Tri-Basin Irrigator

Volume 24, Issue 7 **August 15, 2024**

Program Information

EQIP: **Sign-up now for 2025 funds.**

CSP: **Sign-up now for 2025 funds.**

NSWCP: **For underground pipe from water source to a pivot replacing gravity irrigation, have your application completed by August 30th for first chance at 2025 funds. Applications must be signed by the owner.**

ENERGY EFFICIENCY GRANT: **Next sign-up deadline is September 30th. For more information, contact Jolene at Rural Development at the Kearney USDA Service Center at 308-455-9840 or at *jolene.jones@usda.gov*.**

Calendar of Events

Sept 3: CNPPID Board of Directors Meeting
Sept 5: UNL West Central Fall Field Day – Register at *https://extension.unl.edu/statewide/westcentral/2024-water-crops-and-soil-health-field-day/*
Sept 10: TBNRD Board Meeting
Sept 10-12: Husker Harvest Days

When is My Last Irrigation?

Most corn is at Beginning Dent or approaching 1/4 Milk Line. Rains this week have been a blessing. NeRain looks like Gosper overall is in that 2-2.25 inch range. Phelps average may be 1.50-1.75 inches. Kearney County looks like they are in that 1.00-1.50 inches.

The chart on the right side of this page says you need 3.75 inches of water to finish your corn at 1/4 Milk Line and 5.0 inches at Beginning Dent. Using the example on the right side of this page, you can estimate how much more water needs applied to get the corn to maturity. The example ends the season at 65% moisture.

We need to start managing our moisture levels down so we can make room for the FREE off-season moisture. No need to pay for plenty of water at seasons end only to watch it leach on out of the rootzone taking valuable nutrients with it.

Here are a few thoughts as we start to close the year.

1. Corn seems to shut down rather quickly. Moisture that we thought was going to be used was not. We've ended up with more moisture at maturity than predicted.
2. from 2011 through 2017, average rainfall from 1/2 milk line to black layer was 0.75 inches. 0.21 inches was the low and 1.56 was the high.
3. Soil moisture sensors are a great tool to see how rains fill the profile, how much water the corn is actually using, at what depth water is being removed by the crop, etc.
4. In order to learn if that last irrigation you made was worth it or not, put that last 0.5 inch or so on part of the pivot to get a comparison.
5. Be patient. Don't end the season too soon. You may catch a rain. You can always irrigate later if need be. Keep monitoring and making adjustments as the year progresses.

Curtis's Column

USDA United States Department of Agriculture
Natural Resources Conservation Service

Predicting Last Irrigation

Needed info: **1.** Available Water Capacity (AWC) of soil, **2.** goal for soil moisture level at crop maturity, **3.** current soil moisture level to a four-foot depth (unless roots are not that deep due to compaction, too much water early, etc.), **4.** current crop stage, and **5.** water use from current crop stage to maturity (see chart below).

	Growth Stage	Approx. Days to Maturity	Water Use to Maturity
Corn	Dough (R4)	34	7.5"
	Beg. Dent (R4.7)	24	5.0"
	¼ Milk Line (R5)	19	3.75"
	½ Milk Line (Full Dent)	13	2.25"
	¾ Milk Line	7	1.0"
	Maturity (R6)	0	0.0"
Soy Beans	Full Pod (R4)	37	9.0"
	Beg. Seed (R5)	29	6.5"
	Full Seed (R6)	18	3.5"
	Leaves Beg. To Yellow (R6.5)	10	1.9"
	Beg. Maturity (R7)	0	0.0"

You can get a copy of NebGuide G1871 "Predicting the Last Irrigation of the Season" online at *http://extensionpublications.unl.edu/assets/pdf/g1871.pdf*.

Predicting Last Irrigation Example

Crop: Corn Growth Stage: 1/4 Milk Line
Current Moisture: 80% Year-End Moisture Goal: 65%
Water Use To Maturity: 3.75 in. (see chart above)
Soil Type: Holdrege Silt Loam = an AWC of 2.25 in. per ft.
(Soil information available at your local NRCS office)

1. AWC (2.25 in./ft.) x root zone (4 ft.) = **9.0 in. Total AWC**
2. Crop maturity moisture goal of 65% x 9.0 in. Total AWC = **Minimum Water Balance (MWB) of 5.85 inches in 4 ft.**
3. Current moisture level of 80% x 9.0 in. Total AWC = **7.2 in. current available water**
4. 7.2 in. current available water – 3.75 in. to reach maturity = **3.45 in. water at crop maturity**
5. 3.45 in. water at crop maturity – MWB of 5.85 in. = **- 2.40 in. of water**
   (Negative: water is needed. Positive: done irrigating.)
6. **2.40 in. of irrigation and rainfall is needed between now and crop maturity.**

Note: It's recommended to periodically check soil moisture levels & crop stages, repeating this process through crop maturity. Different hybrids can utilize moisture differently, did all rainfall enter the soil profile, etc.

If you have any questions, you can contact Curtis Scheele at *curtis.scheele@usda.gov* or call him at 308-995-6121, Ext. 3.

CNPPID Notes

Irrigation Technology

Central is currently evaluating new surface water delivery automation for all of Central's canals that will complement on-farm technology. This surface water delivery technology would allow automatic water adjustments with variable rate systems (including swing arms) and it would shut off water should a mechanical issue arise with a down pump or pivot. Automating all of Central's canals (side laterals) will make the conveyance and delivery of surface water closer to on-demand, since the Central customer's irrigation system is connected directly to the canal, automation will automatically adjust canal levels when needed (ie…a pump turns on/off, the canal self-adjusts, and the patrolman sees it online). New surface water delivery technology is convenient and dependable for water users, and it provides greater water savings.

Irrigation technology (pivots, subsurface drip, soil moisture sensors, etc.) has made on-farm irrigation incredibly efficient, convenient, and less labor intense than what traditional gated pipe, ditch and siphon tubes required. This technology has made great improvements for producers, from the ability to remotely control their irrigation systems to turn on/off to receiving soil moisture and ET data, etc. (all from the convenience of their phones). However, the efficiency gain of today's irrigation systems has made the conveyance and deliveries of surface water more difficult to efficiently manage for CNPPID.

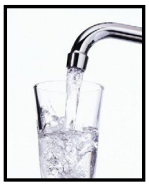
Today's irrigation systems that use variable rate irrigation (along with swing arms), constantly change the flow rate necessary to deliver water to the field. Central staff must adjust flow rates by turning gates. Central operates around 350 miles of open canals within the irrigated area of Gosper, Phelps, and Kearney counties. Approximately 25% of these canals (mostly on the main) are automated for remote control. The remaining 75% of the canals are manually operated and are referred to as "dark canals" (no automation/remote control). A new automation system on the Central system could convert up to 80% of the current Irrigation Service Specialist (patrolman) water delivery work (gate turning) into canal maintenance after full installation.

The investment to automate all of Central's canals helps to secure the use of surface water for irrigation and maintain the mound which surface water irrigation created. Most importantly it addresses and eliminates perceived challenges that inhibit canal water use we occasionally hear about because this technology puts surface water convenience at the user's fingertips.

Visit www.cnppid.com or follow @CNPPID on Facebook, Instagram and Twitter for updates throughout the year.

Tri-Basin NRD News

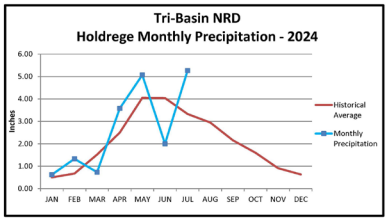
Free Domestic Water Testing



Tri-Basin NRD wants rural residents to have safe drinking water. Any district resident who uses a rural household water well can request NRD staff to sample their well once per year at no charge. The lab will test the sample for nitrates and coliform bacteria.

The lab sends the test results to the Tri-Basin NRD office, where the staff records them in a water quality database. Tri-Basin sends the results to the homeowner, with information about protecting water quality.

Monthly Temperature and Precipitation



Are you interested in how monthly data compares to monthly averages? Our staff keeps track of daily temperatures and precipitation for Holdrege and compiles the data into charts that compare monthly totals to the average for Holdrege. This information is updated on our website monthly and can be found at https://www.tribasinnrd.org/information-outreach/weather-data under Holdrege Monthly Weather Data.

Nebraska Extension Extras

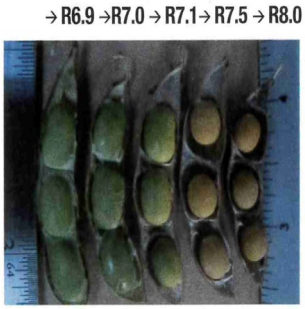
New Bt Trait Names

Most Bt (Bacillus thuringiensis) pesticide proteins resistance traits from bacteria are unchanged in 2024, but **Cry34/35Ab1** is now **Gpp34Ab1/Tpp35Ab1.** The *Handy Bt Trait Table for Corn Production* seed guide / bag tags (Texas A&M link update) is: https://www.texasinsects.org/bt-corn-trait-table.html.

Predicting Last Soybean Irrigation

Soybean maturity is dependent upon day length; also, water usage can vary depending on the year. Generally, irrigators start reducing stored soil profile moisture as crops start drying down four to six weeks before crop physiological maturity. The average target is soils dried down to 40% available water by maturity. Physiological maturity with corn and grain sorghum is defined as the time when kernels or seeds form a black layer at the kernel tip. For soybeans, beginning maturity is when one normal pod on the main stem has reached its mature pod color.

Our Nebraska Extension NebGuide G1871 "Predicting the Last Irrigation of the Season" provides 'end of season irrigation' worksheets for corn, grain sorghum and soybeans. Usually, soybeans are only 10 days from beginning maturity when the plants reach R6.5 growth stage or when the leaves begin to yellow. At this point, the soybean will likely need 1.9 inches of water to complete dry matter production.



Soybeans Growth Stage R7.0 begins when the white membrane inside the soybean pods is no longer attached to the seeds (R7.1); water is no longer transferred to seeds; and further irrigation provides no benefits.

UNL West Central Fall Field Day – Sep. 5

The 20th Annual UNL West Central Research Center Water, Crops and Soil Health Field Day at North Platte is scheduled for **Thursday, Sep. 5** (**8:30 a.m.** registration through **3:00 p.m.**). Featured topics will include: NRCS Rainfall Demonstration; Field Tours; Free Lunch; Keynote Speaker – Dale Strickler; Carbon Markets and Production Panel.

For the full itinerary and meal registration follow link: https://extension.unl.edu/statewide/westcentral/2024-water-crops-and-soil-health-field-day/.

2024 Corn Diseases Update

Tamra Jackson-Ziems, UNL Plant Pathologist, says that Bacterial Leaf Streak has been worse in 2024 compared to last year. This bacterial disease was first identified in central Nebraska in 2016 and can't be controlled with fungicides. Lesions are similiar to Grey Leaf Spot disease, but the Bacterial leaf spots are not as square. The fungicide efficacy weblink is: https://cropprotectionnetwork.org.

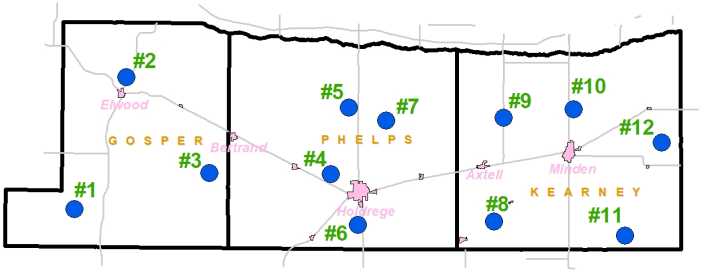
Tar spot (Phyllachora maydis) has become a serious corn disease in much of the Corn Belt. The good news is that it will likely be at least two years before Tri-Basin NRD irrigators will have this disease in their corn fields. However, this disease was positively identified at Clay Center, NE on 8/06/24. The national tar spot movement by counties is available on the corn ipm link: https://corn.ipmpipe.org/tarspot.

NAWMN Crop ET Information

Additional Information and other ET resources can be found at websites listed under "Crop ET Information" below.

Inches of Crop Water Use (ET) = Reference ET x Kc

	July 28 – Aug 4		Aug 5 – Aug 11	
Site	Reference ET	Rain	Reference ET	Rain
1	2.00	0.46	1.00	0.79
2	1.80	0.12	0.90	0.52
3	1.80	0.20	0.90	0.15
4	1.90	0.16	0.90	0.17
5	1.80	0.21	0.90	0.27
6	2.00	0.28	0.90	0.25
7	1.80	0.19	1.00	0.22
8	1.70	0.13	0.90	0.17
9	1.80	0.29	1.00	0.40
10	1.60	0.14	0.90	0.32
11	1.80	0.33	0.80	0.14
12	1.60	0.45	1.00	0.13



2024 Map of TBAWMN Sites across the Tri-Basin NRD.

Crop Coefficients (Kc)

Corn Stage	Kc	Soybeans Stage	Kc
2 leaf	0.10	Cotyledon (VC)	0.10
4 leaf	0.18	1st Node (V1)	0.20
6 leaf	0.35	2nd Node (V2)	0.40
8 leaf	0.51	3rd Node (V3)	0.60
10 leaf	0.69	Beg. Bloom (R1)	0.90
12 leaf	0.88	Full Bloom (R2)	1.00
14 leaf	1.01	Beg. Pod (R3)	1.10
16 leaf	1.10	Full Pod (R4)	1.10
Silk – Beg. Dent	1.10	Beg. Seed (R5)	1.10
¼ Milk Line	1.04	Full Seed (R6)	1.10
Full Dent (½ Milk)	0.98	Yellow Leaf (R6.5)	1.00
¾ Milk Line	0.79	Beg. Mat. (R7)	0.90
Black Layer	0.60	Full Mat. (R8)	0.20
Full Maturity	0.10	Mature	0.10

Crop Stage Information

Corn (R3-Milk stage to R4.7-Beginning Dent stage): At R4.7, Beg Dent, kernels are beginning to dent at the base of the ear. R5.5, Full Dent, is when the milk line is ½ way down the kernel. Knowing this will help in determining last irrigation.

Avg. daily water use from Aug 5 – Aug 11 was 0.12"-0.16".

Soybeans (R3-Beginning Pod to R5-Beginning Seed stage): Demand for water and nutrients is large throughout the rapid seed filling period. Environmental stress from now til shortly after R6 (Full Seed) needs to be avoided.

Avg. daily water use from Aug 5 – Aug 11 was 0.11"-0.16".

Aug 5-Aug 11 (12 of 12 TBAWMN sites reporting): Avg weekly rainfall was 0.29 (range 0.13 to 0.79). Avg weekly ET for corn was 1.02 and for soybeans was 1.01.

Crop ET Information

TBAWMN Sites: https://www.tribasinnrd.org/tbawmn

CropWatch: https://cropwatch.unl.edu/gdd-etdata

Texting: TBNRD: 308-995-6688 or UNL: 308-995-4222

CORN STAGE		DESCRIPTION
R4	Dough	Most kernels contain semi-solid, pasty material.
R4.7	Beg Dent	Kernels at base of ear are beginning to dent.
R5	1/4 Milk Line	All or nearly all kernels are dented. Milk line or starch line appears shortly after denting as a line across the kernel when it is viewed from opposite the embryo side and will advance toward the base of the kernel (start outside and work towards the cob).

SOYBEAN STAGE		DESCRIPTION
R3	Beg Pod	At least one 3/16" length pod is present at any one of the four uppermost main stem nodes that have a fully developed leaf. It's not uncommon to see longer pods at the lower nodes.
R4	Full Pod	At least one pod of 3/4" length is present at any one of the four uppermost main stem nodes that have fully developed leaves.
R5	Beg Seed	At least one pod containing small seeds is present at one of the four uppermost main stem nodes that have fully developed leaves. You can hold a pod up to the bright sky to see the small developing seeds in the pod cavities.

Lake and River Levels

CNPPID Reservoir Elevation and Capacity as well as Platte River Flow data listed below and other locations can be found on CNPPID's website at *http://cnppid.com/wp-content/uploads/2016/06/lakeRiverData.html*.

	August 15, 2024, 8:00 AM	1 Year Ago
El. & Cap. – Lake McConaughy	3231.2 ft - 54.4%	3233.3 ft - NA%
Inflows to Lake McConaughy	1910 cfs	826 cfs
Flows on the North Platte at North Platte	779 cfs	305 cfs
Flows on the South Platte at North Platte	159 cfs	379 cfs
Flows on the Platte at Kearney	1410 cfs	798 cfs

Go Big Red!

Websites of Interest

NRCS Nebraska	*www.ne.nrcs.usda.gov*
Farm Service Agency	*www.fsa.usda.gov*
TBNRD Home Page	*www.tribasinnrd.org/*
Central Irrigation District	*www.cnppid.com/*
UNL Cropwatch	*cropwatch.unl.edu*
UNL Extension	*extensionpubs.unl.edu/*
K-State SDI Website	*www.ksre.ksu.edu/sdi*
No-till On The Plains	*www.notill.org*
Soil Health:	*www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/*
NE State Irrig Assoc	www.nebraskastateirrigationassociation.org/

Rainfall

Rainfall amounts listed below and other locations come from NeRAIN which can be found at website *https://nednr.nebraska.gov/NeRain/Maps/maps*.

Location:	Aug 1 – Aug 14	May 1 – Aug 14
Elwood 1.81 mi. NW:	3.05	14.95
Loomis 0.2 mi. SW:	2.18	15.71
Holdrege 1.7 mi. W:	2.21	13.28
Minden 7.2 mi. W:	2.21	11.74
Minden 5.8 mi. E:	1.62	13.15

Average Rain for May-August in Holdrege = 14.21 Inches

**** If you wish to receive this newsletter via e-mail, or have any questions, comments or ideas, feel free to contact Curtis Scheele at the NRCS office in Holdrege or you can email him at curtis.scheele@usda.gov. ****

USDA - Natural Resources Conservation Service

USDA United States Department of Agriculture
Natural Resources Conservation Service

1609 Burlington Street
PO Box 798
Holdrege, NE 68949-0798
308-995-6121, Ext. 3

309 Smith Street
PO Box 41
Elwood, NE 68937-0041
308-785-3307, Ext. 3

1005 South Brown Street
Minden, NE 68959-2601

308-832-1895, Ext. 3

Central Nebraska Public Power & Irrigation District

CENTRAL Nebraska Public Power and Irrigation District

415 Lincoln Street
PO Box 740
Holdrege, NE 68949
308-995-8601

Tri-Basin Natural Resources District

Tri-Basin Natural Resources District

1723 Burlington Street
Holdrege, NE 68949
308-995-6688

Nebraska Extension

N EXTENSION

1308 2nd Street
Holdrege, NE 68949

308-995-4222

PO Box 146
Elwood, NE 68937

308-785-2390

424 North Colorado
PO Box 31
Minden, NE 68959
308-832-0645