Tri-Basin Irrigator

Volume 21, Issue 3 **June 10, 2021**

Program Information

EQIP: **Applications will continue to be approved as funds become available. Signup anytime for 2022 funds.**

CSP: **General CSP applications continue to be approved as funds become available. Sign up now for 2022 CSP funds.**

NSWCP: **New funds come July 1st for all conservation practices. To have first chance at irrigation practice approval, get your irrigation applications in by Aug. 31st.**

ENERGY EFFICIENCY GRANT: **Signup anytime for 2022 funds. Deadline is October 31, 2021. For more information contact Kelley at Rural Development at the Kearney USDA Service Center at 308-455-9837 or *kelley.messenger@usda.gov*.**

Calendar of Events

June 14: Flag Day
June 20: Father's Day
July 6: CNPPID Board of Directors Meeting
July 13: TBNRD Board Meeting

Answer to Last Issues (Issue 2) Question!

What do you think the soil profile looks like in each of these nearby fields after this rain event in June 2006?

Tilled (Runoff water in ditch)

vs.

No-Tilled (No runoff water)

See attachment "Infiltration and Runoff". The rainfall simulator demonstration photos on the attachment demonstrate what these fields are showing. Crusting prevents infiltration, thus increasing runoff. No-till prevents crusting, has worm holes to aide in higher infiltration rates getting water deeper, and it has a better soil structure. The no-till field has a lot more free moisture in the soil for the crop than the tilled field.

2021 Starting Moisture Levels!

Moisture levels are full to 3 feet. The 4th foot is at or nearly full depending upon moisture levels at the end of last crop season and moisture received in the off-season.

I know it's hot. I believe it's too early to irrigate for irrigation. Need to let the roots go down deep in order to help the crop out with that subsoil moisture in July and August.

Granted nowadays, when you see a pivot running, you don't' know if it's for irrigating, activating herbicides, or applying fertilizer. Pivots provide many benefits, including application of fertilizer when the crops need it rather than all up front.

Curtis's Column

USDA United States Department of Agriculture
Natural Resources Conservation Service

Crop Water Use (ET) Where to get this Information!

I know of 8 places where Crop Water Use (ET) can be retrieved for corn and soybeans. I will briefly explain each one. They will be categorized by crop stage/emergence date.

Weather Stations w/ Set Crop Stage/Emergence Date

The following data comes from weather stations that measure climatic conditions such as wind, temps, humidity, etc. This info is calculated to determine Crop Water Use (ET). In this calculation, an average crop stage / emergence date is used.

1. **CNPPID Website:** *https://www.cnppid.com/weatheret-data/* This website has 5 weather stations within or neighboring the Tri-Basin NRD. Offered is current day, 3 previous days, and 3 future days as well as Growing Degree Days (GDD). For 2021, emergence date for corn is May 10th and May 15th for soybeans.
2. **CNPPID Email:** CNPPID emails daily the same information on its website. Contact CNPPID at 308-995-3555 to be added to the email list.
3. **TBNRD Texting:** TBNRD offers daily text messages for the 3 weather stations within the TBNRD. Offered is current day and future 3 days. Contact TBNRD at 308-995-6688 to be added to the text messaging list.
4. **CropWatch Website:** *https://cropwatch.unl.edu/gdd-etdata* This website has 1 weather station neighboring the TBNRD. It offers GDD, previous 7- and 3-days ET, and the next 3 days. This site does have 6 different emergence dates per crop. Includes Sorghum and Wheat.

Use Your Actual Crop Stage for Your Own Fields

The following data comes from 14 atmometer locations within the Tri-Basin NRD. Atmometers evaporate water based off weather conditions. Reference ET is a direct reading off the atmometer. This reading multiplied by crop stage determines Crop Water Use (ET). The website and email below have already multiplied it for you, so no calculations needed.

1. **Tri-Basin NRD Website:** *https://www.tribasinnrd.org/nawmn*. This site posts weekly and average daily ET from the previous week. 4 crop stages will be offered. Instructions will be available to simply predict future weekly ET. Also posted will be weekly rainfall.
2. **CNPPID Website:** *https://www.cnppid.com/weatheret-data/.* This website will have a link to the Tri-Basin NRD website mentioned in #1 above.
3. **TBAWMN Email:** Curtis emails each Monday the same information that will posted on the TBNRD website. Contact Curtis at 308-995-6121, Ext. 3 to be added to the email list.
4. **Tri-Basin Irrigator Newsletter:** This information is provided on page 3 of this newsletter for the previous 2 weeks. Calculations need to be made. Page 3 also offers weekly rainfall and other crop information that come from these 14 sites. A map showing these 14 sites is shown on page 3.

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

CNPPID Notes

Irrigation Season Begins:

So far this season, we've seen some steady precipitation across the Central Nebraska Public Power & Irrigation District. From April 1st to June 9th the three UNL weather stations that the District sponsors have recorded the following rainfall amounts: Axtell 5NE 6.16 inches, Holdrege 5N 7.38 inches, and Smithfield 2E 5.43 inches. These numbers are above the normal amount during this time frame.

The scheduled irrigation season began on June 7th, and we ask that our customers communicate daily with their Irrigation Service Specialist on water deliveries. This communication allows the ISS to deliver the irrigation water to the customer on time, minimize excess spill, and helps Central's system to run efficiently.

During the last half of May, the excess flows in the Platte River allowed Central to divert water out of the river and into Central's system to deliver ground water recharge to Elwood Reservoir, Victor Waterfowl Production Area (WPA), Johnson Waterfowl Production Area (WPA), and Funk Lagoon. These ground water recharge events across the District are achieved through the cooperation and efforts with Nebraska Department of Natural Resources, Tri-Basin Natural Resources District, Platte River Recovery Implementation Program, United States Fish & Wildlife Service, and The Central Nebraska Public Power & Irrigation District.

Find us at www.cnppid.com or @CNPPID on Facebook, Instagram, Twitter, and Linked In.

Tri-Basin NRD News

Chemigation Reminder:

Do you plan to apply fertilizer or ag chemicals to your fields through your center pivot or drip irrigation system? If so, you must have a chemigation permit from Tri-Basin NRD for each injection point. Call TBNRD at 1-877-995-6688 for more information about the permitting process.

If you already have chemigation permits, it is a good idea to check your safety equipment over at least once a year to make sure all the equipment is in working order.

In the TBNRD chemigation safety equipment inspections are required every three years. At the inspection, the well and irrigation system need to start and operate at normal pressure for at least one minute. Then the following will be checked:

- water discharges from low pressure drain & stops as system's pressure increases
- 20 ft of hose attached to low-pressure drain to carry contaminated water away from well
- chemical injection line check valve is free of leaks

During shutdown of the system:

- injection pump shuts off when system shuts off
- air is drawn into pipeline through vacuum relief valve
- irrigation pipeline check valve is watertight
- water discharges from low pressure drain & then stops (if pipeline check valve is not leaking)

Nebraska Extension Extras

UNL Irrigated Soybean Research Update:

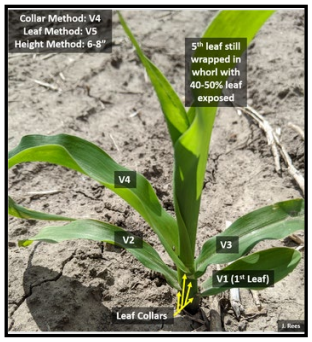
A two-year (2019-2020) Nebraska Extension research study was conducted with 91 Nebraska soybean growers statewide (including 10 Tri-Basin NRD growers) comparing irrigated and dryland soybean yields and grain quality.

Although soybean oil content was slightly lower (-0.18%) in irrigated fields versus rainfed; average yields (+10 bu/A) and protein content (+0.32%) were higher in irrigated. (Note three exception cases, in which irrigated yields were lower than comparative rainfed fields, were attributed to weed infestation, sub-optimal irrigation amounts, or later planting). This study shows that higher yields do not equate to lower protein content.

Although there were no statistical differences between irrigated and dryland field test weights, the 57 pounds per bushel average test weights were 3 lbs/bu below the standard market soybean test weights during past two growing seasons.

V-6 Corn Growth Stage:

Corn plants with their first six leaves collared are defined as Vegetative Growth Stage (V6). Since most corn fields have now reached V6, now is good time to flag representative corn plants within a field and mark the sixth (above ground leaf) prior to the lower leaves decomposing and becoming increasingly harder to identify as the growing season progresses. Using designated flagged plants, growers can either paint or trim the 6th outer leaf tip.



This stage is also when the corn plant growing point moves about the soil surface and ear shoot growth and early tassel is initiated. Potential ear size is also beginning with the row number determined soon at V7. So, stresses at the V6 stage, whether drought, nutrient deficiencies or hail may have at least some long-range yield impacts.

Crop Water Us (Growth Charts):

Evapotranspiration (ETgage®) charts for alfalfa, corn, potatoes, sorghum, soybeans and wheat are available online at: https://cropwatch.unl.edu/evapotranspiration-resources Each 'Crop Growth Stage Chart' includes illustrations of growth stages for vegetative and reproduction growth stages.

Iowa State University provides a printed guide PMR 1009 "Corn Growth and Development;" and North Dakota State University provides a "Soybean Growth and Management Quick Guide" with photo illustrations available for online purchase.

Alfalfa Irrigation Management:

Alfalfa is relatively drought-tolerant, so it does not have an 'extremely critical water stress stage.' If water is not available, plants will slow or stop growing and go dormant. When water becomes available, growth will resume. However, lack of water will reduce crop ET and yield.

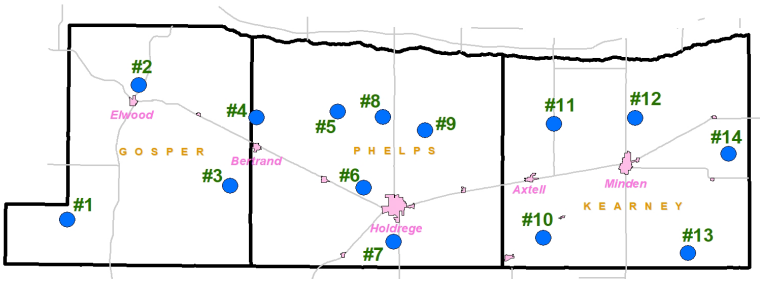
Due to the longer growing season, alfalfa can be the highest water usage crop with peak demand at crop canopy closure near pre-bud stage at 10-12 inches in height. Irrigation will likely be most beneficial just before the second cutting. Net irrigation required during the 3rd and 4th growth periods is typically 6 to 7 inches. Peak water needs range from 0.3 to 0.35 inches per day in July and August; but may reach 0.5 inches per day during hot, windy, dry days; so ET scheduling is advised. Our free NebGuide, G1778, "Irrigation Management and Crop Characteristics of Alfalfa,' provides more details.

TBAWMN 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) = Evaporation x Kc

	May 24 – May 30		May 31 – June 6	
Site	Evaporation	Rain	Evaporation	Rain
1	1.50	1.64	1.90	0.00
2	1.10	1.64	1.80	0.00
3	1.00	2.71	1.90	0.00
4	0.80	2.55	2.20	0.00
5	0.60	0.58	1.90	0.00
6	1.00	2.29	1.90	0.00
7	0.90	1.29	1.80	0.00
8	NA	NA	1.90	0.00
9	0.70	2.55	1.90	0.00
10	1.00	1.72	1.80	0.00
11	0.90	1.63	1.90	0.00
12	1.10	1.69	2.00	0.00
13	0.80	1.44	2.00	0.00
14	1.00	1.90	1.60	0.00



2021 Map of NAWMN 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 (V2-2 Leaf to V8-8 Leaf stage): At V6, the growing point and tassel are above the soil surface. The stalk is beginning a period of increased elongation. Nutrients and water are in greater demand starting at 10 leaf.

Avg. daily water use from May 31 – June 6 was 0.03"-0.11".

Soybeans (V1-First Node to V3-Third Node stage): From V2-V5, the lateral roots will grow rapidly in the top 6 inches between the rows. By V5, they will completely reach across a 30" row. Nitrogen-fixation begins at the V2-V3 stages.

Avg. daily water use from May 17 – May 23 was 0.05"-0.19".

May 31-June 6 (14 of 14 NAWMN sites reporting): Average weekly rainfall was 0.00 (range 0.00 to 0.00). Average weekly ET for corn was 0.58 and for soybeans was 0.84.

Crop ET Information

TBAWMN Sites:
Tri-Basin NRD: Site under construction
Email: Contact Curtis at 308-995-6121, Ext. 3
CropWatch: https://cropwatch.unl.edu/gdd-etdata
CNPPID: https://www.cnppid.com/weatheret-data/
Texting: Contact TBNRD at 308-995-6688
Email: Contact CNPPID at 308-995-3555

CORN STAGE		DESCRIPTION
V2	2 Leaves	Leaf stage is defined by number of leaves with visible collars. The collar is a discolored line where the leaf meets the stalk. This line circles the stalk. TIP: Mark the 6th leaf or a higher leaf by cutting a notch in it or some other way so as to know that leaf number. Reason is the lower leaves will be lost as the plant develops. Flag or somehow mark the plant in the field as a reference plant when determining later leaf (vegetative) stages.
V6	6 Leaves	
V10	10 Leaves	

SOYBEAN STAGE		DESCRIPTION
V2	2nd Node	V2 has 2 nodes on main stem, each with a trifoliate leaf with unfolded leaflets. Plant has 3 nodes total: 1 unifoliate + 2 trifoliates
V4	4th Node	V4 has 4 nodes on the main stem with 4 trifoliates. (5 nodes total = 1 unifoliate + 4 trifoliates)
R1	Beginning Bloom	At least on open flower is present at any main stem node.

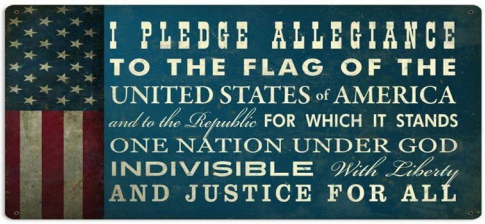
Lake and River Levels

CNPPID Reservoir Elevation and 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.

	June 10, 2021, 8:00 AM	1 Year Ago
Capacity of Lake McConaughy	77.0%	NA
Inflows to Lake McConaughy	567 cfs	1260 cfs
Flows on the North Platte at North Platte	310 cfs	1000 cfs
Flows on the South Platte at North Platte	1800 cfs	234 cfs
Flows on the Platte at Overton	798 cfs	2120 cfs

Flag Day

June 14th



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/
HPRCC	hprcc.unl.edu/
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:	May 27 – June 9	May 1 – June 9
Elwood 0.26 mi. S:	1.85	4.80
Bertrand 6.1 mi. SE:	2.21	6.60
Holdrege 0.99 mi. E:	1.60	3.64
Minden 7.2 mi. W:	1.44	5.26
Minden 5.8 mi. E:	1.74	5.17

Average Rain for May-June in Holdrege = 8.04 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
308-955-6688

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

Infiltration and Runoff

A rainfall simulator demonstrates infiltration and runoff. See photos below to see how a Holdrege Silt Loam soil fared with different tillage and residues.

Rain applied was 1 inch in 5 minutes. The front jars caught runoff while the back jars caught infiltration. Note when the soils were flipped what the 2-3 inch depth below the soil surface demonstrated. Wet soil due to better infiltration.

1. Bare Tilled Soil – Crusting quickly occurred producing lots of runoff and very little infiltration. Note the dry soil at the 2-3 inch depth.

2. Tilled Soil w/ 30% Cover – A little less runoff and a little more infiltration than #1.

3. Tilled Soil w/ 100% Cover – Less runoff and more infiltration than 1 & 2. Infiltrated through the soil on the down slope side of the soil pan.

4. Bare No-Tilled Soil – Very little runoff. Water infiltrated throughout the pan. What if residue was left on this sample as the case in a no-tilled field?

5. No-Till Grass – Pan wasn't flipped but look at all the infiltration (finger pointing to) and how very little runoff there was.

Looking at the white board behind the soils, note the raindrop splash on the bare soils versus the covered soils. Also note the little splash on the bare no-till versus the bare tilled.