

Minnesota Irrigator

PUBLICATION OF THE IRRIGATORS ASSOCIATION OF MINNESOTA FALL 2021



Comments by the IAM President

Jake Wildman

Greetings members of IAM,

Thank you for taking the time to read through IAM's summer newsletter. As you page through, I am sure you will notice a common topic. The topic of course is the drought many of us, if not all, are experiencing right now. Some are experiencing challenges we have not had to face before or were too young to remember. Some have seen these challenges before, but haven't had to face them in over 33 years. I was born in the spring of 1988, so I have zero memories of what that year was like. But throughout my life, it amazed me whenever the topic of drought got brought up, 1988 was always the year that was referenced and people remembered all of the challenges they experienced like it was yesterday. Now some may argue that this drought isn't quite as intense as 1988, but I'm starting to understand how events like this can be remembered for so many years after the fact. It's a very stressful time right now for all areas of agriculture but hopefully better days are ahead.

When it comes specifically to irrigation, I encourage everybody to continue to do their best with what they got. As always, continue to keep water conservation a top priority and know

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In Memory of James R. Anderson, IAM Vice President... see page 3

IAM Irrigation Farm Tour - Stoney Brook Farm Wednesday, August 11th - Start 9:30 AM, Lunch 12:00 noon

Learn more about the technology, conservation, and economics behind irrigated farmland. The Irrigators Association of Minnesota, along with **Stoney Brook Farms** near Foley would like to invite you to an irrigation field day this summer Wednesday, August 11th where you will



see new irrigation technologies and see a showcase of irrigated vegetables. Food in-

dustry representatives and vegetable processors will talk about the importance of irrigation when sourcing food for stores.

Please join us! Field day starts at **Jack and Jim's Restaurant** (11025 Duelm Rd NE, Foley, MN) at 9:30 am to hear from Ag Commissioner Thom Peterson from the state of Minnesota, Mark Koch from Compeer Ag Lending, and Jake Bauerly who served on the Benton County Board as well Food Industry Representatives about irrigated agriculture.

RSVP on IAM Website

<https://mnirrigators.org>

Or email

jerrywright1970@gmail.com

by Wednesday August 4th

Then, we will travel by motorcoach to see different field operations for vegetables growing at Stoney Brook Farm. The irrigated fresh vegetable farm is operated by Mark and Brad Chmielewski and their families. It is a great farm with a lot going on in central Minnesota.

Crops grown include sweet corn, asparagus, sugar peas, green beans, squash, and pumpkins and are marketed through various wholesale outlets and locally through stores such as Lunds and Byerlys and Coborns. Then back at Jack and Jim's Restaurant by noon and stay for lunch and conversation – ask questions, talk irrigation, meet a farmer!

For more information contact Jake Wildman, IAM President at 320-424-0713

IAM Awards Alan Peterson Agricultural Scholarship to Two Students

The Irrigators Association of Minnesota board of directors has recently selected two students to receive the first annual Alan Peterson Agricultural Scholarships. Congratulations to Anna Buckentine of Chaska, MN and Adam Lange of Deer Creek, MN for being selected this year.



Anna is a 2017 graduate of Chanhassen High School in Chaska and is attending the University of Minnesota in the Twin Cities studying Agricultural Education. Her goal is to

work in a high school setting teaching agricultural education. Until then, she will participate in a MAELC internship to hone her skills. Anna plans to bring her 4H experience and love for watching young people learn to the classroom.

AdamLangeisa2019graduateofHenning



Public School in Deer Creek and is attending University of Minnesota at Crookston with a major in Agronomy and minor in Agricultural Business. After graduation, he hopes to return home and continue growing his family crop farm. He looks forward to bringing the newly learned skills back to the farm, including new technology like drones to improve yields.

The Alan Peterson Agricultural Scholarship serves to Respect natural resources, Embrace innovation, Advocate agriculture at local, regional, and national levels, Protect irrigated production agriculture and Promote research.

A committee of IAM members chose students who are either currently attending an accredited post-secondary college

program pursuing a career in an Agricultural related field or are High School seniors planning to enroll in an Agricultural related field of study.

For additional information about this scholarship program visit the Irrigators Association of Minnesota's website <https://mnirrigators.org/>

Prepared by Anna Bregier, IAM Scholarship committee chair annabregier.pfc@gmail.com or 612-709-7310, Prairie Farm Company - Rice, MN.

Submitted: Jerry Wright, IAM Membership Secretary
Jerrywright1970@gmail.com

**SEE PAGE 15 FOR NEW
SCHOLARSHIP MATCH
OPPORTUNITY!!!**

Welcome to the MN Irrigator's Summer/Fall Newsletter

Jerry Wright, 2021 IAM Membership Secretary



This newsletter comes to you thanks to the support of advertisers, current IAM members, Industry Sponsors and Extra Mile Member Supporters listed on page 9.

Your Directors on the IAM Board welcome and strongly encourage you to become a member if you have not already joined. Last year we ended up with only 421 members and at this time we only have 311. The Board and officer would like to see those numbers grow in the next couple months.

We all benefit from each other's ideas, experiences, and partnership in IAM activities this year including keeping a watchful eye on MN Irrigators Water Rights; telling personal stories about benefits of irrigation with Legislators as well as representing the interests of irrigation practices across the state.

To become a member, simply return the signup form included on the last page of this newsletter. As a member, you can also be placed on the IAM email alert list if you submit your email address.

PRESIDENT continued from pg 1
that as every day passes, we are one day closer to the finish line. If you do experience any issues, like a well interference complaint, don't hesitate to reach out to myself or another board member and let us know about your situation. We feel it is important that we aware of what's going on in different parts of the state and if there is an opportunity for IAM to provide any assistance, we want to be able to do that.

As you can see on the front page here, IAM suffered a major loss with the sad and tragic passing of Jim Anderson. Jim and his family have been longtime supporters of IAM. In fact, Jim's dad Jack was one of three individuals the formed IAM. Jim was a past president, the current vice president and was active on the board for many,

many years. He was just such a strong advocate for all things irrigation. In my mind, Jim was one that really understood the true value of irrigation. He saw more than just the obvious value it brought to the farm, but the positive impact and value it had on the small communities and the business within that community. Jim was actually the one who first talked me into getting involved with IAM. He first asked if I would join the board of our local Bonanza Valley Association and shortly after that, he nominated me for a board member position at one of the annual meetings. After I was elected president, let's just say, he didn't have much of a choice when it came to accepting the position of vice president. You got me started in all of this, so you're coming along for the ride buddy. All jokes a side, Jim was somebody I had a ton of respect for. His knowledge and ex-

perience was something I relied on heavily since I was young and inexperienced and our relationship grew from knowing who each other were into a true friendship in a short period of time. He will be greatly missed, but his legacy will live on.

The last thing I want to touch on is where IAM's bill ended up at the end of the legislative session. Unfortunately, we were not able to get any of our legislative priorities passed. The bill was once again part the Senate Environment bill, which was then passed in the senate. From there, the bill ended up in conference committee similar to the 2019 session. The language was included right up until the very end, but certain events occurred that were out of our control and it was not able to advanced out of conference committee. Again, very unfortunate, but let's just say it's a very interesting time right now in St.Paul. I can

assure thou, we are not giving up. IAM will continue to remain active by having conversations with key legislators, along with the DNR and we will be prepared again to introduce legislation when the 2021 session begins. IAM is remaining active by hosting our annual legislative tour here in a couple of weeks. The event is taking place on August 11th and this year we will be touring Stoney Brook Farms near Foley Minnesota. More details are included in the newsletter so take a look at that and everybody is more than welcome to attend if your schedule allows.

With that, I just want to say thank you for supporting IAM. We will continue to look after and protect your rights as irrigators. Everybody stay safe, stay cool and keep doing those rain dances.

Jake Wildman

If you are not interested in receiving future newsletters from Irrigators Association of Minnesota (IAM), please send a note to wrightsj@charter.net or IAM, 24 S. Edquist St., Appleton, MN 56208

If you have a topic that you would like to see discussed in a future issue, drop a note to IAM president, Jake Wildman at jakewildman@outlook.com. Articles for the newsletter are solicited and gathered by the IAM officers and Membership Secretary, Jerry Wright whom can be contacted at jerrywright1970@gmail.com.

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In Memory of James R. Anderson

December 26, 1952 ~ May 20, 2021 (age 68)



IAM member since 1976, IAM President 1998-2000, IAM Vice President 2019-2021, IAM Director 1990-2021

James R. Anderson, 68 of Belgrade, died unexpectedly Thursday, May 20, 2021 at the Sanford Medical Center in Fargo. Funeral services will be 11 a.m., Friday, May 28, 2021 at Trinity Lutheran Church in Brooten. Visitation will be from 4-8 p.m., Thursday, May 27th at the Anderson Farms shop (45086 Glendale Road, Belgrade) and for one hour prior to the service. Burial will be at the Methodist Cemetery in Belgrade.

Arrangements are with the Johnson Funeral Home in Belgrade.

James Richard Anderson was born on December 26, 1952, the son of Jack and Viola (Bakko) Anderson. He grew up on the Anderson Family Farm west of Belgrade and attended Belgrade High School where he participated in football, basketball and FFA, graduating in 1971. He continued his education at SDSU where he was a member

of the Alpha Gamma Rho Fraternity and was actively involved with the Livestock & Meat Judging Teams. He graduated in 1975 with a major in Animal Science and returned home to farm. On June 24, 1978 Jim was united in marriage to Susan Rademacher. This union was blessed with three sons and a daughter. They made their home on the Anderson Family Farm where he farmed with his father, brother and later his three sons. In 2015, he underwent open heart surgery. After his recovery, Jim & Sue decided to purchase a home on Games Lake where they enjoyed pontoon rides; going for walks, water skiing and fishing with their children and grandchildren. He continued to farm daily.

Jim faithfully served the Lord and was an active member of Trinity Lutheran Church where he served on the council, taught Sunday school and enjoyed singing in the choir. Jim was passionate about his community. He served on the BBE School Board; co-owned the local hardware store, refereed school basketball games, was on the Crow Lake Township Board, the Irrigation Association Board and was intentional about supporting local businesses. Jim and Sue played volleyball with friends for over 30

years. They enjoyed many wonderful adventures together and loved to travel. Trips to Norway and Sweden to visit family and friends and a trip to the Holy Land were some of the highlights of his life's travels. He also loved to garden, ride bike and enjoy a boat ride around the lake after a hard day's work. His greatest pride was instilling a passion for faith, farming and work ethic in his children.

Jim was welcomed home by his Heavenly Father on May 20, 2021 at the age of 68. He is preceded in death by his parents.

Left to cherish his memory are his loving wife, Sue, of 42 years; children, Grant (Heidi) Anderson, Noah (Amanda) Anderson, Isaac (Shannon) Anderson and Rachel (Emmanuel) Gyasi; grandchildren, Laken, Whitney, Jack, Nolan, Andie, Claire, Asher, Joah and Lila; siblings, Mary Kay (Monte) Herrmann, John (Shirley) Anderson and Cheril (Eric) Rios and numerous nieces and nephews.

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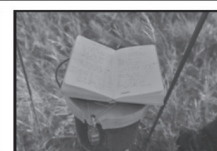
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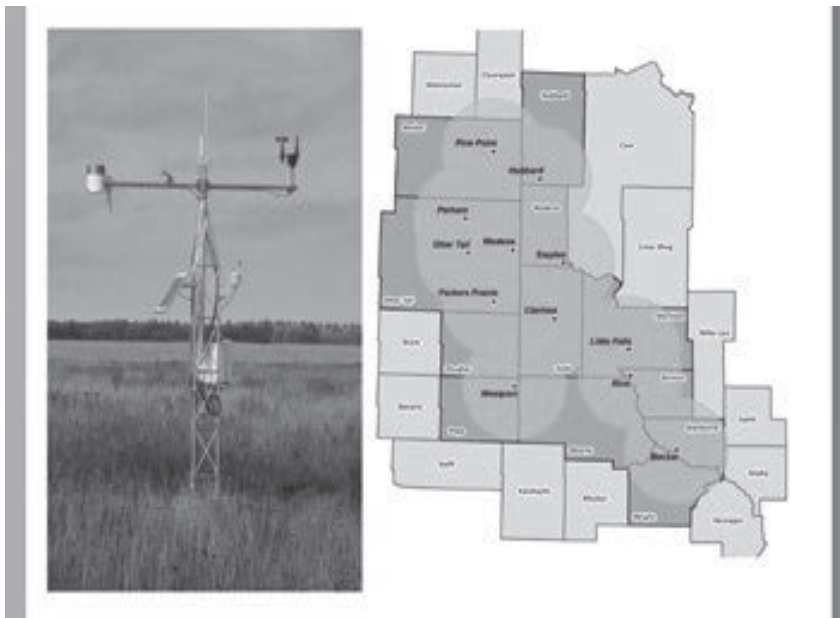
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Early Season Drought Effects on Corn and Soybean

By: University of Minnesota Extension Crop News: Vasudha Sharma, Extension irrigation specialist, Seth Naeve, Extension soybean agronomist, and Jeff Coulter, Extension corn agronomist.

<https://blog-crop-news.extension.umn.edu/2021/06/early-season-drought-effects-on-corn.html>

Extremely hot weather and lack of rain in Minnesota is making growers worried about the impact on crop yield. Through this blog post we have tried to provide an overview on early season drought effects on corn and soybean and provide recommendations on irrigation management.

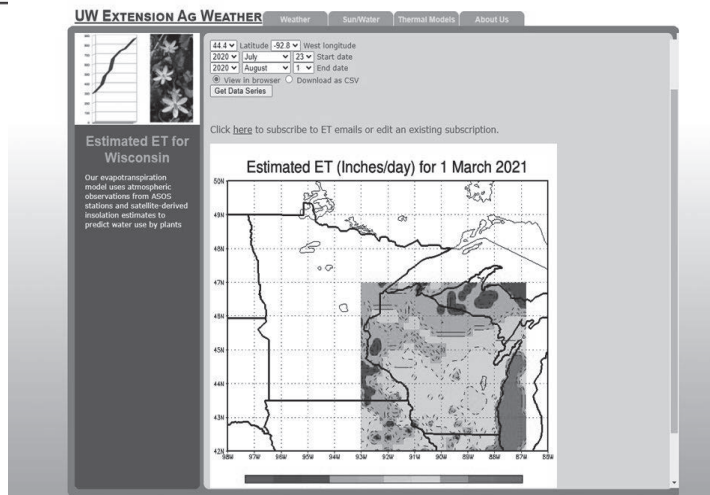
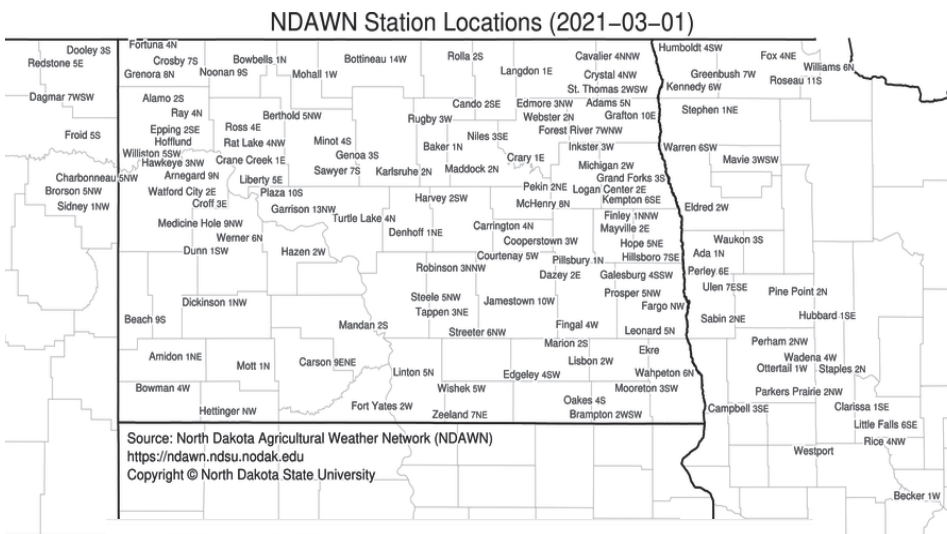
EFFECTS ON CORN

The severity of drought stress in corn is indicated by the time of day when leaf rolling begins. Plants that exhibit leaf rolling early in the morning are under more stress than those that begin leaf rolling later in the day. Drought stress during vegetative growth can reduce plant height, but it typically does not reduce the number of leaves produced (Lauer, 2012).

The nodal root system is the primary root system of corn from the three leaf collar stage (V3) until maturity. Nodal roots establish at just 0.75 inches below the soil surface. Therefore, dry soil at a depth of 0.75 inches can restrict nodal root growth, especially when the soil at this depth is loose, compacted, or cloddy. Poor nodal root establishment reduces the ability of corn to extract soil water and stand upright. In fields where there is poor



Leaf rolling in mid-morning on corn at the eight leaf collar stage. Photo by Jeff Coulter.



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 (includes SE MN Counties)
https://agweather.cals.wisc.edu/sun_water/et_wimn

Alfalfa During Drought

By: University of Minnesota Crop NEWS: Jared Goplen, Extension educator - crops, and Craig Sheaffer, Professor, Department of Agronomy and Plant Genetics

https://blog-crop-news.extension.umn.edu/2021/06/alfalfa-during-drought.html

OVERVIEW

A recently harvested alfalfa plant will become dormant if subject to drought and high temperatures. It will survive several months

of dormancy and resume regrowth when moisture conditions are avorable. Photo: C.C Sheaffer.

- High temperatures combined with drought have affected establishment and growth of alfalfa. The extent of drought conditions are shown on the U.S drought monitor (https://droughtmonitor.unl.edu/).
- Alfalfa seed that has been planted and not yet germinated will survive in the soil during drought and can germinate when rainfall occurs.
- Newly established seedlings are very susceptible to drought because their root systems are inadequate.
- Drought and high temperatures will not kill established alfalfa but will cause it to go dormant.
- Dormant alfalfa will recover following rainfall or irrigation. Alfalfa stands that are drought stressed but ready for harvest should be cut because of the potential for leaf loss.

ALFALFA USES A LOT OF WATER

Because of its high stem density and dense canopy, alfalfa has a high rate of water use. Alfalfa uses 0.1 to 0.3 inches of water per day (Table 1). Daily water use is influenced by plant growth stage and environmental factors like air temperature and wind speed. For example, on a windy, 90° F day in Minnesota, alfalfa will likely use 0.30 inches of water. Water use is greatest when alfalfa has a full vegetative canopy before harvest and is greater during summer months when solar energy and air temperatures are greatest. Water use declines following harvests and is less in the



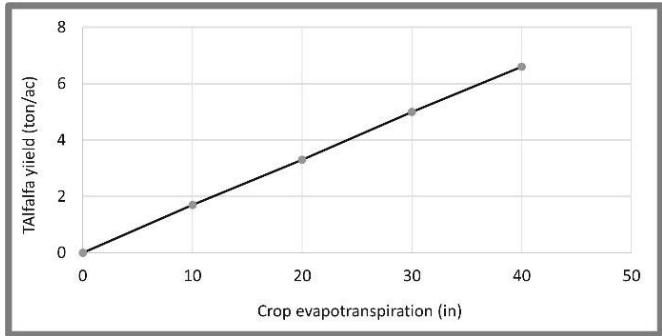
spring and fall when the sun’s energy and air temperatures are lower.

Table 1. Alfalfa total water use for the first three weeks after the first and second cuttings.

| Daily maximum temperature (°F) | Estimated water use (inches/day) | | |
|-----------------------------------|----------------------------------|--------------------------|--------------------------|
| | 1 week after cutting | 2 weeks after cutting | 3 weeks after cutting |
| 50 | 0.05 | 0.06 | 0.08 |
| 60 | 0.08 | 0.11 | 0.13 |
| 70 | 0.11 | 0.15 | 0.13 |
| 80 | 0.15 | 0.19 | 0.23 |
| 90 | 0.19 | 0.23 | 0.28 |

Scherer and Steele, Irrigation Scheduling by the Checkbook Method, 2019. https://www.ag.ndsu.edu/publications/crops/irrigation-scheduling-by-the-checkbook-method-1

Figure 1. Total season yield of alfalfa in relationship to season-long water use from precipitation and/or irrigation.



Over the growing season alfalfa may use more total water than other crops because of its long growing season. There is generally a linear relationship between crop water use and forage yield, although aspects of this relationship vary somewhat based on other environmental factors.

Water use ranges from 4 to 7 inches per ton of forage depending on the environment (Figure 1).

ALFALFA continued on page 11

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Where are we today with the Drought and Water Supplies?

By: Carmelita Nelson and Dan Miller, Minnesota Department of Natural Resources

The July 6, 2021 drought map shows 40 percent of Minnesota is in severe drought, and short-term forecast outlooks are pointing toward a warmer and drier-than-normal July across the state. Drought is a naturally occurring aspect of Minnesota's climate. Droughts affect agriculture, water resources, power supply, forestry, fisheries and wildlife, wildfire, tourism and recreation, human health and many other factors. The Minnesota Department of Natural Resources (DNR) is working with all water users to protect our surface and groundwater resources while trying to minimize economic impacts.

Procedures and plans are in place for dealing with drought

Legislation enacted in 1990 mandated the DNR to prepare a drought plan. This plan provides a framework for responding to droughts, to minimize conflicts and negative impacts on Minnesota's natural resources and economy.

The DNR and partner agencies have extensive climate and water monitoring networks. Each week, the State Climatology Office within the DNR works closely with

the authors of the United States Drought Monitor Map at www.droughtmonitor.unl.edu to ensure that drought conditions in Minnesota are depicted accurately. The map is updated each Thursday. These data, plus the State Drought Plan and existing laws, guide actions during a drought.

Drought impacts on surface water are more visible than impacts on groundwater. One of the reasons we are seeing reduced streamflow is because it has been dry since last summer, and especially dry since early March this year. Much of the state is three to six inches of precipitation behind normal since the start of the calendar year. That means any rainfall we get will replenish soil moisture before it can contribute to stream flow in many areas of the state.

Sharing the Groundwater

Groundwater use permits for agricultural crop irrigation are generally not suspended during the growing season, unless there are out-of-water complaints for domestic water supplies from neighbors who file a Well Interference Complaint. DNR staff are now seeing an increase in domestic out-of-water calls, in Polk, Kandiyohi,

Grant and Todd Counties. While the first option is to help your neighbor by conserving water and working out irrigation schedules, sometimes those steps aren't enough to restore a domestic water supply.

The DNR has been helping to resolve well interference complaints for more than 45 years. This saves everyone the burden of legal costs and time spent in court. The DNR's well interference reports are thorough and science-based. Some cases can be investigated and resolved in a matter of weeks. Most well interference cases take five to six months to be settled. While all efforts are made to avoid suspending groundwater permits during the growing season, state law mandates that drinking water is the highest priority for water use. It is possible that irrigation may have to stop temporarily, if a domestic water supply is interrupted. Because we do not know how long this drought will last, it is imperative to conserve and use water efficiently.

Surface Water Suspensions

Surface water rules are quite different from groundwater rules. If flow reaches a critical level in a river or stream, the DNR must suspend surface water appropriations from that lake, stream or river. Low stream

flows across the state mean the DNR has already suspended some surface water appropriation permits in parts of the state that are very dry. We do this to protect fish and wildlife habitat within the stream and to maintain water availability for other users downstream. Some permit holders have a contingency water supply, such as a well, to use while their surface water appropriation is suspended. Many other permit holders do not have an alternate source of water available. If you are considering applying for a permit to use water from a surface water, it is important to consider what you would use during a drought.

You can keep track of stream flows near your water appropriation site by going to the DNR stream gaging webpage at www.dnr.state.mn.us/waters/csg/index.html. There, you can find the gages the DNR uses to determine when flows are below a critical stage and surface water appropriation suspensions should be considered.

This summer, we've suspended a number of different surface water appropriation permit types including: agricultural crop irrigation, golf course irrigation, landscape and athletic field irrigation, wild rice irrigation, sod farm irrigation, cemetery irrigation, construction-related activities, pipeline and tank testing, dust control, and sand and gravel washing.

The DNR will continue to monitor water levels and flows across the state and keep

DROUGHT continued on pg 7



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EQUIPMENT

DROUGHT *continued from pg 6*

you informed of any potential changes to surface water appropriation permits. If you have questions about a surface water appropriation permit, please contact your local DNR area hydrologist. A list of staff and the areas they cover is available at https://files.dnr.state.mn.us/waters/area_hydros.pdf.

During this summer of drought, all irrigators are encouraged to maintain their systems to the highest efficiency, minimize irrigation to the extent possible, and cooperate with neighboring irrigators and homeowners.

Do You Fertigate? Permit Requirements and Reminders

In Minnesota, you must obtain a chemigation permit if you operate an irrigation system connected to a water supply and inject fertilizer or pesticide. The MN Chemigation Rule has been in place since the late 1980's and was created to protect Minnesota's water resources from contamination by fertilizers or pesticides that are applied through irrigation to crop fields, in greenhouses, nurseries, or on golf courses/athletic fields.

The program is administered by the Minnesota Department of Agriculture (MDA). The permit holder must certify that the chemigation system is compliant and maintained prior to use. MDA inspectors may conduct permit inspections to verify compliance.

Chemigation permits are not transferable. A chemigation operator or entity must obtain their own permit(s). For example: Two entities- ABC Farms and XYZ Farms are each required to obtain their own permit if they operate the same irrigation system. The reason for this is that each entity is an individual operator who is required to maintain compliance

of the system when they are making an application. Due to this requirement there can be multiple permit holders for the same irrigation system. Once a chemigation permit is issued, it is active indefinitely until the permit holder makes a request in writing to the MDA to deactivate their permit(s).

Chemigation permit requirements include:

1. Submitting a permit application with the appropriate fee for the type of chemigation application to be made. Fertilizer = \$50.00, Fertilizer + Pesticide = \$250.00.

2. Install, maintain, and inspect the required anti-pollution devices to ensure that the system is in legal working condition.

a. The required anti-pollution devices include:

i. MDA/MDH (MN Dept. of Health) approved mainline check valves/backflow preventers to prevent chemigation water from back siphoning into the water supply.

ii. Injection line check valves to prevent irrigation water from back siphoning into the chemigation supply tank which could overflow the supply tank.

iii. Low pressure shutdown switch that shuts down the chemigation injection unit in the event the water pressure drops for the irrigation system.

iv. System interlock between the irrigation system and the chemigation injection unit that shuts down the injection unit when the irrigation system is shut down.

3. Comply with chemigation supply tank setback requirements as prescribed by the MDA and the MDH. If setback requirements can't be met the chemigation supply tank will require secondary containment to prevent a spill from contaminating the water supply or soil.

4. Recording and maintaining chemigation application records and system inspection records for a period of 5 years from the date of application and inspection. Recordkeeping forms are available on the MDA Chemigation Permit Program webpage.

Please contact Jeff Lorentz at 320-223-6547 with any questions or consult the MDA Chemigation Permit Program webpage at www.mda.state.mn.us/chemigation-permit-program.

If you no longer need of your chemigation permit(s) please submit a written deactivation request to either Stacy Weldon-Franco stacy.weldon-franco@state.mn.us or Jeff Lorentz Jeffrey.Lorentz@state.mn.us.



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nodal root establishment, some plants will lean from upright as early as the five leaf collar stage (V5), as their small nodal root systems are unable to support their aboveground weight. Following rainfall, additional nodal roots can establish in moist soil.

Ear size in corn is dependent on the number of rows of kernels and the number kernels per row. The number of rows of kernels per ear is set between V5 and the eight leaf collar stage (V8). It is mainly influenced by genetics, and to a lesser degree by the growing environment and agronomic management. The number of potential kernels (ovules) per row is set by the 12 to 15 leaf collar stages (V12 to V15, respectively) and is heavily influenced by the growing environment and agronomic management (Nielsen, 2007). Therefore, drought stress during the early- to mid-vegetative stages of corn can affect potential ear size to some degree, mainly through a reduction in the number

of potential kernels per row. However, the actual number of kernels per row depends on the effectiveness of pollination and the number of kernels that are retained following pollination.

Typically, corn grain yield is not substantially reduced if drought stress occurs before the 13 leaf collar stage (V13) (Lauer, 2012). From V13 to silking, the effect of drought stress on corn grain yield becomes more severe as the time of drought stress gets closer to silking. Yield loss due to drought stress is greatest when it occurs at silking, followed by the kernel blister through dough stages, followed by the late vegetative stages, followed by the mid-vegetative or kernel dent stages.

In conclusion, drought stress to corn during the early- to mid-vegetative stages is likely to have only a small negative effect on corn grain yield. If corn is under drought stress at V13 or beyond, yield loss is expected to be greater, with the level of

yield loss dependent on the time and duration of drought stress.

EFFECT ON SOYBEAN

Because drought stress is nearly ubiquitous throughout time and across biomes it has had a strong evolutionary impact on nearly every plant species. Plants have multiple and complex systems to respond to drought to ensure that they can produce as many viable seeds as possible.

Moisture stressed soybean at Rosemount, MN. Photo: Dave Nicolai

Some important responses can be seen in soybean. But note, corn has a very similar pattern of reactions to drought. Early in drought stress, soybean plants re-orient their leaves and expose the lighter side of their leaves, to absorb as little light energy as possible. Next,

plants slow their rate of leaf expansion to reduce water losses. At roughly the same time, plants reallocate resources from shoot development to root development, and within the roots, the soybean plants reallocate resources from shallow roots to assist with the development of deep penetrating roots. Nitrogen fixation begins to fail under dry soil conditions. Lastly, as drought stress intensifies, photosynthesis itself can be compromised.

Research (Hoogenboom et al., 1987a) supports conventional wisdom that non-irrigated soybean roots penetrate much deeper in the soil profile than well-watered plants. In this study, total



Moisture stressed soybean at Rosemount, MN. Photo: Dave Nicolai

EARLY SEASON continued on page 13

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Minn. Dept. of Ag Receives Federal Funding to Bring Innovative Conservation Practices to Irrigated Land

April 30, 2021

The U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) is awarding the Minnesota Department of Agriculture and project partners \$3.5 million to implement conservation measures on irrigated lands. The money is being awarded through the Regional Conservation Partnership Program (RCPP) and will fund a 5-year project that is focused on 20 counties across the state of Minnesota.

"We are grateful for this funding from NRCS," said Minnesota Agriculture Commissioner Thom Petersen. "Irrigation is critical for many of our farmers, and this money will allow us to work with producers and our partners to enhance conservation measures on the land that will ultimately benefit our water resources."

"The Regional Conservation Partnership Program is public-private partnership working at its best," said Terry Cosby, Acting Chief for USDA's Natural Resources Conservation Service. "These new projects will harness the power of partnership to help bring about solutions to natural resource concerns across the country while supporting our efforts to combat the climate crisis."

Through the RCPP, conservation partners like the Minnesota Department of Agriculture (MDA) work in collaboration with NRCS and Soil and Water Conservation Districts (SWCDs) to help farmers, ranchers, and forest landowners throughout the nation to implement systems that conserve water and soil resources, improve the health of wildlife habitats, and increase climate resilience.

The MDA project, "Implementing Innovative Irrigation Practices to Protect Groundwater Quality and Quantity," will work directly with agricultural producers using irrigation to implement conservation practices that protect groundwater and promote expanded precision irrigation practices. The MDA has partnered with SWCDs, Central Lakes College Ag and Energy, AgCentric, the University of Minnesota, the Mille Lacs Band of Ojibwe, irrigation associations, and other public and private organizations to implement the project.

The 20 Soil and Water Conservation Districts in the project area are: Becker, Benton, Cass, Dakota, Douglas, East Otter Tail, Grant, Hubbard, Kandiyohi, Meeker, Morrison, Pope, Sherburne, Stearns, Stevens, Swift, Todd, Wadena, West Otter Tail, and Washington.

The irrigation project is one of 85 locally driven, public-private partnerships receiving more than \$330 million as part of the Regional Conservation Partnership Program.

For more information, visit the RCPP website.

Media Contact

Allen Sommerfeld, MDA Communications

651-201-6185 Allen.Sommerfeld@state.mn.us

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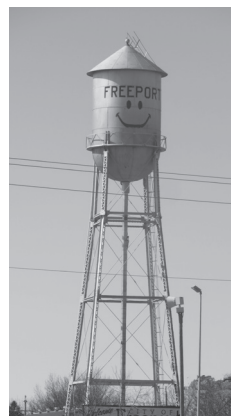
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IAM president Jake Wildman
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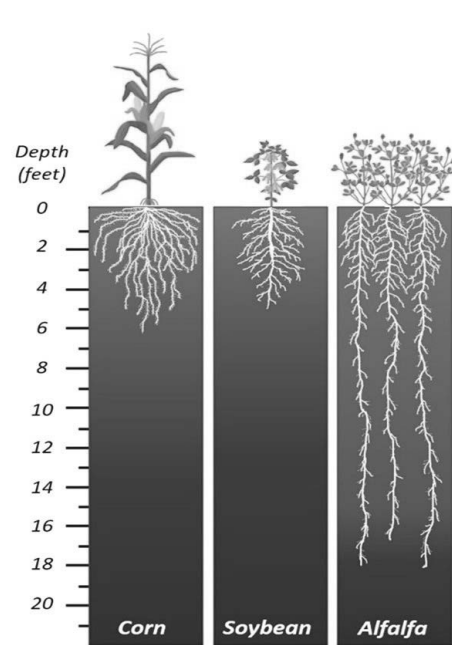


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ALFALFA continued from pg 5

ALFALFA TOLERATES DROUGHT,
BUT IS NOT RESISTANT

Figure 2. Common root length and structure of corn, soybean, and alfalfa. Source: Fernandez etl., 2019. Alfalfa wildlife and the Environment. National Alfalfa and Forage Alliance. Nafa@alfalfa.org



Alfalfa has an extensive root system that enables it to extract water from deep in the soil profile. Alfalfa roots are mostly concentrated in the top 4 feet of the soil, but it is not uncommon for roots to reach depths of 16 feet.

In response to soil moisture deficits, alfalfa increases its root mass and length. Alfalfa survives severe moisture deficits by going dormant. In the Midwest, alfalfa plants can survive several months in dormancy. In some climates dormant alfalfa can survive for years.

During the onset of drought, alfalfa plants increase carbohydrates stored in the crown to allow the plant to survive dormancy. When water becomes available alfalfa regrows rapidly from buds on the crown.

MOISTURE STRESS REDUCES YIELD

The physiological and morphological changes to moisture-stressed alfalfa ultimately reduces forage yield. Many changes are due to a dramatic reduction in photosynthesis. Morphological changes include a decrease in leaf size, stem number, stem diameter and stem length.

Initially alfalfa plants will cup or fold their leaves to decrease moisture loss. Under moisture stress, leaves are senesced beginning in the lower portions of the canopy. Soil moisture deficits also delay alfalfa maturity. The delay in maturity will reduce forage yields but can increase the forage quality of alfalfa (Table 2).

Table 2. Effect of moisture deficit stress level on alfalfa traits. Source: Halim et al. 1989. Agron. J.

| Alfalfa trait | High stress | Medium stress | Low stress |
|---------------|-------------|---------------|------------|
| Maturity* | 2.5 | 3.4 | 4.0 |
| Leaf/stem | 0.8 | 0.63 | 0.6 |
| IVDDM | 65% | 64% | 63% |
| NDF | 40% | 41% | 43% |

*Maturity: 2=vegetative; 3=early bud; 4=late bud

Moisture stress will also reduce biological nitrogen fixation by alfalfa largely through its negative impacts on photosynthesis. Bacteria located in small nodules on alfalfa root hairs can normally fix 100-200 lb of N/acre per year from the air and convert it to protein for plant growth. Moisture deficits reduce nodule mass, nodule number, and function of enzymes in the nodules. Therefore, the contribution of N to grasses grown in association with alfalfa, or to rotational crops will be reduced.

CAN DROUGHT-STRESSED ALFALFA BE HARVESTED?

If drought occurs in the early stages of regrowth and less than a foot of regrowth has accumulated, avoid cutting the crop as the yield will be small. Alfalfa that is at or near harvest maturity and has accumulated appreciable yield should be harvested. If the drought continues, significant leaf loss will occur. As with all harvests, avoid excess wheel traffic in the field as stressed plants can be more susceptible to physical damage.

DROUGHT HAMMERS ALFALFA SEEDLINGS

Drought affects alfalfa seeding by interfering with germination and stressing germinated seedlings that have small root systems. Seeds sown into dry ground will remain viable until adequate moisture is present; however, seeds that germinate and begin root emergence will die if insufficient moisture is present.

For successful establishment, alfalfa should be seeded at ¼ to ½ inch depth into firm seedbeds. These conditions provide good soil-seed contact which allows seeds to absorb water while minimizing exposure to extremes in temperature and moisture.

Within 24 to 48 hours after seeding, alfalfa will absorb water. Within 4-7 days, the root (called a radicle) emerges through the seed coat. Before radical emergence, the germination process can be stopped if moisture deficits occur. After radicle emergence, however, moisture deficits will kill the seedling. Even if the seedling emerges and reaches the first trifoliate leaf stage, it has little tolerance to drought because of its inadequate root system.

The growth stage at which alfalfa can tolerate extended soil moisture deficits has not been established, but by 8 weeks, the risk of drought damage is minimized as plants have a well-developed crown and multiple stems.

IRRIGATION

Determining how much irrigation water to apply is critical for water conservation and for profitable use of irrigation. Most irrigation scheduling focuses on prevention of yield-reducing stress while optimizing economic yields.

Water budgeting approaches or “checkbook scheduling” involves monitoring soil moisture in addition to determining daily crop water use through evapotranspiration (ET). Soil moisture can be monitored using moisture-sensing instrumentation. With alfalfa, irrigation typically begins with only about 50% depletion of available water in the root zone. See more about irrigation scheduling in Minnesota at: <https://extension.umn.edu/soil-and-water/irrigation>

Other irrigation scheduling considerations unique to alfalfa include: 1) avoid scheduling during times of peak ET in the summer months, 2) avoid irrigation 1 week before harvest to facilitate harvest equipment and to avoid compaction, 3) irrigate immediately after a harvest, and 4) avoid irrigation when alfalfa is undergoing the dormancy reaction in the fall.



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The Importance of Pressure Gauges

By NDSU Extension - Water Spouts #316 June 2021

The pressure gauge is an often overlooked and neglected instrument on many irrigation systems. Yet it is probably the most important indicator of irrigation pump operation readily available to you.

Every time you turn the pump on, the pressure gauge receives a “shot” due to pressure fluctuations from filling the pipeline. In addition to the bounce at turn on, while the pump is operating, you often have pressure fluctuations and vibrations. Because of these conditions, pressure gauges (even liquid-filled types) lose their accuracy after a couple of growing seasons.

If your pressure gauges are old and you question their accuracy, now

would be a good time to replace them. Many center pivots have a pressure transducer connected to the control box. The pressure is displayed in the panel, along with other operations parameters. Having an accurate pressure gauge at the pivot point provides a check on the accuracy of the pressure transducer.

Because a pressure gauge only conveys useful information when you are looking at it, why not install a shut-off valve between the gauge and the pipeline? When you want to check the pressure, just open the valve. This will extend the life of the pressure gauge and ensure you are getting accurate readings. Plus, this makes removing the pressure gauge at the end of the season easy to do.

Tom Scherer, NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu 701-231-7239



Central Lakes College Ag and Energy Research Center FIELD DAY

Friday, August 27, 2021 9:00 - 3:00pm
26505 County Road 2 Staples, MN

9:00-2:30

Drone Flights

-Hands on Demonstration

Tractor Ride and Drive

-courtesy of Midwest Machinery

'Sota Grown Pod Tours

-Indoor food demonstration



10:00-11:00—White Mold in Soybeans Study & Edible Bean Presentation

-Angie Peltier (U of M Crookston) and Byron Fischer (Chippewa Valley Bean)

11:00-12:00—Precision Irrigation & Weather Station Presentation

-Nathan Wiese (SWCD) and Luke Stuewe (MDA)



11:00-12:00—Kid's Program

-Tractor Driving

-Potato Digging

-Exploring Technology

Will bring home fresh veggies

12:00-1:30—Lunch Program

-Legislative Update



1:30-3:00—Living Legacy Garden Ice Cream Social and Tours

-Tammy Rick

1:30-2:30—Local Foods Tour

-Vineyard—Dennis Emslie Drummond

-Orchards—Tricia Sauer

-Farm-to-School—Katerina Eckenrode

-FFA Hoop House—Joe Ramstad



1:30-3:00—Forage Council Pasture Walk

-Rainfall Simulator

-Grazing and Fencing Discussion

FOR MORE INFORMATION CONTACT: Melody Weber - 218.894.5123

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www.clcmn.edu/ag-energy-center/

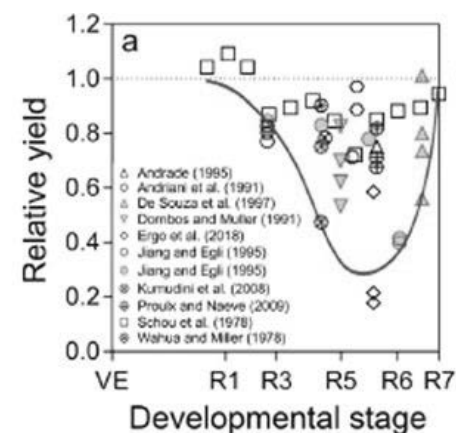


root mass between irrigated and non-irrigated soybeans was similar, however irrigated soybeans proliferated in the top 2' of soil. Non-irrigated soybeans had roots much deeper in the profile.

Due to reallocation of nutrients and reduced water potential in the shoot, early season drought stress reduces rates of stem elongation and leaf area expansion (Hoogenboom et al., 1987b), leading to smaller leaves than fully watered plants. After rains return, however, drought-stricken plants have been shown to grow more rapidly than those not stressed (Hoogenboom et al., 1987b), resulting in similar sized plants overall, producing similar yields.

From a practical standpoint, significant drought stress during the vegetative period of soybean development primarily pauses plant growth. Leaf expansion is slowed or stopped and only under severe drought does photosynthesis slow or stop. Reducing photosynthetic rates results in a permanent effect on yield potential as this represents a lost opportunity for yield accrual. However, at early growth stages, soybean plants are collecting only a portion of available light, anyway. Reduced photosynthetic rates for a few hours per day tends to have little yield effect on soybean prior to R1.

Figure 1. From Grassini et al., 2021

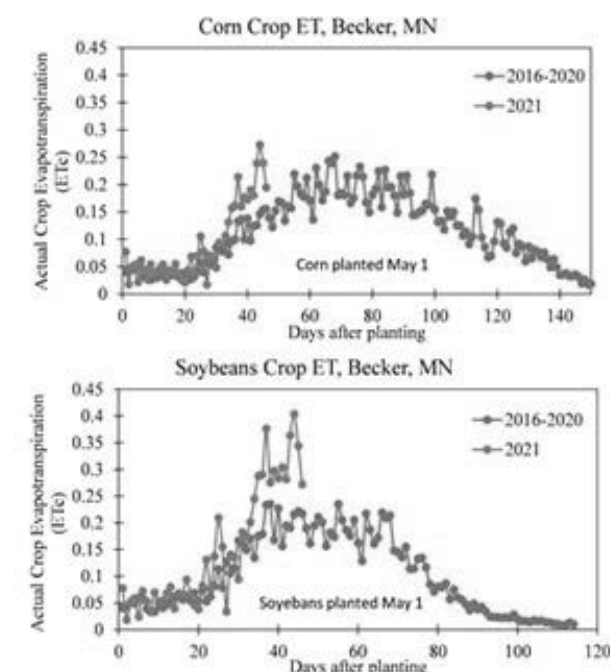


In fact, soybean is quite resilient to most stressors through early reproductive growth. Figure 1 shows soybean yields relative to unstressed plants in a series of experiments where soybeans have been exposed to stresses such as (drought, shading, heat, or defoliation). While stresses during seed filling can have a large effect on seed yield, little research, including that on drought, has demonstrated significant yield losses to stressors prior to seed filling.

WATER USE AND IRRIGATION

The term evapotranspiration (ETc) and crop water use are used synonymously to describe the water movement from the soil through evaporation and from the plant surface through transpiration. Understanding of the critical water use periods for corn and soybeans to maximize the yield potential and to improve water use efficiency can help in efficient irrigation management.

Figure 2. Corn and soybean evapotranspiration at Becker, MN.



As discussed above, drought stress is less detrimental during the vegetative growth stages in both corn and soybean. The highest demand for water does not occur until

the plant is in the transition phase from vegetative growth stages to reproductive growth stages. High temperatures early in the season have increased the ETc (crop water demands-see Figure 2) as compared to last few years, but water stress is not that critical at this stage. In an average growing season, ETc for corn and soybean at this stage would be around 0.1 to 0.2 inches/day. If enough soil water (~35% of total available water) is available in the root zone at this stage, corn and soybeans could sustain without any yield loss.

The maximum amount of water that the soil can hold and total water available to the plants is dictated by the soil type. Fine textured soils, like clays, can hold more water than coarse textured sandy soils. For

your particular soil type, the soil water and soil water depletion can be measured and estimated using soil moisture sensors or weather-based irrigation scheduling tools <https://z.umn.edu/irrigationmgmt>. For the early season corn and soybeans, relying on stored soil moisture as much as possible is recommended to encourage deeper root systems. Crops with deeper root systems can withstand drought conditions better

For irrigated fields, water applications in early growth stages

can be reduced without impacting the yield much, as long as water stress is alleviated during early reproductive periods (Lamm and Kheira, 2008). For corn and soybean, soil water depletion can be as high as 60-70% in the early vegetative growth stage without affecting plant development.

In dry seasons when crop water demands are really high, like the one we are experiencing right now, water availability for irrigation could be an issue later in the season so it is beneficial to use this water cautiously at the stages that can withstand water stress and use that water later in the season near tasseling and early reproductive periods.

SOURCES

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IAM Gets Updated Webpage and Facebook Presence

If you have not visited the NEW IAM website <https://mnirrigators.org/> and Facebook page recently it's time you do so! At IAM, our mission is to "support new science-based research on irrigation management and provide advocacy at the state and local level for the right of farmers to irrigate." This website highlights our work in this area, and we'll provide updates and events via our Facebook page.



"The impact of irrigation on Minnesota's economy not just to the farmer, but also the rural communities where irrigation takes place in Minnesota is significant. IAM wants to spread the message that farmers who irrigate are working hard to be good stewards of our natural resources."

- ALAN PETERSON, FORMER IAM PRESIDENT



Be sure to review the membership section, where you can donate online to our \$0.25/acre legislative fund, renew your membership, or become a sponsor. There is also a place for farmers to find resources from research farms across the state and the latest copy of IAM's Minnesota Irrigator newsletter.

CHECK OUT THE IAM FACEBOOK PAGE and BECOME A FOLLOWER !!!!



Thanks to IAM Board member Anna Bregier and technical staff at Central Lakes College for upgrading and organizing the website layout and creating a Facebook page.





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"Friends of Alan Peterson" Offer Matching Dollars for any NEW DONATIONS to the ALAN PETERSON AG SCHOLARSHIP FUND

Five friends of the late Alan Peterson came together, donating \$12,500 the first of April. These funds are to be used to match any new donations made over the next year. Hence any new gifts including your donation to the scholarship fund will be doubled thanks to this group of generous donors. This offer of a match to the Alan Peterson Scholarship fund goes until July 1st, 2022.

As Qualifying Donations are received by IAM for the Scholarship Fund an equal amount will be withdrawn from the Friends of Alan Peterson Fund by the IAM Treasurer and deposited into the Alan Peterson Scholarship Fund. If the Friends of the Alan Peterson Fund is not depleted by July 1, 2022, their remaining deposit will be returned to the depositors in equal shares.

Since last fall, we have raised over \$38,000 in donations honoring our former president Alan Peterson, who lost his battle with cancer in 2020. A committee of the board was formed to develop criteria for this scholarship and recently announced two recipients to receive the scholarships once they have enrolled in college this fall. Applications for next year 2022 award can be found on our website www.mnirrigators.org/resources.

Donation checks can be made payable to the
"Alan Peterson Agricultural Scholarship Fund" and mailed to:

Irrigators Association of Minnesota
Fletcher Syltie, Treasurer
24 S. Edquist St.
Appleton, MN 56208

ROSHOLT RESEARCH FARM FIELD DAY



THURSDAY, AUGUST 19, 2021

9:30 A.M. - 1:00 P.M.

Rosholt Research Farm, 910 Old Hwy 28, Westport, MN 56385

LEARN ABOUT:

- Nitrogen Management for Corn in Irrigated Sand
- Irrigation Management for Profitable Crop Production and Water Quality Protection
- Kernza: A New Perennial Grain Crop to Improve Drinking Water
- Adding Value to Kernza: An Update on AURI's Efforts to Identify Processing Methods and Early Supply Chain & Market Opportunities for Kernza in Minnesota

RSVP via Event Brite: <https://www.eventbrite.com/e/rosholt-research-farm-field-day-tickets-162430805913> or via phone at 320-634-5327 Registration is free, but required. Lunch will be provided.

FOR MORE INFORMATION:

Holly Kovarik | District Manager
Pope Soil & Water Conservation District
320-634-5327
www.popeswcd.org

FUNDING:

Funding for the work at the Rosholt Research Farm has been provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR), Minnesota Department of Agriculture Agricultural Fertilizer Research and Education Council (AFREC), and the Clean Water Fund as a part of the Clean Water, Land, and Legacy Amendment.



Funding for this project was provided by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR). For more information, visit www.lccmr.leg.mn.



Funding provided from the Clean Water Fund as part of the Clean Water, Land, and Legacy Amendment. For more information, visit www.legacy.mn.gov/clean-water-fund.

PROJECT PARTNERS

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320-743-3000

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Starbuck, MN 56387

1-877-947-4868

K & T IRRIGATION

1124 W. Main Ave.
West Fargo, ND 58078

701-281-9418

CA 1111

| Stage of Growth | Approximate number of days to maturity | Water use (ET) to maturity (inches) |
|-------------------------|--|-------------------------------------|
| Corn | | |
| Blister (R2) | 40-50 | 7-7.5 |
| Milk (R3) | 38-42 | 4.8-5.3 |
| Dough (R4) | 30-35 | 3.2-3.6 |
| Beginning Dent (R4.7) | 23-27 | 2.1-2.4 |
| Full Dent (R5) | 19-21 | 1.6-1.8 |
| 1/2 milk line (R5.5) | 12-14 | 0.9-1.2 |
| 3/4 milk line (R5.75) | 6-8 | 0.4-0.6 |
| Soybeans | | |
| Full flowering (R2) | 48-54 | 6.8-7.6 |
| Full pod (R4) | 35-39 | 4.0-4.8 |
| Beginning seed (R5) | 27-31 | 2.7-3.3 |
| Full seed (R6) | 15-18 | 1.0-1.4 |
| Beginning Maturity (R7) | 9-11 | 0.4-0.7 |

Table 5. Estimated normal water requirements for corn (95 RM) and soybeans between various growth stages and maturity in central Minnesota.

For more Information on how to apply this information visit University of Minnesota Extension Irrigation Management at:

<https://extension.umn.edu/irrigation/irrigation-management-strategies#predicting-the-last-irrigation-for-corn-and-soybeans>

<https://blog-crop-news.extension.umn.edu/2020/09/predicting-last-irrigation-for-corn-and.html>

IAM 2021 MEMBERSHIP – WE NEED YOUR SUPPORT!

NAME _____
(PLEASE COMPLETE)

IRRIGATOR ☐ Ag crop ☐ Horticulture ☐ Wild Rice

IRRIGATION INDUSTRY

☐ Irrigation equipment dealer, well driller, etc.

☐ Agribusiness — seed, fertilizer, financial, etc.

☐ Educational/Agency _____

☐ Other _____



Please mail this form and a check payable to "IAM" to:

Irrigators Association of Minnesota

Attn: Fletcher J. Syltie, IAM Treasurer, 24 S Edquist St, Appleton, MN 56208

Address _____

City, State & Zip _____

Email Address _____

ANNUAL MEMBERSHIP DUES

Individual Annual Dues — \$100 or \$275 for 3 Years \$ _____

Platinum Circle Membership — \$1,000 or more \$ _____

Presidential Membership — \$500 or more \$ _____

GOLD Membership — \$300 \$ _____

Silver Membership — \$200 \$ _____

Bronze Membership — \$150 \$ _____

TOTAL ENCLOSED \$ _____