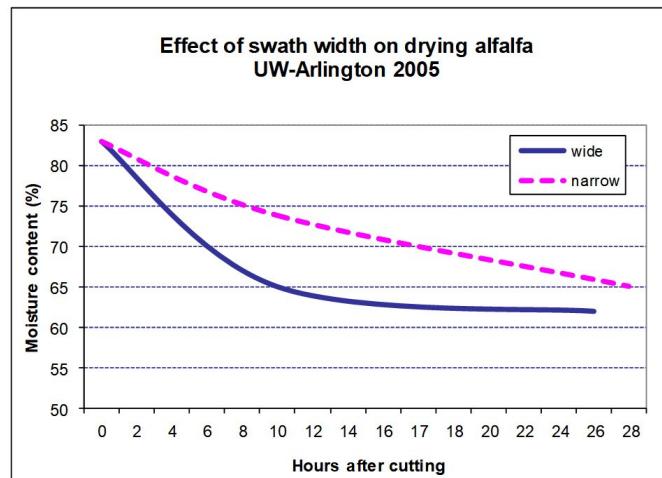


Figure 1. Decreased drying time due to swath width. Image by Dan Undersander, University of Wisconsin.

Tip #4 – When harvesting grass, use a tedder to speed drying.

A tedder is a practical piece of equipment, especially for grass, to speed drying times. A tedder will fluff the windrow and this will allow more air to go through the windrow. A tedder should not be used in alfalfa after partial drying due to leaves being torn off, subsequently decreasing quality.

These tips are not the only things a forage producer should consider for faster drying times in their hay. Weather always plays a major part of the hay drying process, and there's not much we can do to change what has or will happen.

For more information, visit the Michigan State University Forage Research Program, or contact Phil Kaatz, MSU Extension educator at 810-667-0341 or at kaatz@msu.edu or Kim Cassida at cassida@msu.edu.

MSU Extension offers additional educational resources and programs to help farmers as they deal with delayed planting seasons at <https://www.canr.msu.edu/agriculture/delayed-planting-resources>.

MSU Extension launches new website for farmers struggling during difficult planting season

Farmers throughout Michigan are struggling with an unprecedented amount of rainfall this spring that has resulted in a historically low planting pace. Michigan State University Extension has developed resources for farmers to deal with financial and emotional challenges. Educators throughout the state have created programming and resources designed to help farmers deal with the logistical, financial and personal implications of these difficult circumstances.

Resources surrounding topics including delayed planting decisions, emergency forage options, financial management and stress management can be found at extension.msu.edu/delayedplanting.

In addition, MSU Extension has partnered with agricultural organizations throughout the state to lead discussions around the state, drawing hundreds of farmers looking for help, learning about their needs and sharing important resources.

"The crisis facing Michigan agriculture right now is acute, and we hear heartbreaking stories every day from our educators who work with farmers," said Jeff Dwyer, director of MSU Extension. "That is why we are committed to meeting the needs of Michigan farmers, the true backbone of our economy and communities throughout the state, with the latest research and education. These families need support now more than ever."

To meet the ever-changing needs and circumstances, the MSU Extension website is continually updated with the latest news on agricultural conditions and options. Available resources take the form of news articles, podcasts, webinars, activity guides and videos. MSU Extension is also hosting weekly virtual breakfasts, online discussions about soil fertility and weed control, disease and insect management. MSU Extension has prioritized information specific to the wet season and is directing people to resources if they or their neighbors are struggling.

The MSU Extension Delayed Planting Resources site also features an online question submission tool where farmers can submit an inquiry. Questions are distributed to MSU Extension's statewide network of educators who provide answers using the latest scientific research and information available.

As farmers cope with the damaging physical conditions, the situation continues to take a toll on farmers' and farmworkers' emotional health. MSU Extension has been delivering workshops across the state since 2016 to farmers, farm families, and professionals who work with farmers about to help them recognize the signs of stress and suicide, and provide strategies to communicate with others in times of distress.

Twelve informational sheets and activity guides from the MSU Extension farm stress management programs are now available online at no cost. These tools can help people begin to tackle important financial issues including understanding credit and debt and creating a spending plan, as well as emotional health issues such as recognizing stress in youth on the farm, responding to the opioid crisis in farming communities and talking to farmers under stress.

"It's essential that we are attentive to the mental health impact of a variety of stressors to farmers, including weather," said Cheryl Eschbach, director of health and nutrition programming for MSU Extension. "Each day of rain impacts planting decisions, and it also impacts the emotional health of farmers and farm families in Michigan. We need to support them to make decisions and to seek help when distressed. We also want to teach others how to support farmers under stress."

For more information about the MSU Extension Managing Farm Stress program, visit extension.msu.edu/farmstress/. To access the suite of resources and information available from MSU Extension, visit extension.msu.edu.

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Inspections: Tues, July 23 & Mon, August 5 (12 noon-5pm)

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EQUIPMENT BIDDING ENDS AT 3PM

Load Out: Thursday, August 8 (10am-2pm)



2019 Distinguished Service to UP Ag Award

The Growing UP Ag Association 2019 Distinguished Service Award goes to Diane Hanson of Cornell.

Diane grew up on a diversified livestock crop farm whose main cash crop was seed potatoes. After marriage and time spent in the real world, opportunity brought the family back to the home farm.

With husband Dennis, and sons Scott and Ted, a four member team, they have expanded the farm to one of the nation's top seed potato operations. All team members have served in leadership capacities of the potato industry.

Some of Diane's roles in leadership include former MDA ag commissioner, former member of the National Potato Board, local Farm Bureau board of directors, former president and now current vice president of the local board, and some state responsibilities with Farm Bureau.

Diane continues to serve by planning and coordinating the ag exhibits in the Miracle of Life building at the UP State Fair each year.



Classifieds

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FARM FOR SALE by owner: 278A / 200 tillable, 160A adjacent to farm buildings, some woods for harvest/hunting. Includes 96' barn, 6 buildings, 2 wells. All structures have metal roofing. \$382,000. [Visit FB Link](#) - Brimley Sales for pics/details. Contact Melvin Schwiderson @ (906) 248-6633 or northwind906@icloud.com

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WANTED TO BUY: Feed barley or yellow peas in large totes or semi loads. Also, 2019 hay bales off of field. Prefer 4x6 bales in Delta, Schoolcraft or Alger County. Call Dan Dalgord (906)644-2276.

FOR SALE: John Deere B. Clean, less than 50 hrs on rebuild. Allis-Chalmers C. New paint, runs good. Hay Hauler. Hauls up to 10—4x6 round bales, use spear on back, don't have to unhook. Call Terry (906)644-2777.

FOR SALE: 9680 Lilliston No-Till Grain Drill. The Chippewa Luce Mackinac Conservation District is accepting closed bids until May 15th, 2019. Drill has been rented and maintained by Conservation District for over 20 years. Drill/planting width is 10.5ft. Transport width is 14.5ft. Weight is 5500 empty. Will require some work. Comes with owners manual. Please contact Mike at (906) 635-1278 for additional information. Bids can be sent to CLMCD 2847 Ashmun St. Sault Ste Marie, MI 49783.

Market Report

Choice Steers	\$100—\$112 per 100 lbs.
Holstein Steers	\$80—\$94 per 100 lbs.
Hogs	\$76—\$80 per 100 lbs.
Lambs	\$150—\$170 per 100 lbs.
Cull cows	\$48—\$63 per 100 lbs.
Calves	\$50—\$100 per 100 lbs.
Goats	\$200—\$300 per 100 lbs.

Breeding and Feeder Animals

Grade Holstein cows \$1200—\$1500/head
Grade Holstein bred heifers \$1400—\$1900/head

Feed Prices across the U.P.

	Avg. \$/cwt	Avg. \$/ton	Price Range
Corn	\$10.81	\$216.25	\$175-280
Soymeal	\$19.53	\$390.50	\$360-450
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Barley	\$10.56	\$211.25	\$160-260

Average price/100 wt. for 1 ton lots



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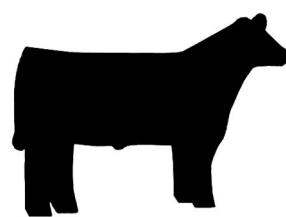
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Calendar of Events

Gardening with Season Extenders—July 13—Graveraet Elementary School hoophouse, Marquette, 10-noon
Schoolcraft County Fair—July 26-27—Manistique

Alger County Fair—August 2-4—Chatham

Iron County Fair—August 8-11—Iron River

Marquette County Fair—August 8-11—Marquette

UP State Fair—August 12-18—Escanaba

Houghton County Fair—August 22-25, Hancock

UP Summer Field Day Schedule (note some cancellations due to weather)

Field Day	Location	Date/time	Contact:
Alfalfa establishment in Corn	Menominee Twin Island Farms	July 2 nd , 11:30 central	Monica Jean
Ag Innovation Day	East Lansing-Campus	7/26, all day	Monica Jean
Wildlife Repellents and Dry Bean Variety Demo.	Delta- Cooks and Garden	8/6, lunch	Monica Jean
UPREC Field Day	Alger-UPREC, Chatham	8/10, all day	UPREC
Potato Field Day	Delta- VanDamme Farm	8/28, evening	Monica Jean
Corn Field Day	Menominee- Pleasant View Dairy	8/27, lunch	Monica Jean
Silvopasture demo. and drainage	Pelkie	9/19, evening	Jim Isleib or Frank W.
Silvopasture Demo	Delta	Late August/Sept.	Monica Jean
Drainage	Dafter/Rudyard	Late August/Sept.	Jim Isleib or Frank W.
Soybean Field day	Delta- Forest Biomass Innovation Center	9/4, afternoon	Monica Jean
Cover Crops and Alfalfa in corn silage	Menominee Twin Island Farms	Sept. 18 th , Lunch	Monica Jean
Renovating your forage fields	Chippewa-Sweeten Farm LLC	Sept 30, 5:00 p.m.	Monica Jean
			8