Issue #9 – June 20, 2025

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🌾🚜 From South to North: Indiana's Corn Progress Update

(Jeferson Pimentel, Dan Quinn, Betsy Bower & Bruno Scheffer)

With planting now wrapped up nationwide, corn emergence is nearing completion across much of the Corn Belt. Emergence in Indiana has progressed well, reaching 89%, up from 81% the previous week, although it is still slightly behind the five-year average of 94%. Meanwhile, states like Iowa (97%), Minnesota (98%), Nebraska (97%), and South Dakota (98%) are ahead of average, signaling a strong start to early crop development (see Interactive Maps 2). As V3–V5 growth stages become more common, many growers are already applying sidedressing nitrogen, while others should prepare their equipment and monitor the weather for ideal application windows. Timely nitrogen management at these early vegetative stages will be critical to support uniform growth and optimize yield potential later in the season.

The USDA-NASS also released the corn condition ratings of the 2025 season, providing a snapshot of crop health across the country. In Indiana, 58% of the corn crop is rated in good condition and 9% in excellent condition, a solid start to the season as planting and emergence wrap up. Across the broader Corn Belt, several key states are showing strong early crop performance. Iowa leads with 63% rated good and 21% excellent, while Illinois reports 55% good and 15% excellent. Minnesota and Nebraska also show promising ratings, each with over 59% rated good or better. Nationwide, among the 18 reporting states, which represent 92% of the total corn acreage, 59% of the crop is rated in good condition and 13% in excellent condition, with only 5% falling into poor or very poor categories. This early-season assessment suggests that, despite a wet and delayed start in some areas, the 2025 corn crop is off to a healthy and productive beginning. See Interactive Maps 3 for more state-level condition details.

➡️ Let us know if we can help.

Interactive Maps 1. U.S. Corn **Emerged** Progress (USDA-NASS)
Click on the dates below to see the corn emerged progress over time and the average:

Jun 15, 2024	Jun 8, 2025	Jun 15, 2025	Average (2020-2024)

Interactive Maps 2. U.S. Corn **Condition** (USDA-NASS)
Click on the categories below to see the corn condition at each U.S. state on Jun 15th.

Very Poor	Poor	Fair	Good	Excellent

Purdue Corn Team Research Update

(Bruno Scheffer, Jeferson Pimentel, Dan Quinn & Betsy Bower)

At Purdue's Agronomy Center for Research and Education (ACRE), we are advancing nitrogen (N) management strategies through a new research trial funded by the NRCS aimed at testing innovative, field-ready imaging technologies. Efficient N management is a persistent challenge in corn production, both over- and under-application can significantly affect yields and contribute to environmental issues.

This year's trial focuses on two corn hybrids: **short-stature Preceon 111-20SSC** and **tall-stature Dekalb 62-70**, each planted at a population of **34,000 plants per acre**. Five nitrogen rates (0, 20, 80, 140, and 200 lbs/acre) were sidedress applied between the V4–V6 stages, in addition to a uniform **starter rate of 40 lbs/acre at planting**, except for the zero-N plots. Each experimental plot measures **15 feet wide by 40 feet long**.

Last week, at the **V6 growth stage**, we conducted a key round of data collection. The focus was on comparing **four proximal imaging systems** developed at Purdue for **early-season N status prediction through** corn **leaf phenotyping**. First, **LeafSpec** – a high-resolution **hyperspectral** scanner optimized for detailed tissue-level analysis under controlled lighting (Figure 1). Second, **Leaf Scanner** – a compact **multispectral** device capturing essential crop traits across fewer but strategically chosen bands. Third, **Smartphone-based imaging system** – a highly accessible tool enhanced with **RGB sensors** and real-time image processing capabilities. Finally, a **Standard LeafSpec** – a benchmark **hyperspectral model** used as a reference for model comparison and validation.

Figure 1. Testing the LeafSpec in the field at the IoT4Ag trial at ACRE, West Lafayette, IN.

Using **artificial intelligence**, we aim to determine which device is best suited for broader on-farm use in plant tissue N content prediction, with imagery data

being cross-referenced against lab-based **biomass N measurements** and **soil analysis**.

In parallel, we deployed the **DJI M300 UAV (Figure 2)**, equipped with a **multispectral camera (0.03 m resolution)**, to capture overhead imagery of all plots. This will allow us to compare data from **handheld sensors, drone-based imagery**, and **satellite imagery (3 m resolution)**. Vegetative indices (VI) values will be calculated from all platforms and compared against **ground truth data** to assess predictive accuracy.

Figure 2. Preparing the M300 drone for flight at the NRCS research trial at ACRE, West Lafayette, IN.

What's Growing Beneath Your Boots? Understanding Roots to Guide Better Management

You might have a high-yielding hybrid on paper, but if its root system does not fit your farming practices, it might fall short in the field. Therefore, understanding hybrid root system differences and their responses to various management practices may help guide both hybrid selection and management practice optimization. That is the goal of our partnership with **Beck's Hybrids**: to give you simple, visual, and research-backed insights to help you get more out of potential hybrid by management practice interactions.

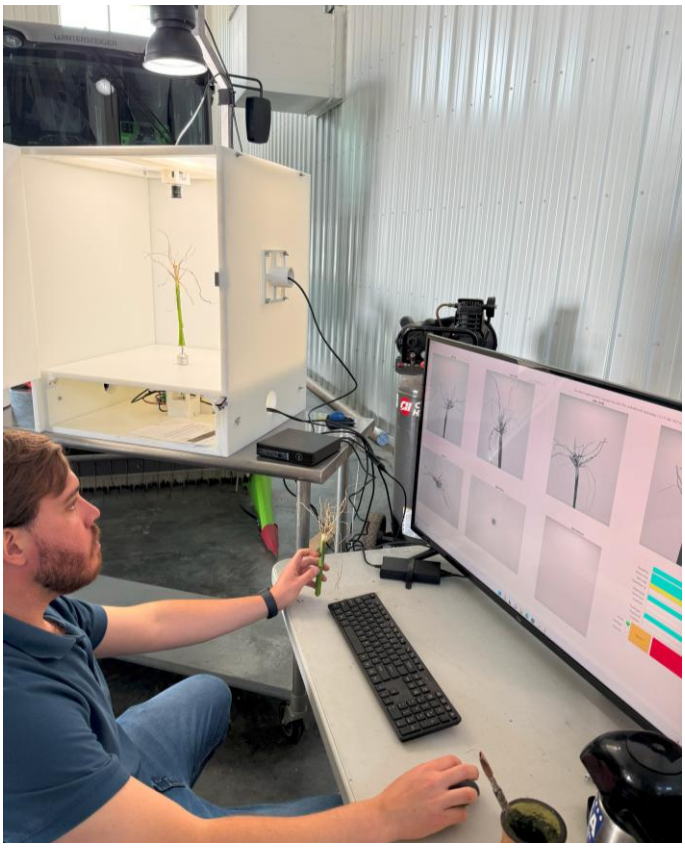

Figure 3. Analyzing the root scanning results at Beck's Hybrids facility in Atlanta, IN.

Why Root Systems Matter

Through preliminary observations in this research trials, different corn hybrids can have different root system architectures, particularly classified as **either vertical or horizontal, which may affect their performance under various** conditions and management practices.

- **Horizontal roots** spread out near the soil surface. In **no-till systems**, they may be able to take advantage of **nutrient stratification** (where nutrients concentrate near the soil surface). In addition, they may also perform better in **poorly drained or heavier soils**,

where shallow roots help the plant access oxygen more quickly.

- **Vertical roots** may have the capacity to grow deeper into the soil. Therefore, they may be better suited for **searching for water and nutrients** deeper in the profile, which can give them an edge in **dry conditions** or under **drought stress**.

The Research:

To further examine this question of hybrid root type by management practice, we're testing four Beck's hybrids at Purdue's ACRE research farm in West Lafayette, IN and at the Pinney Purdue Agricultural Center in Wanatah, IN. The specific hybrids chosen and their root system classification are designated below:

- **Vertical Root: 6184V2P and 6414V2P**
- **Horizontal Root: 6152D1 and 6274VP**

Overall, we're comparing how these root types respond to different plant populations and fertilizer strategies (banded vs. broadcast). We're also measuring plant biomass, and root growth at multiple growth stages throughout the season (Figures 3 and 4) to further understand hybrid differences and management practice influences.

What's in it for you?

By understanding how roots interact with your management, you can start asking:
"What can I influence to get the most out of this hybrid?"
Whether you're farming no-till, managing tight clay soils, or facing dry spells, root system selection could be a game-changer.

What We Have Learned So Far? Root Types, Fertilizer Placement & Yield

Our 2024 field trial in West Lafayette, IN, examined the impact of various root architectures and fertilizer strategies on early growth, nitrogen uptake, plant stands, and yield. Here is what we measured when comparing banded vs. broadcast fertilizer applications on four Beck's hybrids with different root systems**.**

Key Takeaways for Farmers:

- Broadcast fertilizer consistently outyielded strip-till banded applications across all hybrids in this trial in 2024.
- However, the vertical-rooted hybrid (6414V2P) responded better to banded fertility than the horizontal-rooted hybrids, exhibiting a much smaller yield decline under banded conditions. In addition, plant nitrogen (V5 stage) uptake was the highest for this hybrid within the banded application treatment as compared to hybrids with classified horizontal root systems.
- Horizontal-rooted hybrids, while performing well under the broadcast fertilizer application treatment, showed a bigger yield decline when nutrients were banded. Overall, these preliminary results suggest a potential hybrid root system by fertilizer management practice interaction which needs to be further explored.

Why It Matters?

- If you're using banded or strip-till fertility, hybrids with vertical root systems might be a better fit to this fertilizer management strategy.
- On the other hand, if you're broadcasting nutrients, horizontal-rooted hybrids may be able to thrive better in these systems by better accessing that topsoil nutrient layer.
- Overall, preliminary work has indicated a hybrid by fertilizer placement interaction, and choosing the right combo might give you a yield advantage. However, further examination and data collection is required.

What is Next?

We are expanding these trials in 2025 to include **more hybrids, locations, and fertilizer strategies**, providing you with more data, information, and potential hybrid placement recommendations that align

with different farming practices.

Figure 4. Placing the roots in the imaging box at Beck's Hybrids facility in Atlanta, IN

"Flattened" or "Root Lodged" Corn caused by Heavy Rain and Wind – Now What?

(Dan Quinn)

Recent storms and heavy rainfall brought have crossed parts of Indiana this past week and brought excessive winds which has resulted in corn being "flattened" from lodging in certain areas of the state. At first sight, corn that has fallen over can be daunting to look at, and cause some serious concern on what may happen next. However, assessing the potential damage and impact on grain yield can be challenging. Therefore, it is important to be patient and wait at least 4 days to allow damaged corn plants to produce visual signs of whether or not they may recover (Nielsen, 2013). Symptoms of recovery can be shown by plants beginning to right themselves upward ("goosenecking", Figure 1), the re-establishment of roots, and the re-orienting and growth of leaves. The overall severity and recovery potential for corn can depend on the growth stage of the plant, soil moisture at the time of the wind event, root mass structure, hybrid planted, and the severity of the leaning or bending of the plants (Lindsey and Thomison, 2022; Rees et al., 2020).

Figure 1. Corn "goosenecking" as it reorients itself following root lodging. Picture taken by D. Quinn in West Lafayette, IN 2021.

The majority of corn in Indiana is still early in vegetative growth stages. Therefore, the smaller the plant, the more tolerant it is to lodging without stalk breakage (root lodging) or with stalk breakage (greensnap) from the combination of heavy rainfall and strong winds. "Root lodging" of corn is the most likely culprit to occur this week and is often observed with the combination of strong winds and high soil moisture levels, which can result in corn roots being pulled out of the soil. Although this symptom can look devastating, yield impacts are often highly dependent on when the damage occurs and what growth stage the plant is in (Lindsey and Thomison, 2022; Figure 1). If the majority of plants are able to re-orient themselves, and if this recovery occurs prior to corn pollination, little impact on pollination success will be observed. Corn plants have been shown to upright themselves fairly quickly (~ 3-4 days) after an initial wind event when in the rapid growth phase. However, if a plant can't reorient itself properly, some leaves can become

shaded and a reduction in photosynthesis can occur. Furthermore, if this damage occurs close to the beginning of pollination, the leaves of neighboring, lodged plants may shade or cover some of the exposed silks, thus causing poor pollination.

Table 2. Corn grain yield reduction and number of barren plants caused by the incidence of root lodging at various growth stages in Ohio. Data acquired from 3-year research trial conducted by Lindsey and Thomison, 2022 (https://ohioline.osu.edu/factsheet/ac-1054)

Growth Stage	Yield Reduction	Barren Plants
	--- % ---	--- % ---
V10	5	2
V13	22	6
VT/R1	43	9
R3	33	1

The occurrence of root lodging can also highlight poor early-season root development (side-wall compaction, insect feeding) and be more prevalent in fields with high plant populations (>35K plants/acre). However, if soil moisture is adequate for root growth, leaves can still intercept sunlight, and plants have adequate time to upright themselves to place silking ears in proper position prior to pollination, root lodged corn fields can recover well and yield loss will be minimal. In contrast, for corn that has already reached pollination and early grain fill, yield losses will be more significant as the plant has less flexibility, time, or ability for the stalks have to reorient themselves properly.

In addition to root lodging, the most significant damage that can happen to a corn plant following a storm is if stalks are broken or "green-snapping" occurs. But, before deciding how severe the damage from a snapped stalk may be, it is important to identify where on the stalk the breakage occurred. Plants that snap above the harvestable ear, can still produce an ear, however yield will likely be lower than desired and neighboring plants that are snapped may cause shading and reduce potential ear size. Green-snap below the harvestable ear is much more severe and results in direct loss of yield potential. Research has shown that corn yield can be reduced by 0.5 to 1% per 1% of plants that are broken or green-snapped (Elmore and Ferguson, 1999; Rees et al., 2020).

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Thomison, P. 2017. Wind Damage in Corn – "Green Snap" and Root Lodging. C.O.R.N. Newsletter. Agronomic Crops Network. Ohio State University Extension. https://agcrops.osu.edu/newsletter/corn-newsletter/2017-21/wind-damage-corn-%E2%80%9Cgreen-snap%E2%80%9D-and-root-lodging

💵 Recent Corn Basis Movement and The Ethanol Plant Premium

(Joshua Strine & Chad Fiechter)

Over the past three weeks, corn basis across the **Eastern Corn Belt** has remained relatively stable or moderately strengthened. Iowa has seen the most consistent basis levels, while **Ohio** has experienced the most notable gains. Both short-term trends break away from the historical average. As a result of the minimal movement in **Iowa** and **Illinois**, many regional basis levels in the states are below the three-year averages, with deficits reaching up to **$0.20/bu.** In **Indiana** and **Ohio**, most regions have corn basis above the historical average. Meanwhile, **Indiana** and **Ohio** have seen above-average basis levels, with parts of **Ohio** recording their strongest second week of June basis in the past decade. Since harvest, the basis has strengthened by as much as **$1.25/bu** in areas of **Ohio**, driven by a historically weak basis in October and a strong basis in June.

At the state level, **ethanol plant basis** trends follow regional corn basis movement but typically carry a price premium. For example, on June 11th, **Indiana ethanol plants** average a **$0.26/bu basis** (Figure 1), slightly higher than the highest regional basis of **$0.23/bu**. In **Ohio**, the **ethanol** plant basis has strengthened by **$1.32/bu** since October, outpacing any single regional basis and offering **premium pricing** potential for hedging strategies. As we approach the expiration of July futures, historical trends would suggest that corn basis will begin to level off and weaken through the end of June. To see where your current local crop basis sits and where it may be headed, check out the **Purdue Center for Commercial Agriculture** Crop Basis Tool.

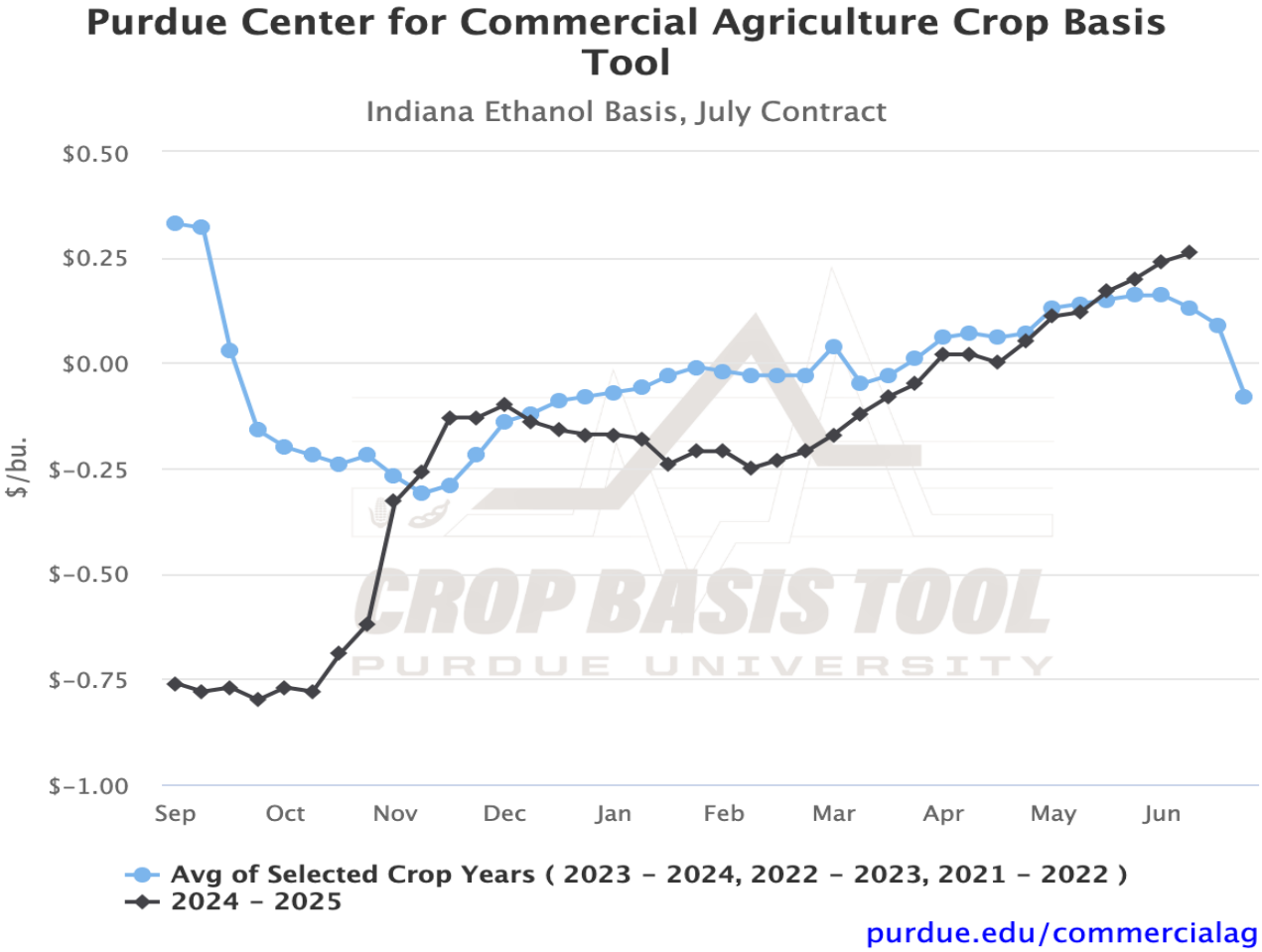

Figure 1. Purdue Center for Commercial Agriculture crop basis tool from 2021 to 2022

A summer's welcome

(Beth Hall)

June 20, 2025, marks the summer solstice in the northern hemisphere. This is more an astronomical (i.e., planetary and orbital, not necessarily huge) event rather than meteorological. This is the date when the north pole is leaning most directly toward the sun due to its tilt relative to earth's solar orbit throughout the year. Because of this, the length of daylight within a 24-hour period is greatest on this day for all locations north of the equator. More daily daylight means more solar exposure and therefore greater surface heating and temperatures. Of course, we've been working up to this moment for a while (since December 21, 2024) and we've already been experiencing warmer temperatures. Mother Nature is going to really show off her solstice spirit, however, with extreme high temperatures expected by the end of this weekend into next week.

Over the last 30 days or so, average temperatures across Indiana have been up to 4° below normal. However, forecasts over the next 7 days are indicating a risk of extreme heat (Figure 1). Maximum daily temperatures typical for June 22-29 tend to be in the 80's (°F). This year, **Indiana is likely to see temperatures in the low-to-mid 90's next week.** Conditions will feel muggy, and the apparent temperature (or heat index) is expected to be in the mid-to-upper 90s. With this likely being the first significant heat event of the season, heed extra caution since many of us have yet to acclimate to these high temperatures this early in the year.

Climate outlooks for temperature over the next few weeks are strongly favoring above-normal temperatures continuing with slight changes of above-normal precipitation. **While moderate drought conditions persist in northwestern Indiana** (according to the U.S. Drought Monitor; Figure 2), perhaps the wetter forecasts will ameliorate the drought and bring us back to "normal" conditions. Speaking of which, has anyone seen those "normal" conditions lately? **Stay tuned.**

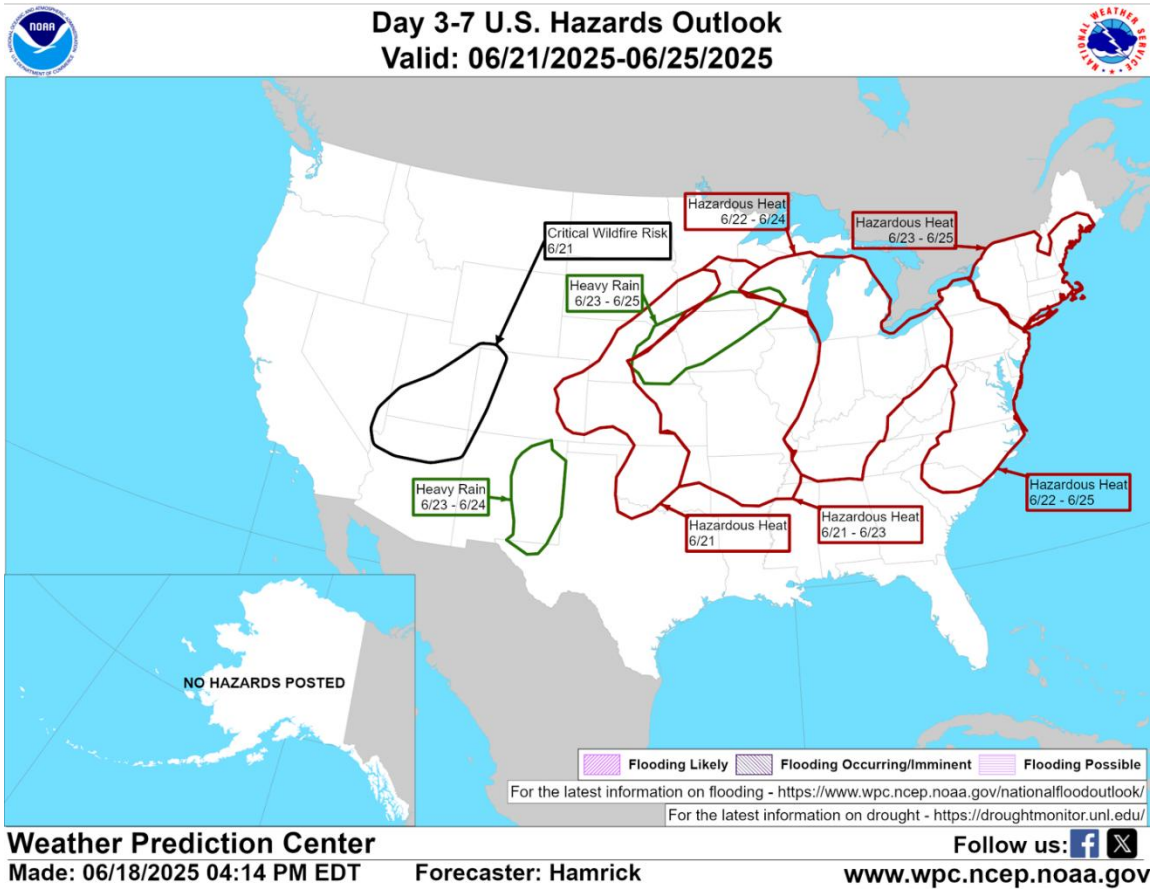

Figure 1. Potential U.S. hazards for June 21-25, 2025.

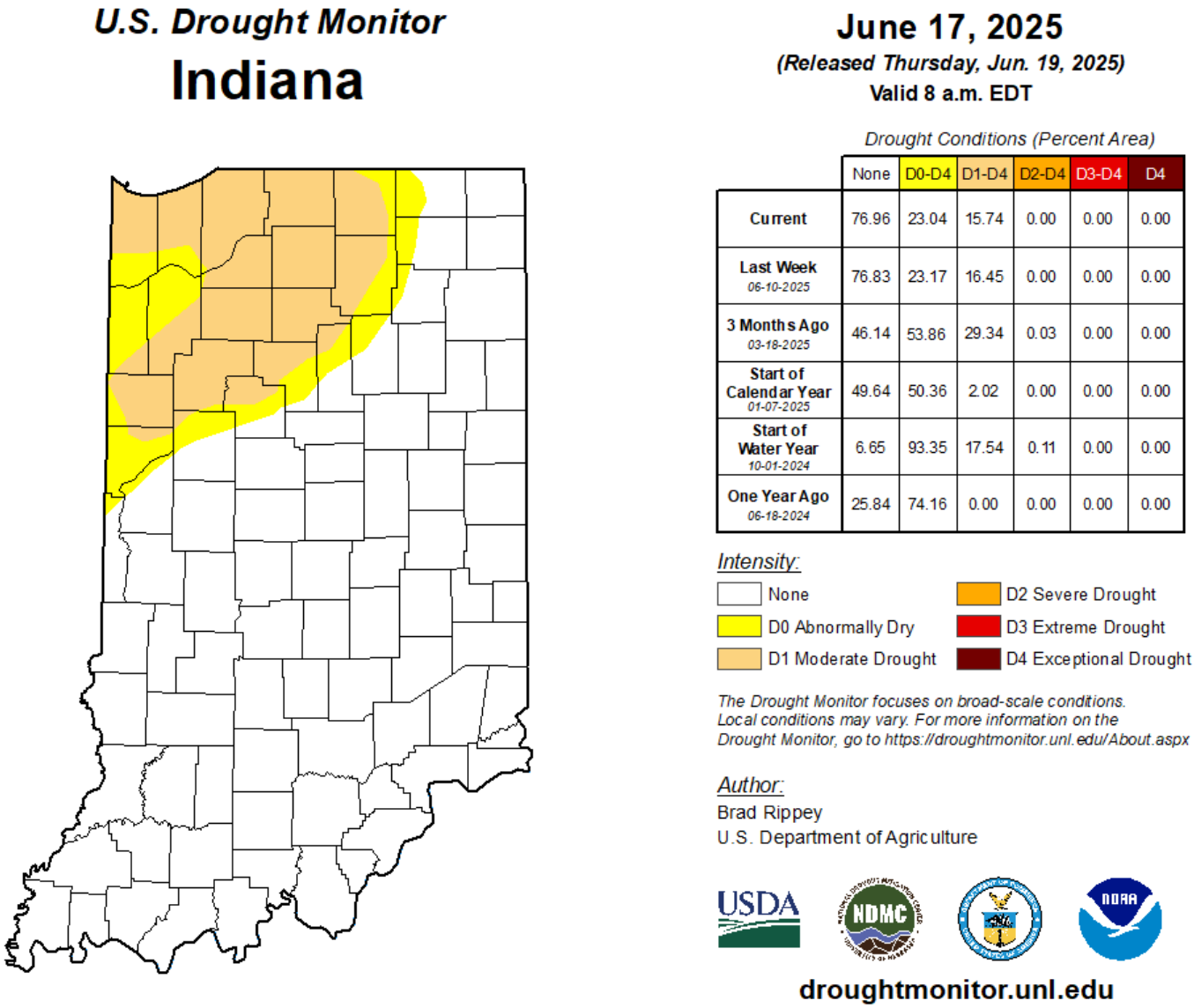

Figure 2. U.S. Drought Monitor status for conditions as of Tuesday, June 17, 2025.

Acknowledgments

The authors greatly appreciate the feedback and contributions of all growers, county agents, consultants, and corn industry stakeholders.

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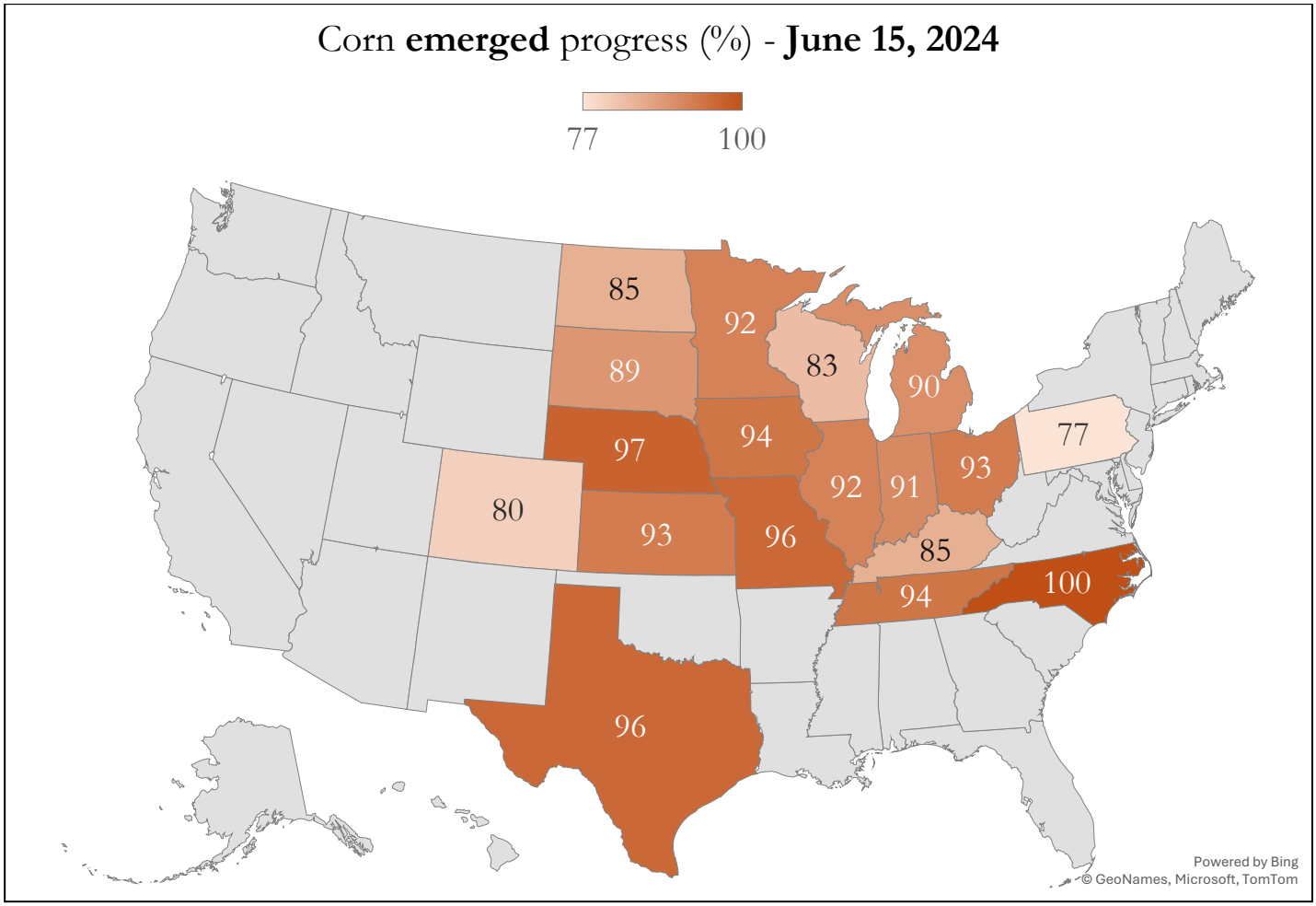

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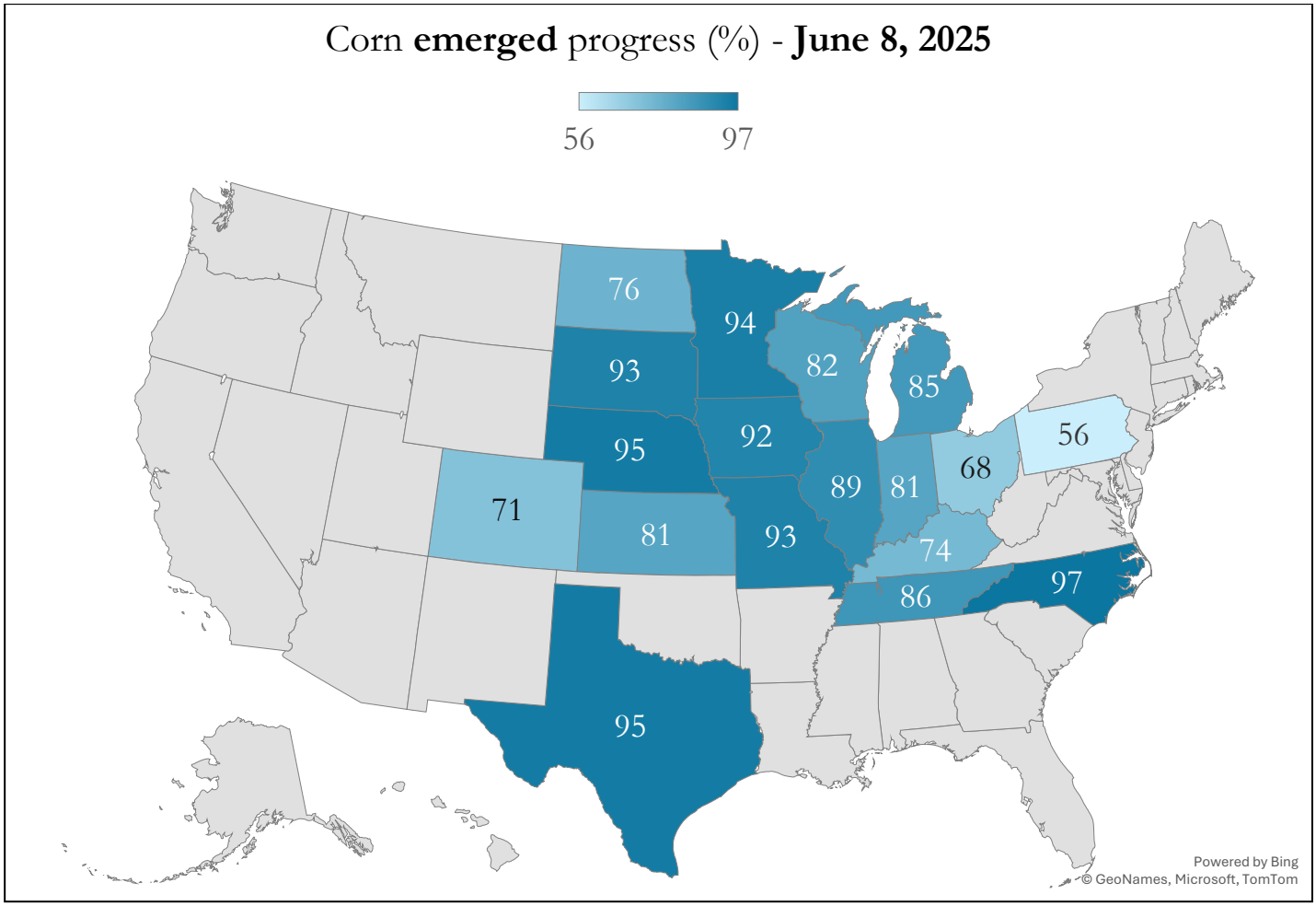

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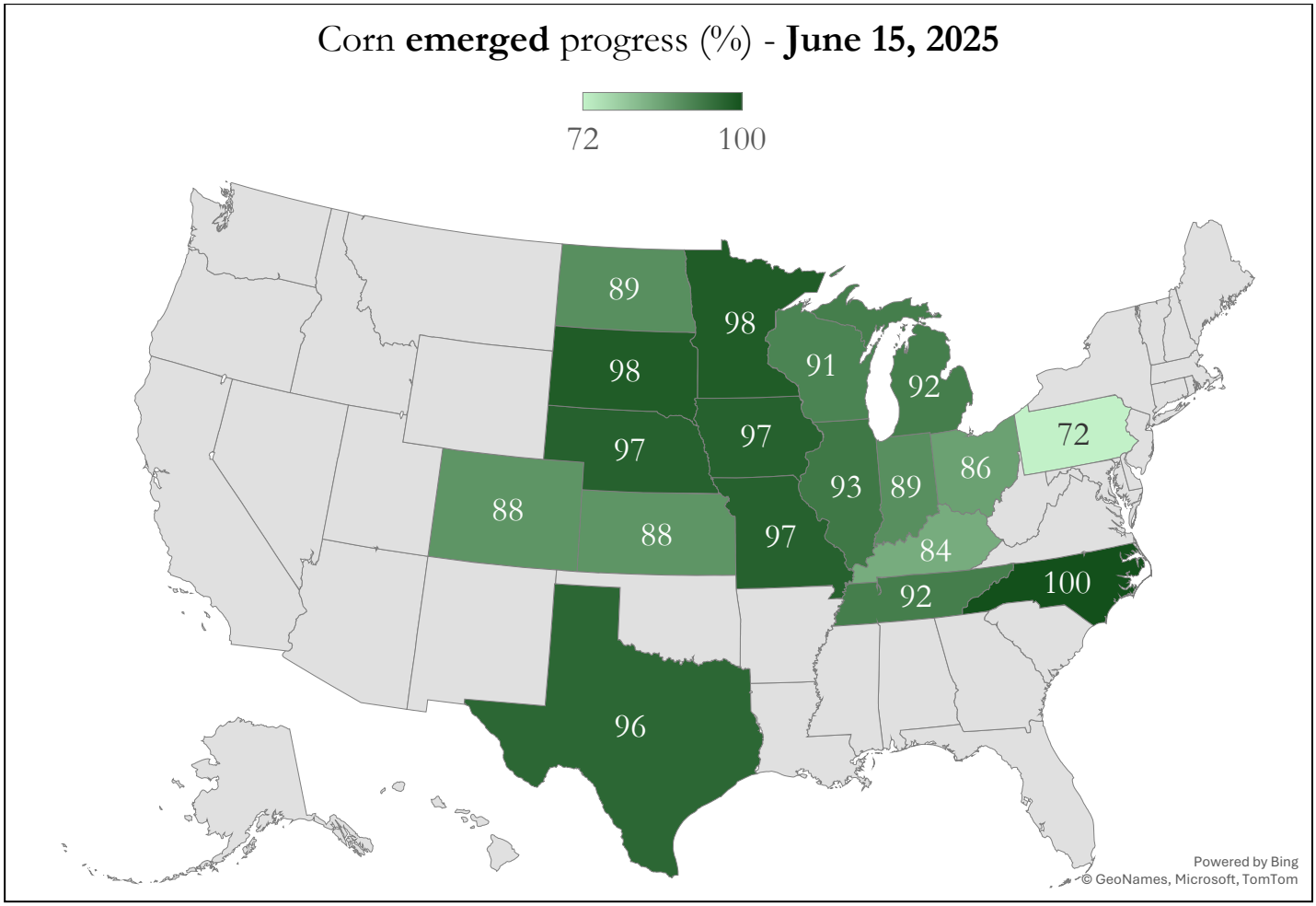

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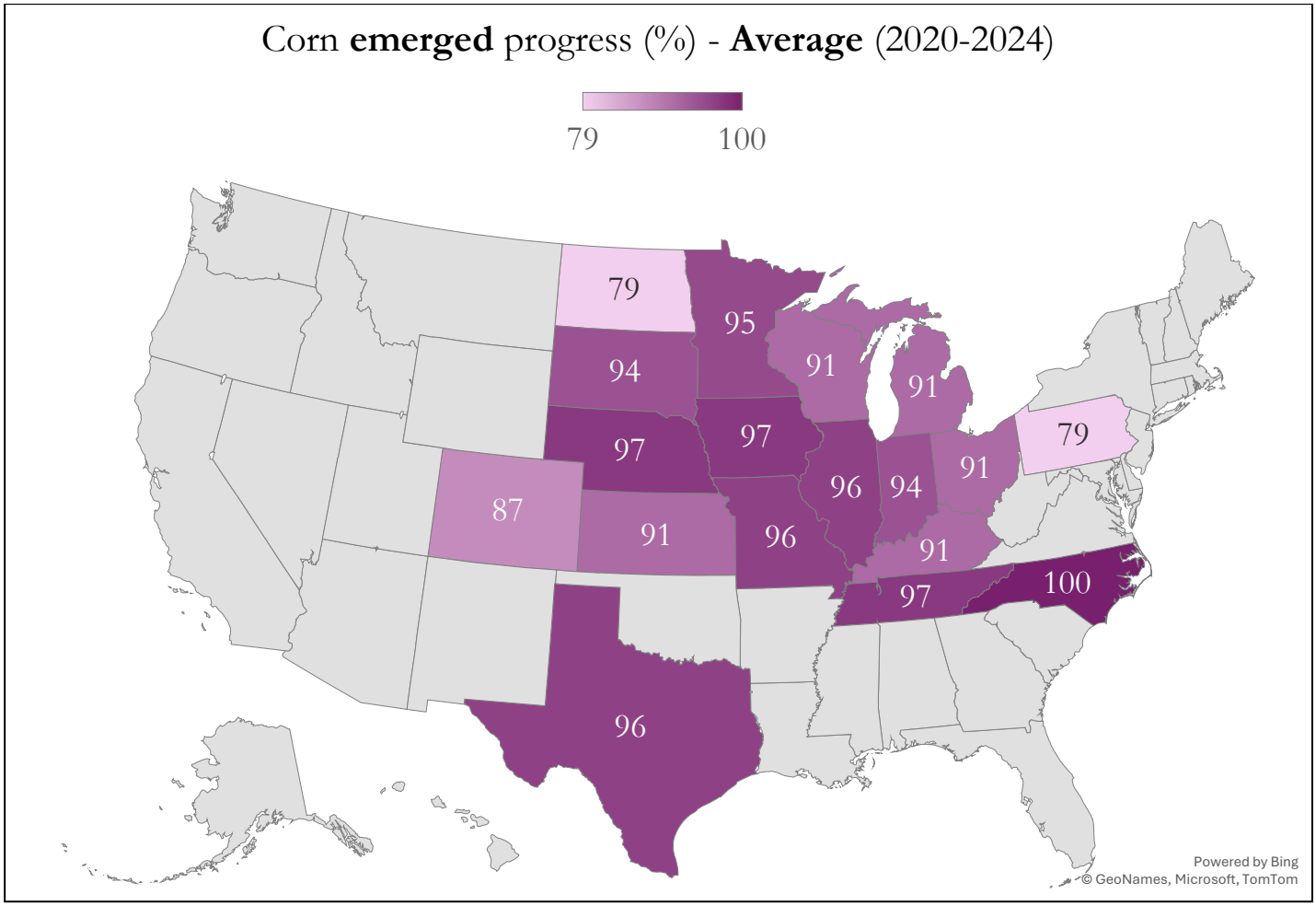

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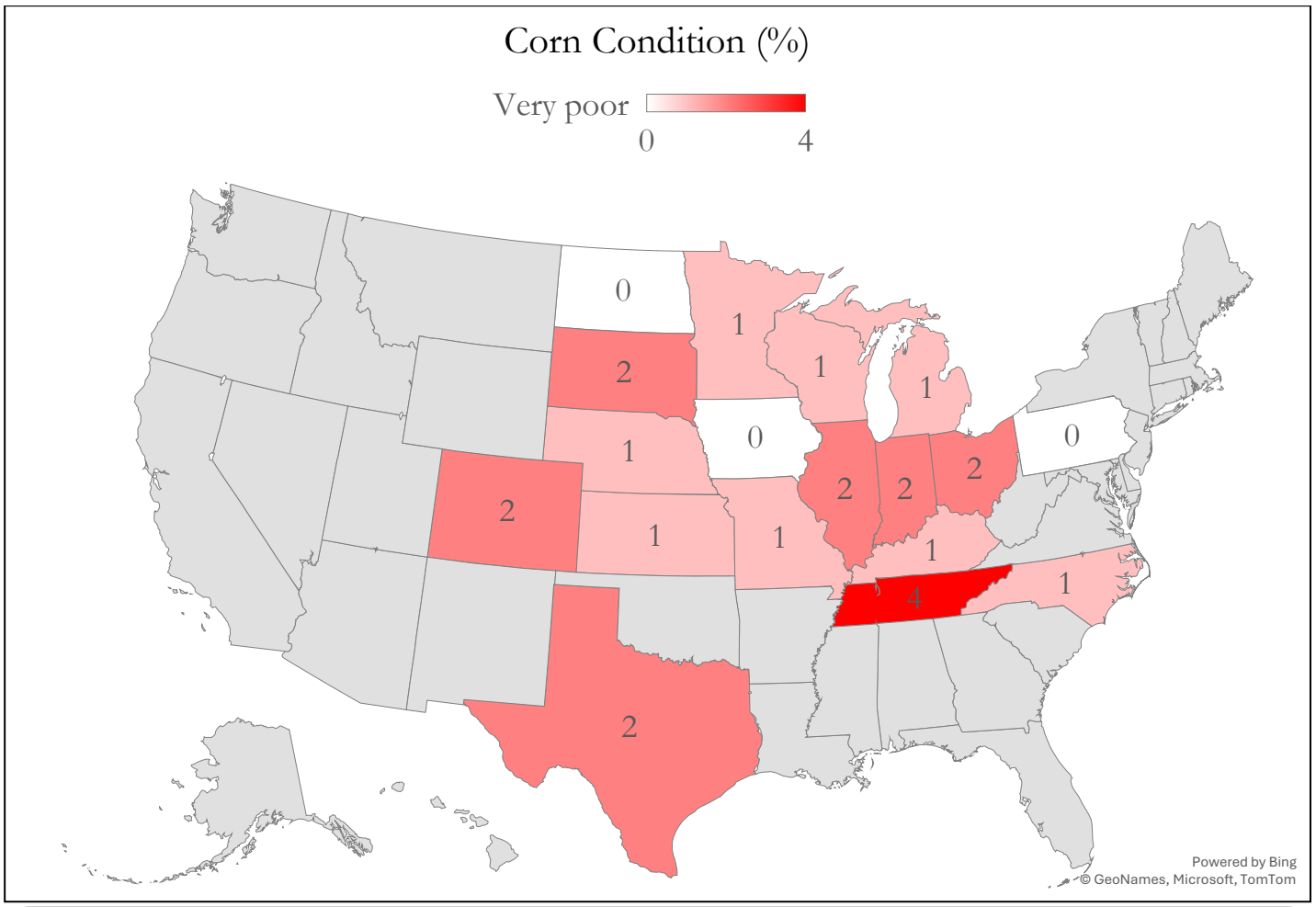

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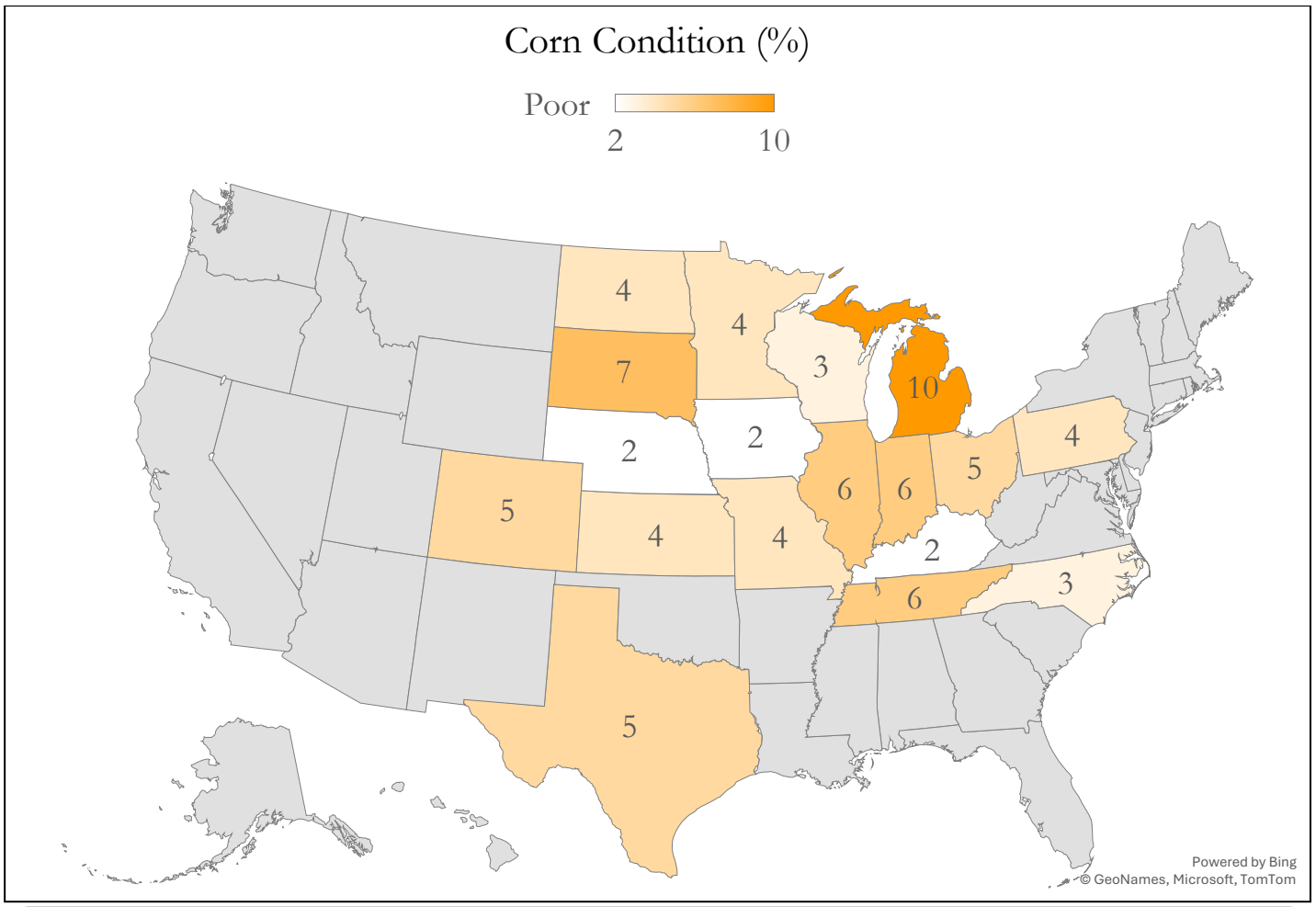

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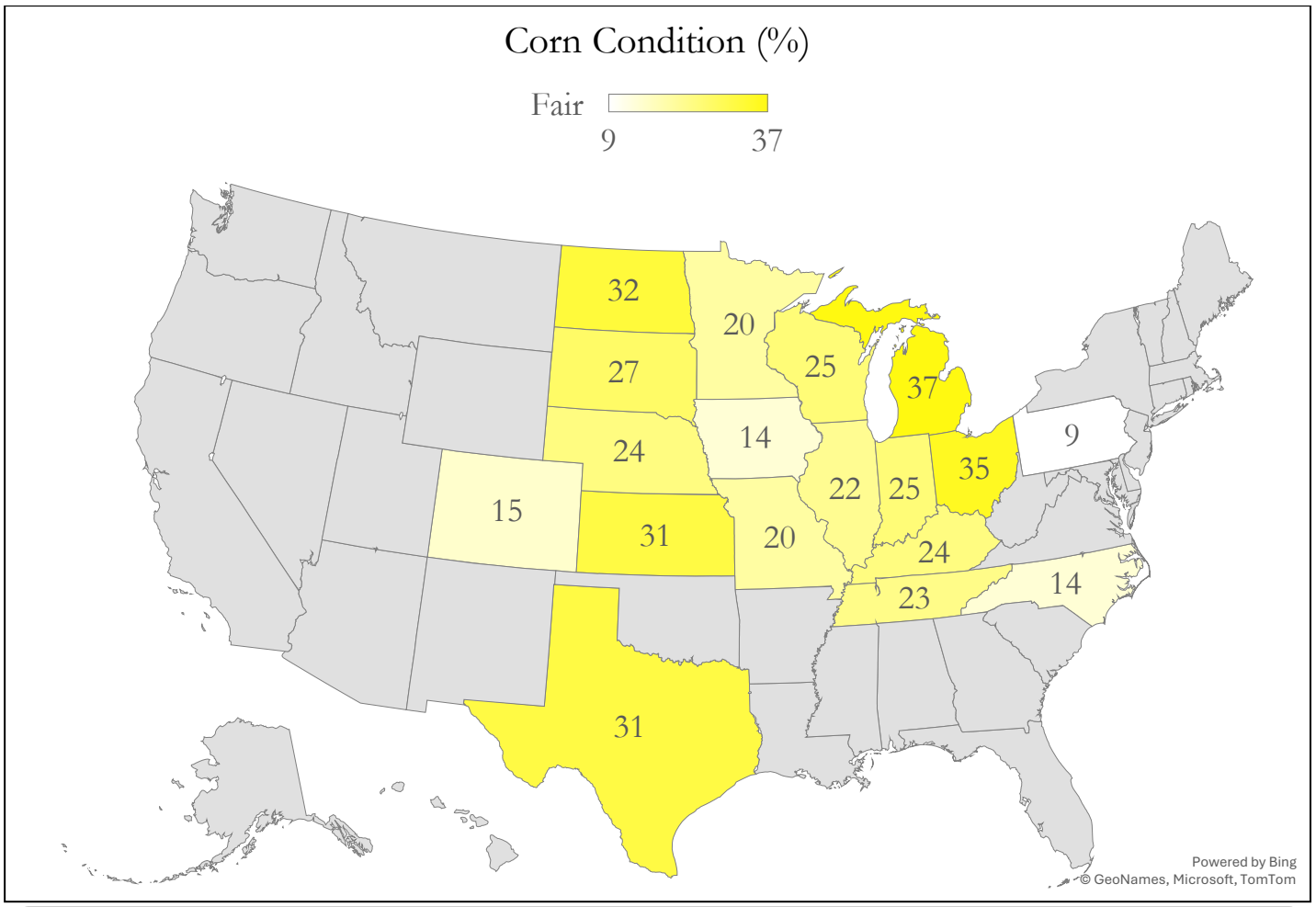

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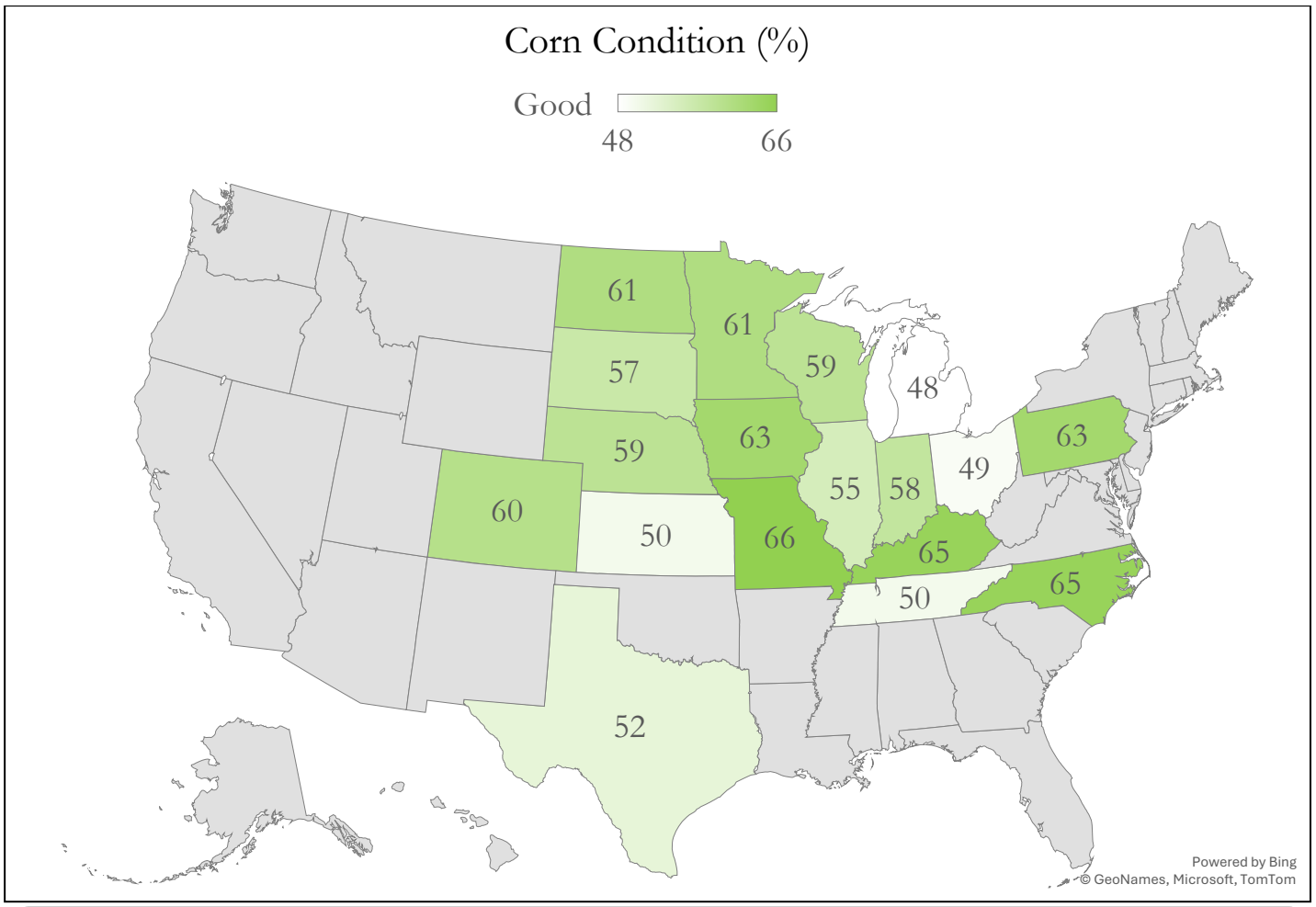

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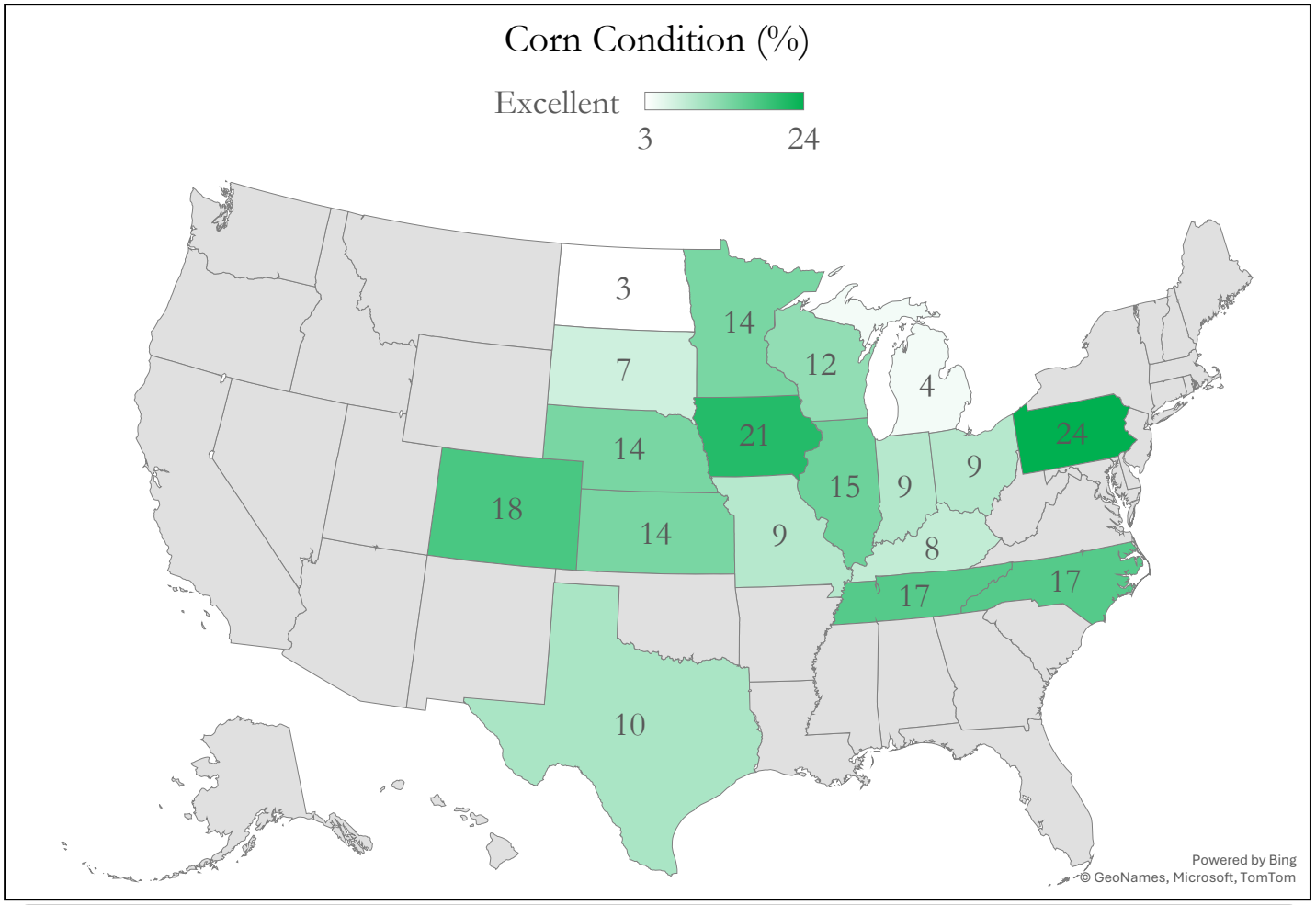

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