

## PROGRAM INFORMATION

**EQIP:** 2023 APPLICATIONS CONTINUE TO BE PRE-APPROVED AS FUNDS BECOME AVAILABLE.

**CSP:** 2023 APPLICATIONS CONTINUE TO BE PRE-APPROVED AS FUNDS BECOME AVAILABLE.

**NSWCP:** FOR IRRIGATION PRACTICES, HAVE YOUR APPLICATION COMPLETE BY AUGUST 31<sup>ST</sup> FOR FIRST CHANCE AT 2024 FUNDS. APPLICATIONS MUST BE SIGNED BY THE OWNER.

**ENERGY EFFICIENCY GRANT: NEXT SIGN-UP DEADLINE IS SEPTEMBER 30<sup>TH</sup>.** FOR MORE INFORMATION CONTACT JOLENE AT RURAL DEVELOPMENT AT THE KEARNEY USDA SERVICE CENTER AT 308-455-9840 OR AT [JOLENE.JONES@USDA.GOV](mailto:JOLENE.JONES@USDA.GOV).

## CALENDAR OF EVENTS

**AUG 24: WCREEC FALL FIELD DAY @ NORTH PLATTE**  
PRE-REGISTRATION BY AUGUST 21<sup>ST</sup>. REGISTER AT [HTTPS://GO.UNL.EDU/2023-WATERCROPSFIELDDAYREGISTRATION](https://go.unl.edu/2023-watercropsfielddayregistration).  
**SEPT 5: CNPPID BOARD OF DIRECTORS MEETING**  
**SEPT 12: TBNRD BOARD MEETING**  
**SEPT 12-14: HUSKER HARVEST DAYS**

## Nebraska On-Farm Research Results! Nitrogen and Pivot Bio

In the last issue, I provided lots of comparisons of Nitrogen from the TAPS program in North Platte. In this issue, I am sharing the results of the 2021 and 2022 Nitrogen and Pivot Bio studies from Nebraska's On-Farm Research. They are attached to this newsletter.

On the attachment, I have highlighted some things in yellow. I have added my own notes in red. In green letters in the gray bar on each scenario, I added the previous years crop.

In reviewing this research, note both the Pivot Bio and the nitrogen results. Remember that each scenario stands on it's own merit and should not be compared to the others.

The attachment shows the results of producers willing to do On-Farm Research. The products used are not endorsed by NRCS, TBNRD, CNPPID, nor UNL.

To dive in deeper into the soil, tillage, timings, fertilizers, etc. that each scenario utilized, you can go to: <https://on-farm-research.unl.edu/> to review these or any other On-Farm Research scenarios that may benefit your operation. Once on the website, you can hover over "Research Results" on the red bar and then select "Result Publications." Then you can select the pdf version to view for the year of your choice. The attached summary pages came from the 2022 publication but shows the results from both 2022 and 2021. However, you will need to select the proper pdf year respective to the scenario.

### Nitrogen Efficiency Forum

Locally developed nitrogen communication tool to share thoughts, trials, etc. related to nitrogen fertilizer. Goto: <https://nitrogen-efficiency.com/> to read. Register to add your own comments or start a new topic.

## CURTIS'S COLUMN



### 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](mailto:curtis.scheele@usda.gov) or call him at 308-995-6121, Ext. 3.

**Elwood Reservoir - Lake McConaughy**

Central began their sixth and final two-week scheduled deliveries on Monday. Central has increased irrigation water releases from Elwood Reservoir in preparation for the upcoming ~\$6 million dam seepage mitigation project to install a toe drain system below Elwood dam. Project construction is scheduled to begin September 2023 and be completed July 2024. After completion Central will have the ability to fill Elwood Reservoir to elevation 2607.0, which currently is restricted to elevation 2597.0.

Central's board of directors approved a \$500,000 contract with RJH Consultants, Inc. for engineering design to repair the face of Kingsley Dam (Lake McConaughy). Several alternatives for permanent slope protection repairs estimate the cost ranging from \$40 million to \$250 million. The early recommended long-term cost-effective solutions is for the replacement of riprap with concrete-faced soil-cement. The preliminary cost estimate for this repair ranges from \$56 million to \$75 million. During the winter and spring of 2021-22, Lake McConaughy sustained high winds which resulted in a series of wave events that displaced existing riprap and subjected materials in the underlying filter blanket which can cause erosion of the dam if not fixed. Central officials have stressed that the dam is safe and the work to reface the dam is part of the District's responsibility to ensure that into the future.

Find us at [www.cnppid.com](http://www.cnppid.com) or @CNPPID on Facebook, Instagram, Twitter and LinkedIn.

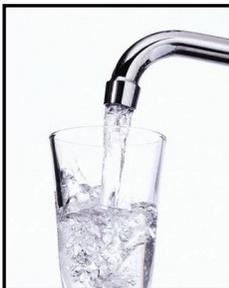
**TRI-BASIN NRD NEWS**



**Free Domestic Water Testing**

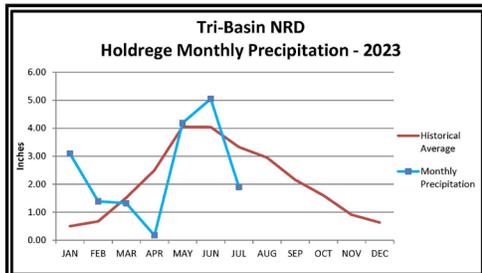
Tri-Basin NRD wants rural residents to have safe drinking water. Any district resident who uses a rural household water well can request NRD staff to sample their well once per year at no charge. The sample will be tested for nitrates and coliform bacteria.

Test results are sent to the Tri-Basin NRD office, where they are recorded in a water quality database. The results are forwarded to the homeowner, along 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.tribasinrd.org/information-outreach/weather-data> under Holdrege Monthly Weather Data.

**Soybean Marketing Indicators**

Grain marketing is complex especially when there is no one indicator that provides absolute exact market timing. However, Jeff Peterson, Heartland Farm Partners Economist, advises producers to focus on the "stochastic" momentum indicator for improved "pre-harvest" non-emotional soybean sales.

The stochastic shows the location of the current price relative to the high to low-price range over a set time. This indicator is very good at identifying when the market is overbought signalling a good time to "sell" when the indicator rises above 80%. And, conversely, when the indicator falls below 20%, the current market is oversold; and thus, signals a strong time to "buy".

Further, the stochastic is displayed by two lines. The %K line = (Current Closing Price – Lowest Low Price) / (Highest High Price – Lowest Low Price) \* 100 (the lowest low price and highest high price for 14 days). The %D line = a three-day moving average of %K. The best way to use this indicator for time of a sale is to sell when the %K (blue line) crosses the %D (red line) from the top when the indicator is over 80%.

Visit <https://www.heartlandfarmpartners.com> and register for free daily chart and trends analysis app OR call 402-434-5191. Select (add indicator) + (slow stochastic) and observe this chart daily for potential sales indicators. Usually, stochastic provides 5 preharvest best times to sell soybeans. Sell 20%+ of bushels when the red line (%K) crosses the blue line (%D).

**UNL Corn & Soybean Clinics**

Nebraska Extension is providing interactive growing season "Corn and Soybean Production Clinics" at two Nebraska locations: UNL WCREEC **Tuesday, Aug. 29** (402 West State Farm Road) – **North Platte** and UNL ENREEC **Thursday, Aug. 31** (1071 County Road G) – **Ithaca**. Registration begins at 9:00 a.m. with the training running from 9:30 a.m. to 3:20 p.m.

Topics will include: Irrigation, Plant Pathology, Entomology, Weed Science, and Nutrient Management with 4.5 CCA credits. For registration cost; event flyer and more details visit:

<https://extension.unl.edu/statewide/enreec/nebraska-corn-soybean-clinic/>

**New First Fall Frost Predictor Tool**

The Midwest Regional Climate Center has a new "Freeze Date Tool" county predictor for northcentral states. For corn and soybeans, 28°F is the suggested critical freeze temperature which kills plants. Historical climate data (1950-2021), pegs the earliest first frost occurred on Oct. 6. The average first fall freeze is Oct. 20 with the latest first fall freeze being Nov. 10.

<https://mrcc.purdue.edu/freeze/freezedatetool.html>

**Last Soybean Irrigation**

Soybean maturity follows day length changes; & generally, irrigators start reducing stored soil profile moisture as crops start drying down four to six weeks before crop physiological maturity. Physiological maturity with corn and grain sorghum occurs when the kernels or seeds form a black layer. Whereas, for soybeans, beginning maturity is when one normal pod on the main stem has reached its mature pod color.



*Soybeans reach physiological maturity at growth stage R7.0. When the membrane inside the soybean pods is no longer attached to the*

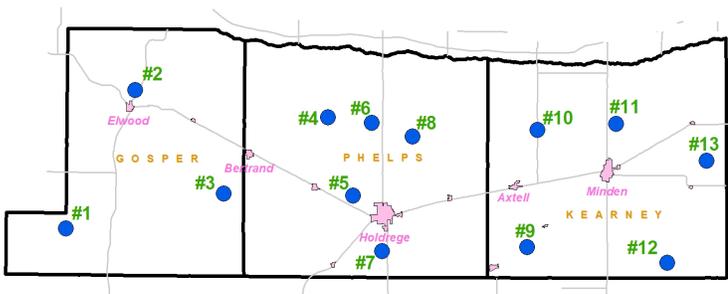
## NAWMN CROP ET INFORMATION

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

Inches of Crop Water Use (ET) =

Evaporation x Kc

Site	July 31 – Aug 6		Aug 7 – Aug 13	
	Evaporation	Rain	Evaporation	Rain
1	1.20	3.53	1.80	0.00
2	1.30	3.75	1.30	0.53
3	1.00	2.30	1.40	0.10
4	NA	NA	NA	NA
5	1.10	2.31	1.40	0.18
6	1.00	1.73	1.30	0.06
7	1.00	3.65	1.40	0.07
8	1.00	2.67	1.40	0.02
9	0.90	1.50	1.40	0.08
10	0.90	2.63	1.45	0.85
11	0.80	1.19	1.50	0.12
12	1.10	1.40	1.60	0.05
13	1.00	1.37	1.60	0.13



**2023 Map of NAWMN Sites across the Tri-Basin NRD**

CORN STAGE		DESCRIPTION
R4	Dough	Most kernels contain semi-solid, pasty material.
R4.7	Beginning Dent	Kernels at base of ear are beginning to dent.
R5	1/4 Milk Line	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 (toward the cob).

SOYBEAN STAGE		DESCRIPTION
R4	Full Pod	At least one pod of 3/4" length is present at 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.
R6	Full Seed	At least one pod whose cavities are completely filled with green seeds is present at one of the four uppermost main stem nodes that have fully developed leaves.

### Crop Coefficients (Kc)

Corn		Soybeans	
Stage	Kc	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 (R2-Blister to R5-1/4 Milk Line stage):** At R4.7, Beginning 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 7 – Aug 13 was 0.19"-0.28".

**Soybeans (R4-Full 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 7 – Aug 13 was 0.20"-0.28".

Aug 7-Aug 13 (12 of 13 NAWMN sites reporting): Average weekly rainfall was 0.18 (range 0.00 to 0.85). Average weekly ET for corn was 1.59 and for soybeans was 1.64.

### CROP ET INFORMATION

**NAWMN:** <https://nawmn.unl.edu/ETdata/DataMap>

**TBNRD:** <https://www.tribasinrd.org/tbawmn>

**UNL CropWatch:** <https://cropwatch.unl.edu/gdd-etdata> NEW

**Texting (Daily):** Sasha @ TBNRD: 308-995-6688

**Email (Weekly):** Curtis @ NRCS: 308-995-6121, Ext. 3

## 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 17, 2023, 8:00 AM	1 Year Ago
<b>El. &amp; Cap. – Lake McConaughy</b>	<b>3233.2 ft - 54.0%</b>	<b>3222.3 ft - NA%</b>
<b>Inflows to Lake McConaughy</b>	<b>775 cfs</b>	<b>256 cfs</b>
<b>Flows on the North Platte at North Platte</b>	<b>NA cfs</b>	<b>1310 cfs</b>
<b>Flows on the South Platte at North Platte</b>	<b>347 cfs</b>	<b>113 cfs</b>
<b>Flows on the Platte at Overton</b>	<b>179 cfs</b>	<b>158 cfs</b>



## WEBSITES OF INTEREST

NRCS Nebraska [www.ne.nrcs.usda.gov](http://www.ne.nrcs.usda.gov)  
 Farm Service Agency [www.fsa.usda.gov](http://www.fsa.usda.gov)  
 TBNRD Home Page [www.tribasinrnr.org/](http://www.tribasinrnr.org/)  
 Central Irrigation District [www.cnppid.com/cropwatch.unl.edu](http://www.cnppid.com/cropwatch.unl.edu)  
 UNL Cropwatch [cropwatch.unl.edu](http://cropwatch.unl.edu)  
 UNL Extension [extensionpubs.unl.edu/](http://extensionpubs.unl.edu/)  
 K-State SDI Website [www.ksre.ksu.edu/sdi](http://www.ksre.ksu.edu/sdi)  
 No-till On The Plains [www.notill.org](http://www.notill.org)  
 Soil Health: [www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/](http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/)  
 NE State Irrig Assoc [www.nebraskastateirrigationassociation.org/](http://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 3 – Aug 16	May 1 – Aug 16
Elwood 1.81 mi. NW:	2.19	14.51
Loomis 0.2 mi. SW:	1.51	14.14
Holdrege 1.7 mi. W:	1.94	12.67
Minden 7.2 mi. W:	1.86	11.18
Minden 5.8 mi. E:	0.41	9.74

**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](mailto:curtis.scheele@usda.gov). \*\*\*

### USDA - 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

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



### Tri-Basin Natural Resources District

1723 Burlington Street  
Holdrege, NE 68949  
308-955-6688



### Nebraska Extension



1308 2<sup>nd</sup> 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

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident. Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English. To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at [How to File a Program Discrimination Complaint](http://www.usda.gov/howtofileadiscriminationcomplaint) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: [mailto:program.intake@usda.gov](mailto:mailto:program.intake@usda.gov). USDA is an equal opportunity provider, employer, and lender.

# PIVOT BIO STUDIES

Nitrogen (N) fertilizer is a significant input in corn-based systems. Additionally, N losses through leaching, volatilization, and denitrification pose environmental concerns and reduce profit. Pivot Bio products contain an N-fixing bacterial inoculant that is expected to fix N over the growing season. Use of biological N fixation in cereal crops has potential to reduce the use of synthetic N fertilizer, thus increasing N use efficiency and reducing N losses. The objective of these studies was to evaluate Pivot Bio PROVEN® (product available in 2021 only) and PROVEN® 40 on corn yield and net return. In all studies, Pivot Bio was applied at 12.8 oz/ac and compared to an untreated check. Nitrogen rates were selected by the growers. Some studies chose to evaluate Pivot Bio at one N rate, while others chose to evaluate Pivot Bio at additional reduced N rates. Eleven site-years of studies were conducted in Dawson, Buffalo, Richardson, Colfax, York, Dodge, and Seward counties 2021-2022 in Nebraska (Figure 1). Site details for 2021 and 2022 are displayed in Table 1.



**Figure 1.** Pivot Bio study locations in Nebraska.

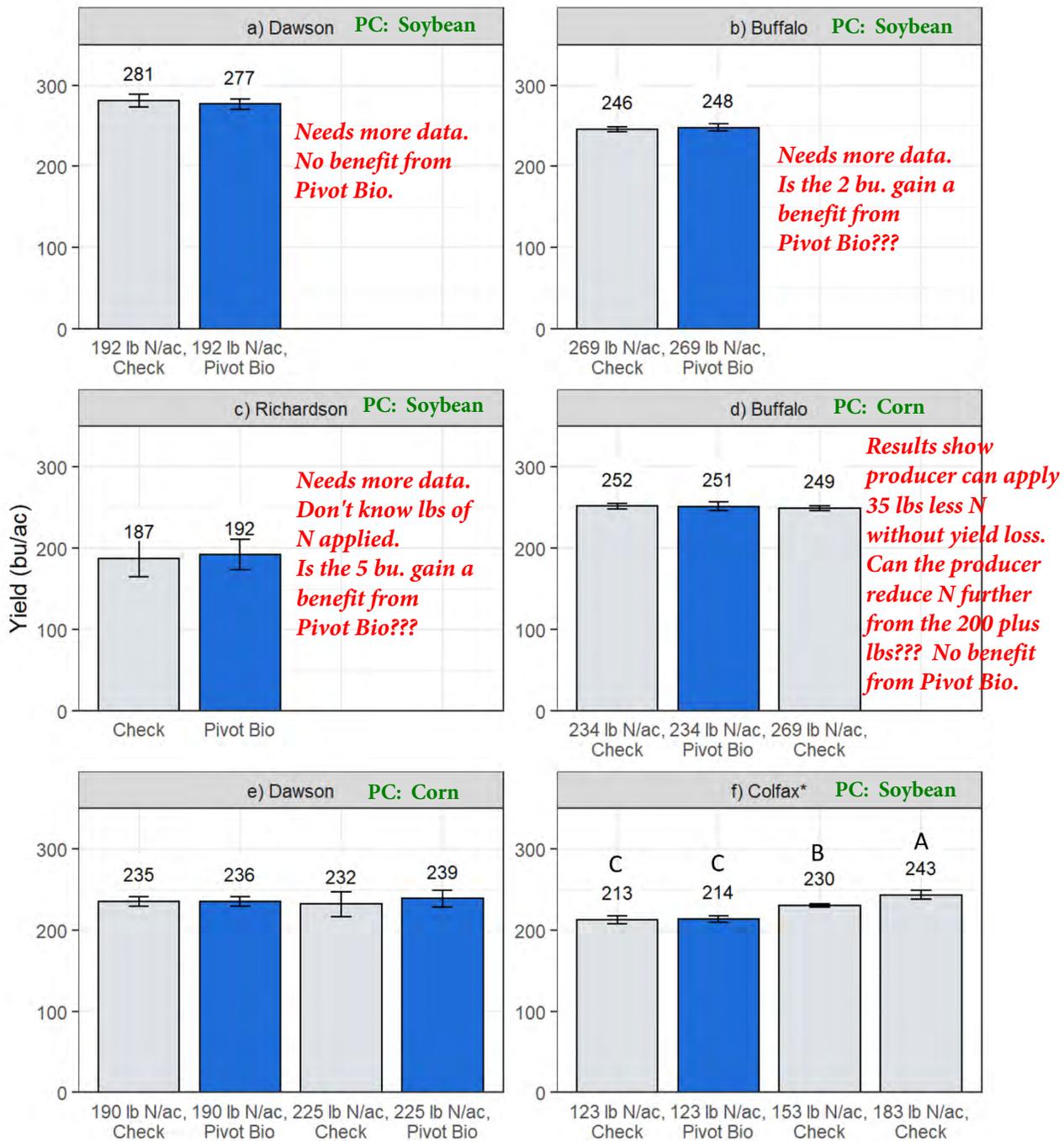
**Table 1.** Sites, location, nitrogen rates evaluated, Pivot Bio application method, Pivot Bio product, and irrigation method for eleven sites in 2021 and 2022.

ID	Report Book ID	County	Reps	N Rates Tested (lb N/ac)	Pivot Bio Application Method	Pivot Bio Product	Irrigation
2021-a	1262047202101	Dawson	10	192	In-furrow with 10-34-0 starter	PROVEN®	Pivot
2021-b	1121019202103	Buffalo	7	269	In-furrow with 10-34-0 starter	PROVEN®	Pivot
2021-c	1251147202101	Richardson	6	-	In-furrow	PROVEN®	None
2021-d	1121019202102	Buffalo	5	269, 234	In-furrow with 10-34-0 starter	PROVEN® 40	Pivot
2021-e	0709047202101	Dawson	4	225, 190	In-furrow with 1 gal/ac Altura™, 1 gal/ac ReaX™ K, and 0.25 gal/ac ReaX™ Zinc	PROVEN®	Gravity
2021-f	0996037202101	Colfax	4	183, 153, 123	In-furrow with 7-22-5 starter	PROVEN®	None
2022-g	1121019202201	Buffalo	6	238, 197	In-furrow with 10-34-0 starter	PROVEN® 40	Pivot
2022-h	0004053202201	Dodge	4	221, 178	In-furrow with 10-34-0 starter	PROVEN® 40	Pivot
2022-i	0118185202201	York	3	173, 153	In-furrow with 6-24-6 starter	PROVEN® 40	Pivot
2022-j	1402047202201	Dawson	4	185, 145, 105	In-furrow	PROVEN® 40	Pivot
2022-k	1395159202201	Seward	4	142, 106	With starter	PROVEN® 40	Pivot

# RESULTS

Yield from the studies were evaluated for each site (Figures 2 and 3) and studies were analyzed as a group by comparing with and without Pivot Bio at the same N rate (Table 2). There was no significant effect of Pivot Bio on yield across 64 replications ( $p=0.698$ ).

**Figure 2:** Yield for Pivot Bio product and untreated check at different nitrogen rates for six sites in 2021. Sites with a statistically significant yield difference between treatments are marked with an asterisk; within a site, bars with different letters are significantly different at a 90% confidence level.



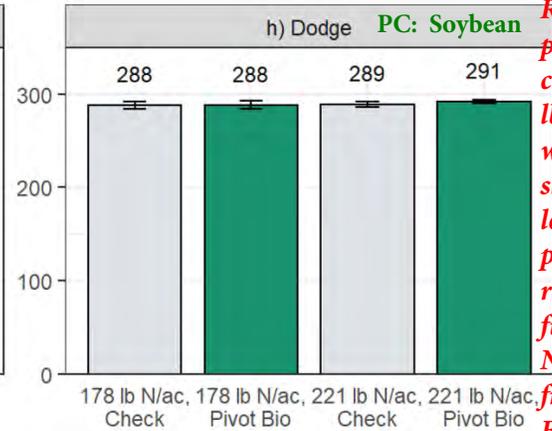
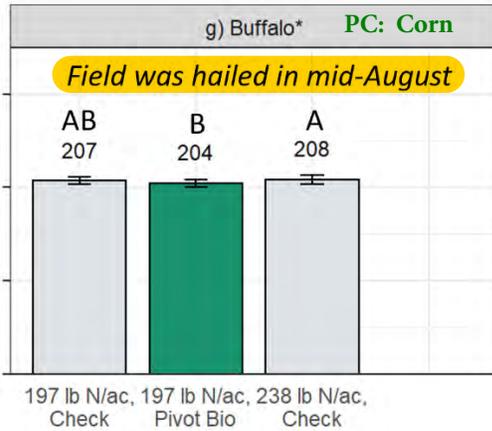
*Results show producer can apply 35 lbs less N with very slight yield loss. Can the producer reduce N further???* Are the 1 bu. and 7 bu. gains a benefit from Pivot Bio???

*Results show yield loss with 30 and 60 lbs less N from 183 lbs N. Is the 1 bu. gain a benefit from Pivot Bio???*

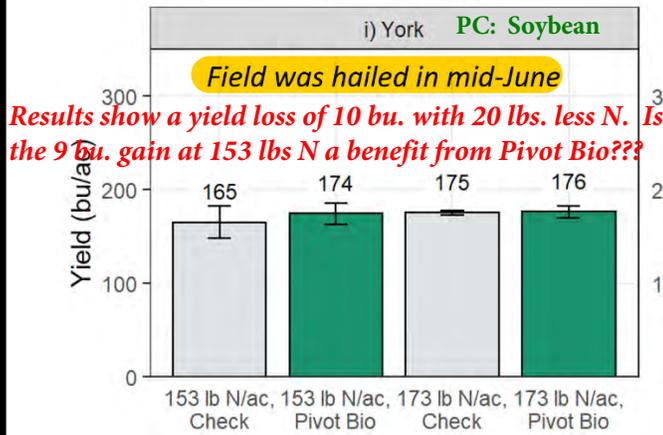
# RESULTS (CONTINUED)

**Figure 3:** Yield for Pivot Bio product and untreated check at different nitrogen rates for five sites in 2022. Sites with a statistically significant yield difference between treatments are marked with an asterisk; within a site, bars with different letters are significantly different at a 90% confidence level.

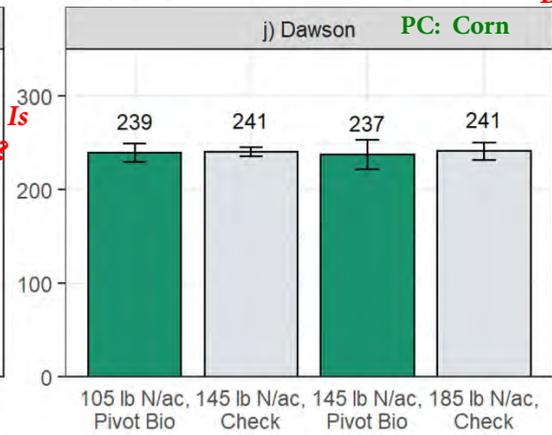
*Results show producer can apply 41 lbs less N with very slight yield loss. Can producer reduce N further??? No benefit from Pivot Bio.*



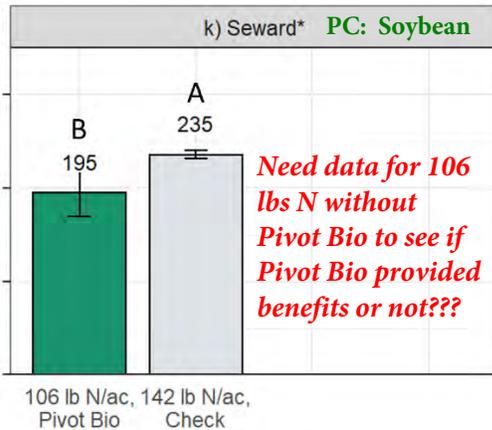
*Results show producer can apply 43 lbs less N with very slight yield loss. Can producer reduce N further??? No benefit from Pivot Bio.*



*Results show a yield loss of 10 bu. with 20 lbs. less N. Is the 9 bu. gain at 153 lbs N a benefit from Pivot Bio???*



*40 lbs less N with no yield loss. Need data for 105 lbs N without Pivot Bio to see if Pivot Bio provided benefits or not???*



*Need data for 106 lbs N without Pivot Bio to see if Pivot Bio provided benefits or not???*

**Table 2:** Yield with and without Pivot Bio across 64 replications.

	Yield (bu/acre) †
Check	234 A*
Pivot Bio	235 A
Site (P>F)	<0.0001
Treatment (P>F)	0.698
Site*Treatment	0.875

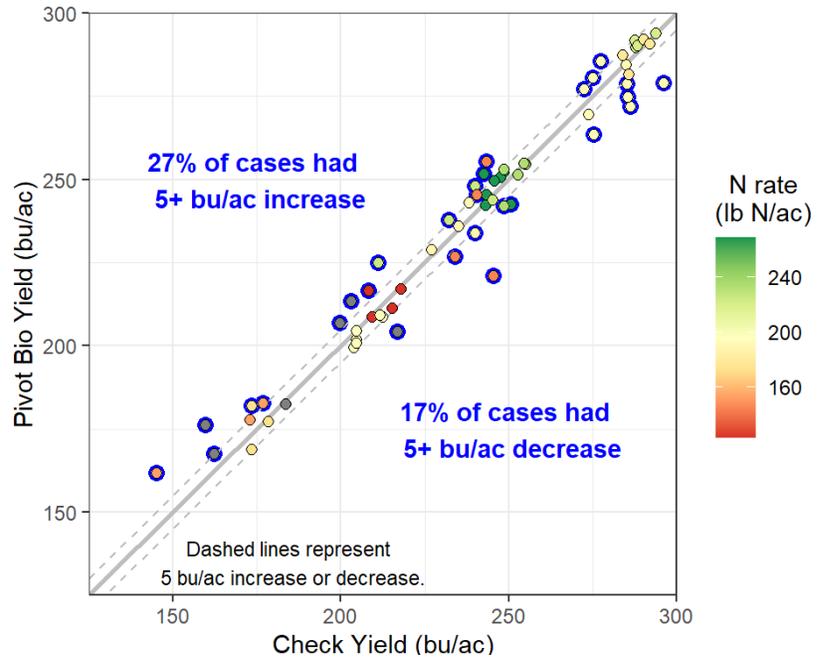
\* Values with the same letter are not significantly different at a 90% confidence level.

† Bushels per acre corrected to 15.5% moisture.

## RESULTS (CONTINUED)

Across 64 replications, there were 27% of cases where Pivot Bio had a 5 bu/acre or greater yield increase, 17% of cases where Pivot Bio had a 5 bu/acre or greater yield decrease, and 56% of cases where the yield difference was within +/- 5 bu/ac (Figure 4).

**Figure 4:** Comparison of yield with and without Pivot Bio at equal nitrogen rates across 64 replications.



## SUMMARY

- ⇒ Individual site and combined site analysis did not show a significant effect of Pivot Bio on yield.
- ⇒ Future research will focus on testing Pivot Bio PROVEN® 40 at a wider range of N rates across different soil textures and landscape positions.

## FARMBITS PODCAST



### BIOLOGICAL BASICS

David Brown, Director of Engineering at Pivot Bio, joins this episode of the FarmBits podcast to discuss how Pivot Bio is evaluating their products using digital technology. In this episode, we cover the basic of Pivot Bio's PROVEN® products, the challenges with implementing and evaluating the efficacy of biological products, and how progress in evaluative technologies may occur in the near future.