Issue #7 – Jun 6, 2025

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From South to North: Indiana's Corn Progress Update

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

According to the USDA-NASS planting progress report released on **June 2, 2025**, **93% of the U.S. corn crop has been planted**, a notable increase from **87% the previous week** and matching the **five-year average of 93%** (Interactive Map 1). Continued favorable weather over the past few weeks has enabled farmers across many states to make rapid progress toward completion.

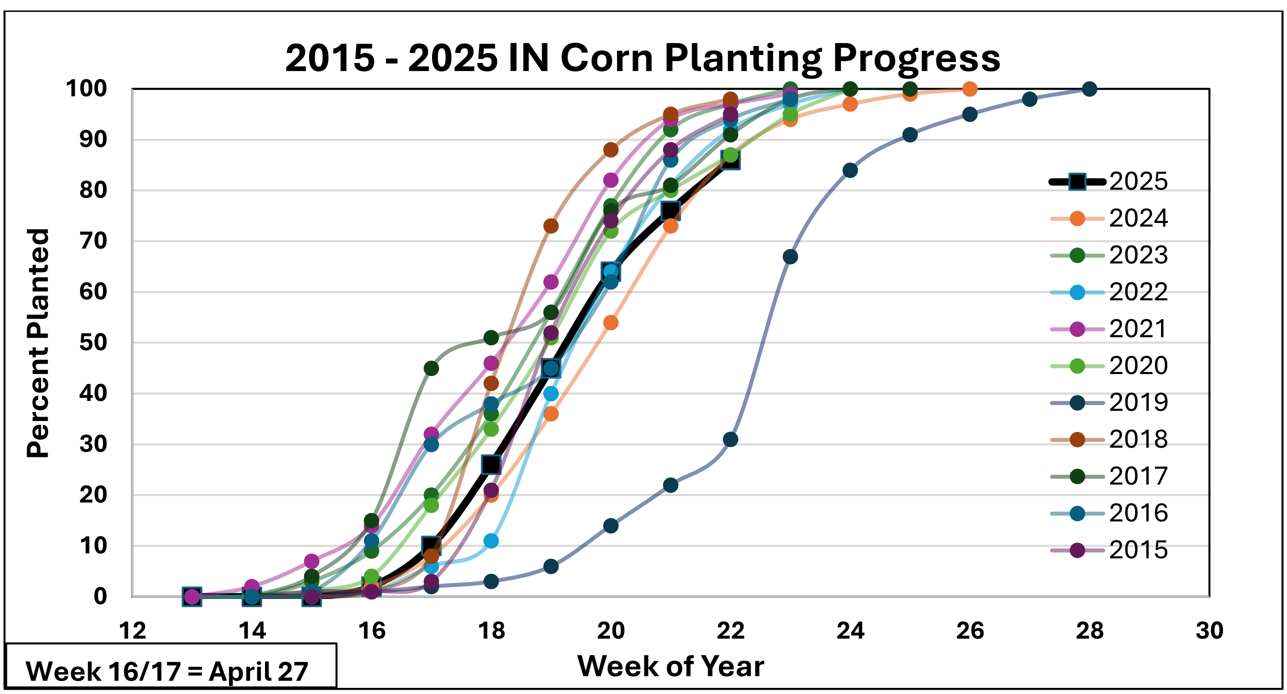

Figure 1. 2015-2025 Indiana corn planting progress by week (USDA-NASS)

In Interactive Maps 1, you'll find updated planting progress across central corn-producing states. The Corn Belt is nearing the end of planting, with standout progress in states such as **Minnesota (99%)**, **Iowa (97%)**, **Nebraska (98%)**, and **Missouri (97%)**, all of which are now ahead of their five-year averages. Even states that had been slightly behind are catching up fast.

Indiana has now reached 86% planted, up from **76% the previous week**, nearly reaching its **five-year average of 90%**. The state made a solid 9-point gain this week, reflecting continued strong momentum. Some states, like **Ohio (72%)** and **Pennsylvania (64%)**, remain behind historical norms due to earlier weather delays, while **North Carolina (99%)** and **Texas (95%)** are essentially complete. These numbers indicate that national planting progress is firmly back on track, with most regions either matching or exceeding seasonal expectations as we close out spring planting.

In addition to planting, corn emergence is advancing quickly, with **78% of the crop emerged nationwide**, up from **67% last week**, slightly ahead of both **2024's pace (72%)** and the **five-year average (77%)**.

In the Corn Belt: **Iowa (87%)**, **Minnesota (87%)**, and **Nebraska (90%)** are significantly ahead of average. **Indiana now reports 70% emergence**, up from **57% last week** and slightly above its five-year average of **73%**. **Ohio (49%)** has improved substantially from last week's **36%**, though it still trails the average. **South Dakota (82%)** is emerging rapidly, far ahead of its five-year average of **71%**. These emergence rates suggest strong early-season development in much of the Corn Belt, although some states continue to feel the impact of earlier cooler or wetter conditions (see Interactive Maps 2).

The USDA-NASS also released the **corn conditions report** of the season, showing that in **Indiana, 60% of the corn crop is rated in good condition and 10% in excellent condition**. This early-season assessment indicates a promising start for Indiana's corn, especially considering recent gains in planting and emergence progress. See Interactive Maps 3 for more information across the U.S.

➡ Let us know if we can help.

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

Jun 1, 2024	May 25, 2025	Jun 1, 2025	Average (2020-2024)

Interactive Maps 2. U.S. Corn **Emerged** Progress (USDA-NASS)
Click on the dates below to see the corn emerged progress over time and the average:

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Interactive Maps 3. U.S. Corn **Condition** (USDA-NASS)
Click on the categories below to see the corn condition at each U.S. state on Jun 1th.

Very Poor	Poor	Fair	Good	Excellent

Purdue Corn Team Research Update

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

The corn crop at Purdue's Agronomy Center for Research and Education (ACRE) has now reached the V4 stage on average (Figure 1), a key milestone when four fully emerged leaves mark the transition into rapid canopy expansion and heightened demand for water, nitrogen and other nutrients. At V4, the root system is still developing but already responsible for the bulk of water and nutrient uptake, making the crop particularly sensitive to both moisture extremes and nutrient imbalances. Ensuring proper drainage early and maintaining starter fertilizer bands can help avoid the yield penalties that often result from waterlogging or early-season nutrient shortages.

Figure 1. Corn plants in the vegetative growth stage V4 at ACRE, West Lafayette, IN.

Corn Hybrid Response to Planting Date Trial

Building on our longstanding interest in how planting date interacts with hybrid genetics, this year's trial evaluates two Pioneer hybrids (P1383AM and P1170AM), across four planting windows that span from late April through late May (Figure 2). Five replications of 15-by-40-ft plots were established in a randomized complete-block design, with seeding set at 32,000 seeds per acre. By splitting planting dates into Late-April, Early-May, Mid-May and Late-May intervals and evaluating both hybrids within each date, we aim to tease apart whether one hybrid's stress-tolerance traits confer an advantage when planting is delayed, or whether calendar timing alone drives yield responses. Ultimately, these data will allow Indiana growers to select not only the best window for planting under variable spring conditions, but also the hybrid that maximizes yield and uniformity when adverse weather forces a schedule shift.

Last year's Corn Yield Response to Hybrid Maturity and Planting Date ACRE trial planted Pioneer P1108Q (110-day relative maturity) and P9608Q (96-day relative maturity) on April 22, May 13, June 10 and June 21, with all treatments maintained at 32,000 seeds per acre and five replications identical to the 2025 design.

Plantings on April 22 produced 235.9 bu/ac at 14.9 percent moisture, lower moisture but also lower yield than the May 13 planting, which yielded 256.1 bu/ac at 16.9 percent moisture. Delaying planting further to June 10 and June 21 caused yields to drop sharply to 162.1 bu/ac and 117.4 bu/ac, respectively, while grain moisture climbed above 19 percent.

When examining hybrid main effects across all planting dates, the longer-maturity P1108Q outperformed P9608Q by roughly 45 bu/ac, averaging 223.9 bu/ac at 20.1 percent moisture versus 178.7 bu/ac at 15.9 percent moisture for P9608Q. No significant interaction between hybrid and planting date was detected, indicating that maturity differences consistently drove yield responses regardless of planting window. These results underscore that full-season hybrids can better capitalize on extended grain-filling periods when planted early, while both hybrids suffer similar proportional penalties when planting is pushed into June.

Taken together, the 2024 findings highlight two clear take-home points: first, targeting an early- to mid-May planting window maximizes yield potential in central Indiana's spring climate; and second, hybrids with longer relative maturities extract greater yield across all planting dates. Our 2025 experiment builds on these insights by expanding the number of planting windows and incorporating two widely grown Pioneer hybrids to refine both calendar and genetics-based recommendations.

Figure 2. April 16 planting (left of the orange stake) on V6 versus May 8 planting (right of the orange stake) on V3. Corn plants growing in the research area with different planting dates at ACRE, West Lafayette, IN.

Hydrology sensors have been installed at the IoT4Ag research trial

At the Internet of Things for Precision Agriculture (IoT4Ag) trial, we are evaluating both tall and short-stature corn hybrids under varying nitrogen application rates. The primary objective is to test and assess the effectiveness of multiple remote sensing platforms, robotics, and handheld proximal sensors for assessing plant nitrogen status and improving in-season nitrogen management practices.

As one of this remote sensing platforms, last week a new network of hydrology sensors (Figure 3) has been installed at the IoT4Ag research trail. These sensors record soil moisture at multiple depths, soil temperature, precipitation and shallow groundwater levels in real time. The goal is possibly finding interactions between the results of this experiment and the moisture data from the sensors, trying to explain some of the results.

Figure 3. Hydrology sensor on the IoT4Ag research trial at ACRE, West Lafayette, IN. Photo taken on May 27th.

It's Not Easy Being Green. The Many Colors of Early-season Corn

(Dan Quinn)

Purple Corn: purple corn symptoms (Figure 1) are caused by the accumulation of a purple pigment in the corn leaves known as anthocyanin. Corn leaves produce sugars by photosynthesis and these sugars are typically metabolized to generate energy for further plant growth. However, when cool temperatures cause plant growth to slow or root development is restricted, these sugars tend to accumulate in the leaf and trigger anthocyanin pigment formation (e.g., purple leaf color). Purple corn can also occur from a genetic response to bright, sunny days and cool nights (Nielsen, 2000). In addition, hybrid genetics can play a role in whether or not a corn plant produces anthocyanin. This symptom often disappears with warmer temperatures and yield losses should be minimal to none.

Figure 1. Purple corn leaf symptoms observed on V2 corn in Northern Indiana in 2021 caused by the buildup of anthocyanin in the corn leaves due to cool temperatures.

- **Note:** This symptom is often confused with phosphorus deficiency of corn. So, before you get the fertilizer spreader out once these symptoms occur, pay attention to your soil test levels and to the corn as temperatures become warmer and if these symptoms begin to disappear.

Yellow-Green Corn: cool temperatures and/or poor root/stand establishment can also cause corn to appear ugly yellow-green instead of that dark, beautiful green we are all looking for. Up until corn reaches the V3 growth stage (3 visibly collared leaves), the energy and nutrition of the seedlings are dependent on the kernel reserves. Once corn gets beyond the V3 growth stage, seedlings begin to transition to being dependent on the nodal root system. During this transition, when poor growing conditions occur this causes insufficient photosynthesis, slowed nodal root development, and poor plant nutrient uptake. Therefore, corn plants appear an ugly yellow-green. However, with more sunshine and higher temperatures, these symptoms are often resolved.

Rapid-Growth Syndrome: rapid growth syndrome often occurs when corn enters the V5 to V6 growth stage and is caused when the corn leaves fail to unfurl properly from the whorl. This often happens after drastic temperature changes, needed rainfall, root establishment, and an acceleration in plant growth. A common symptom is the whorl often becomes tightly wrapped and twisted on the plants. In addition, leaves that were trapped in the whorl will often emerge with a very noticeable bright yellow color (Figure 2).

Figure 2. Bright yellow leaves present in corn experiencing rapid growth syndrome in 2024.

Striped Corn: the presence of yellow and "striped" corn, specifically on the upper leaves of the plant, has been observed in multiple areas across Indiana in 2024 (Figure 3). This symptom is largely caused by nutrient deficiencies, with the most common nutrient deficiency being sulfur.

Figure 3. Upper leaf yellowing and striping occurring in V4 corn in Central Indiana following a rye cover crop in 2024.

Silver Corn: corn that has experienced cool, calm, and clear nights can cause radiational heat loss from corn leaves, thus causing minor leaf surface damage (Nielsen, 2021). This minor chilling injury can result in a silver or gray leaf surface often known as "silver leaf syndrome" (Figure 4).

White Corn: white or "bleached" corn leaves are often blamed on herbicide damage, specifically the pigment inhibitors herbicides (e.g., group 13 and 27). However, young corn that has been under environmental stress such as cool and cloudy weather, which can cause poor root development, can cause a white appearance (Hager and McGlamery, 1997). These symptoms have been observed previously on corn that has had significant root burn caused by a spring anhydrous application. Frost damage can also cause the bleaching of corn leaves. Furthermore, single, white corn plants within a field can be genetic mutants, although this is a rare occurrence (Figure 5).

Figure 4. Silver corn leaf symptoms observed on V4 corn in central Indiana in 2023. Photo taken by Rachel Stevens.

Figure 5. Corn at the V2 growth stage exhibiting symptoms of white corn leaves caused by stressful early-season conditions in 2021. Photo taken by Emma Spurgeon.

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Nutrient Deficiency Image Database Initiative

(Gustavo Santiago & Ignacio Ciampitti)

The Problem: Almost every farmer around the globe suffers from some kind of nutrient deficiency throughout every single season. This impacts not only the farmer but the whole food supply chain, affecting the amount of food produced. The impact on the farmer side is related to an increase in production cost, reducing the profit they can extract from their hard work. The impact on the supply chain side is a decrease in how much food would be produced because if a plant is under nutrient deficiency, it will not reach its maximum production potential. The production decrease due to nutrient deficiency is accentuated in small and medium farmers (the majority of the farmers around the globe), where access to top technologies and equipment is limited.

The Alleviation: This significant impact on food production could be alleviated by early detection of nutrient deficiency at a reduced cost, making it accessible to small and medium-sized farmers. Considering that smartphones are widely available nowadays, an affordable and democratic approach would be to develop a free mobile application that indicates if a plant is experiencing a nutrient deficiency and identifies the specific nutrient deficiency.

Our proposal: A crucial step for this mobile application is developing a robust and versatile machine learning model that allows the detection of the deficiency and the degree of its spread over the plant. To train a very robust and reliable model, the mandatory first step is to have trainable data. However, in the current situation, the community does not have an open and reliable leaf image under the nutrient deficiency database.

Figure 1. Corn at the V3 growth stage with phosphorus (P) deficiency.

Figure 2. Soybean with magnesium (Mg) deficiency.

The First Step: The purpose of this initiative is to first create this database, train these models, and lastly develop the mobile application. The database would be fed by the community by uploading images to a secure image database through a platform. This image database would then be evaluated by nutrient-deficient experts to ensure the reliability of the information inserted. After verification, the images are opened to the public, indicating the crop, deficiency, and degree of deficiency.

The database would be built by the farming community to generate a product benefiting the whole society

Figure 3. Corn at the V6 growth stage with potassium (K) deficiency.

🌽 🪱 Will Earthworms Eat Corn Leaves?

(Christian Krupke)

Most of the best article ideas come from observations in the field. Recently, a crop consultant recently contacted us with questions about what was causing damage, shown below, that included corn leaves appearing to have been dragged down into burrows where they were presumably fed upon. The damage was not estimated to be at economically significant levels, but interesting all the same. From Vermillion and Parke Counties to Lake Michigan have received between 25% and 75% of the normal precipitation through May 27 (Figure 1). Conditions were

Figure 1. Note the uppermost leaves have been dragged or pulled down into holes in the ground. See video below for the appearance of the leaves below the surface.

Common early season pests like cutworms and armyworms typically don't cause this type of damage. The consultant hypothesized that this may be due to earthworm feeding, which at first sounded unlikely… earthworms don't eat living, healthy plants, do they? They are widely viewed as soil building organic material recyclers, beloved by farmers, gardeners, fishermen and the many birds that eat them.

I'll admit I had never read about what earthworms actually eat, so I consulted the literature and found a few good references, including **this one**, that points out that earthworms (particularly the large nightcrawlers, *Lumbricus terristris*) will eat just about anything under the right conditions. While living, healthy plant tissues are not preferred and are likely more difficult for them to digest than the partially decomposed leaf litter and crop residues they prefer, it's a whole lot better than nothing. Like most animals, they will make do with what's available.

Adding to this particular story, this field was subjected to the dust storm conditions of about 2 weeks ago that damaged corn foliage and completely destroyed some soybean fields in the area. That may have may these leaves even more accessible and palatable. Perhaps also partially as a result of those high winds, you can see the soil surface of this field is almost completely barren –

there's not much material for earthworms, or anything else, to get nutrition from aside from corn.

Does this mean earthworms should be considered pests? Certainly not. But it's an interesting story about how opportunistic and variable animal behavior can be and the value of getting into the field and **keeping your eyes open!**

2025 Weed Science Field Day at TPAC

(Tommy Butts, Bryan Young, Bill Johnson, Leo Piveta, and Julie Young)

Mark your calendars and come on out to join us for our annual Purdue Weed Science Field Day! The event will be held on ***Thursday, June 26th at the Throckmorton-Purdue Agricultural Center (TPAC)*** located at 8343 South US-231, Lafayette, IN 47909.

The field day will start at 8:00 AM with walk-in registration, coffee, and donuts. At 8:30 AM, the event will begin with a brief poster session presented by the weed science graduate students before heading to the field research trials. As we view the field trials, we'll discuss weed control issues that have popped up from across **Indiana in 2025**, advancements in weed management technology, and provide research-supported management recommendations for some of Indiana's most problematic weeds. This is a great opportunity for networking with all our industry and academic representatives, as well as strengthening our weed management knowledge. Indiana CCH credits will also be available for a variety of categories.

For more information and to pre-register to attend, please visit our website here: https://ag.purdue.edu/department/btny/weed-science-field-day.html. **We look forward to seeing you on the 26th!**

It's a Hazy Shade of June

(Beth Hall)

Welcome to the start of Hurricane Season that runs from June through November each year. Why would Indiana care about hurricane season? Certainly, by the time any hurricane might impact the state, it will have been greatly downgraded to what is called an extratropical (i.e., poleward of the Tropic of Cancer (23.5° north latitude)) storm or the remnants of the hurricane. Regardless, these hurricane remnant storms can bring often-needed rainfall with enough moisture to potentially be drought busters.

While our first tropical storm of 2025 (would be named **"Andrea")** has yet to develop, forecasters are keeping an eye on strong wind patterns coming from western Africa and areas of low pressure that could strengthen to tropical storm levels (maximum sustained surface winds reaching 39-73 mph (34-63 knots)).

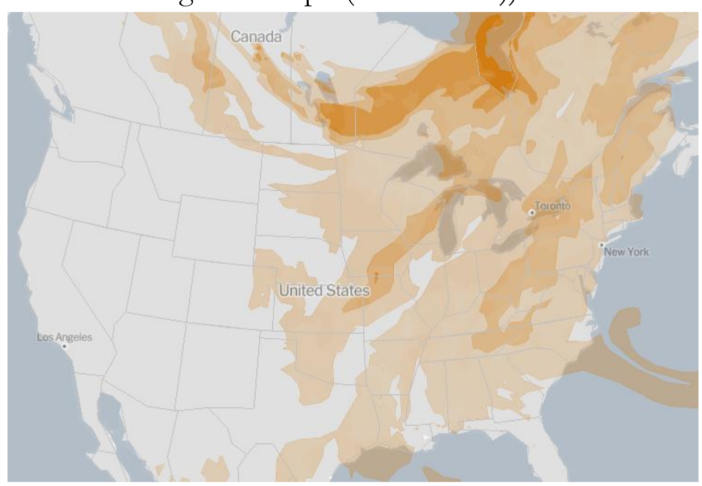

Figure 1. Example of the NOAA experimental forecast product showing smoke intensity for 3 PM EDT on Wednesday, June 4, 2025. Product enhance by the *New York Times.*

Speaking of those easterly winds coming from western Africa, another reason why Indiana may be interested in these and other tropical storm patterns is due to massive Saharan dust storms that can be carried thousands of miles across the Atlantic Ocean. There is currently a massive dust cloud, fed by the Sahara Desert and carried by the northeast trade winds, that is headed our way (Science Alert). AccuWeather provides a fun animation of the size and path of this dust storm that is currently impacting the Caribbean Sea and is projected to steer northward into the United States from the Gulf region (AccuWeather). Depending upon how far north this dust plume goes, we may see hazy skies that are likely to reduce the amount of solar radiation reaching our surface.

Smoke from Canadian wildfires is also creating hazy skies across Indiana. The National Oceanic and Atmospheric Administration (NOAA) provides an experimental smoke forecast product that predicts smoke intensity for the next 48 hours. The ***New York Times*** offered a color-shaded product of the NOAA tool, as shown in Figure 1. As long as the wildfires continue burning and upper-atmospheric winds continue to steer the smoke southeastward, we can expect hazy skies across our area.

How do hazy skies impact crop production? There are both positive and negative impacts. As mentioned, smoky skies can block incoming solar radiation that is necessary for photosynthetic development. However, the reduced solar radiation can also reduce daytime heating by several degrees causing a reduction in evapotranspiration and other possible drought impacts. Smoke and dust particles – depending upon their concentration – also service as cloud condensation nuclei (i.e., particles that water vapor can condense on to). With the right amount of suspended particles and water vapor in the air, cloud droplet may grow enough to cause precipitation – another important component to crop production. On the other hand, too many suspended particles could simply haze up the sky without encouraging those cloud droplets to grow.

Finally, smoke and dust can pose significant health hazards, particularly for the elderly and those with pre-existing respiratory conditions. Be sure to monitor the Indiana Department of Environmental Management's near real-time air quality maps and data to assess air quality risk levels for your area before spending too much time outdoors. Figure 2 provides an example of one of their maps.

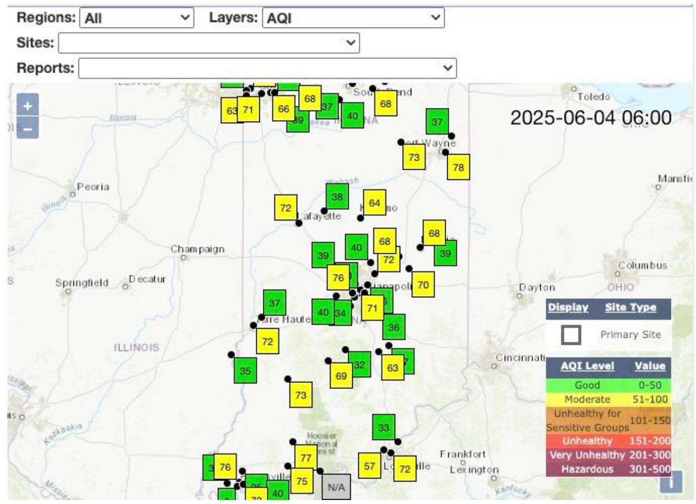

Figure 2. Example output from the Indiana Department of Environmental Management's near real-time air quality map. (https://www.in.gov/idem/airmonitoring/air-quality-data/)

Acknowledgments

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

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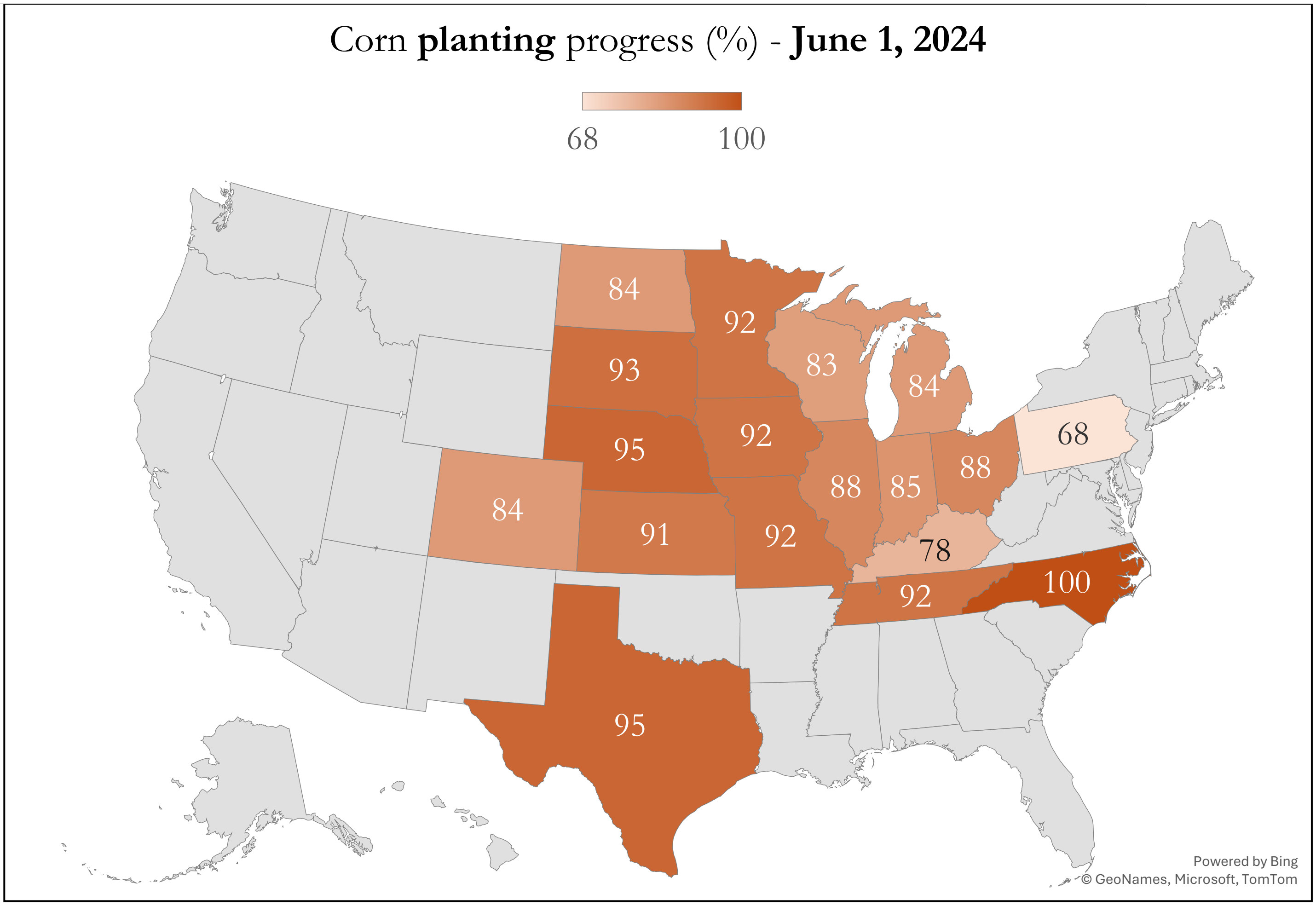

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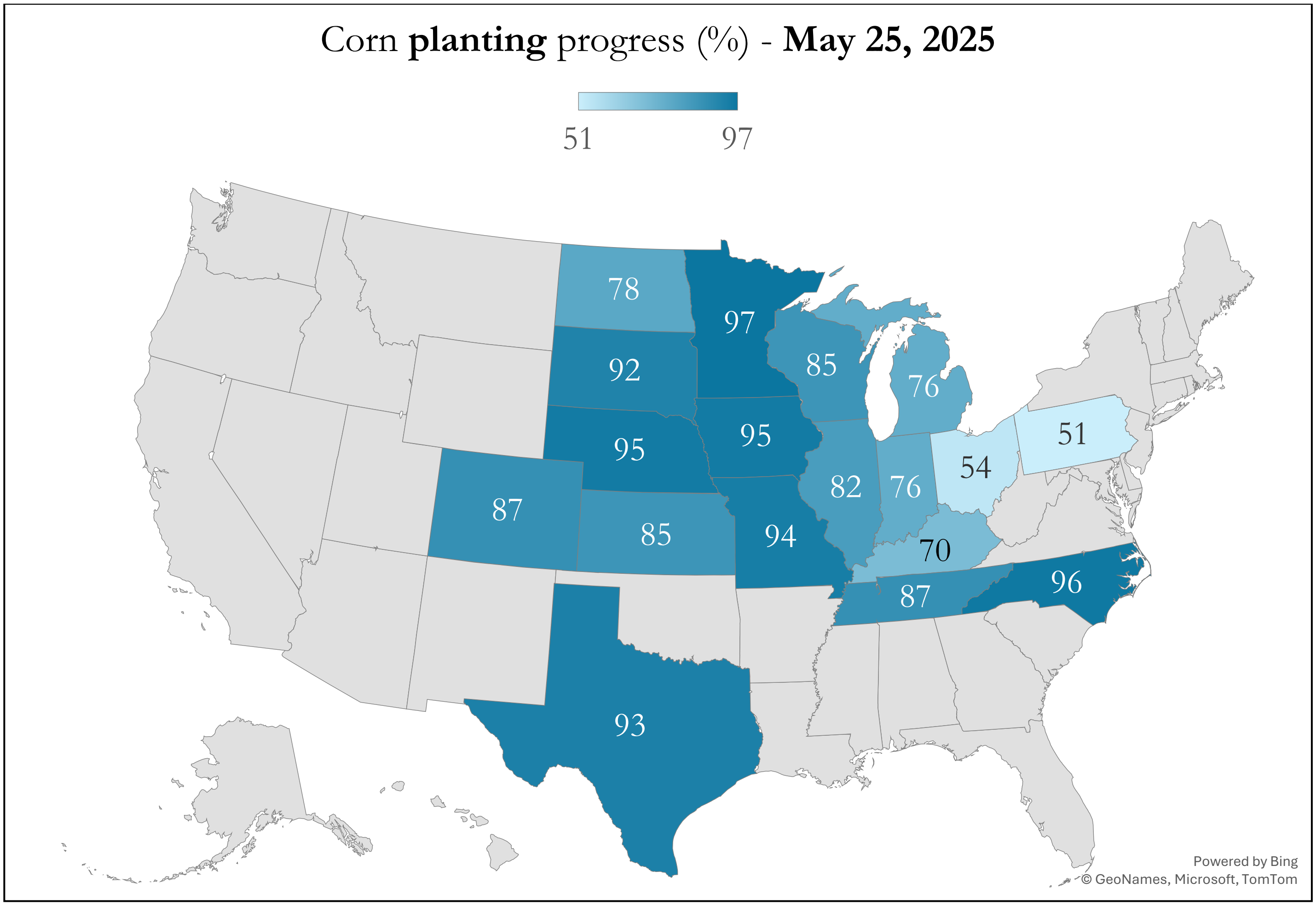

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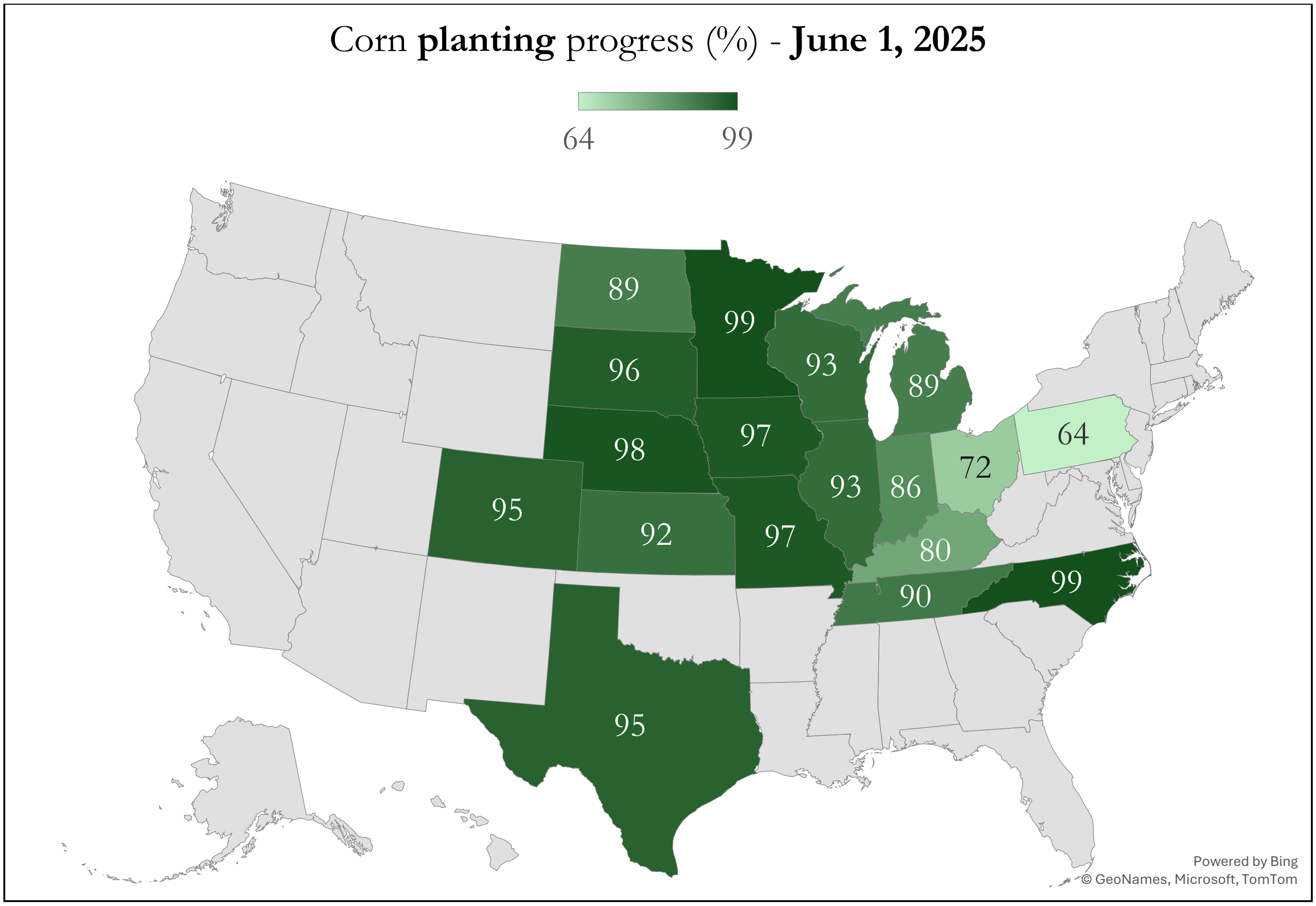

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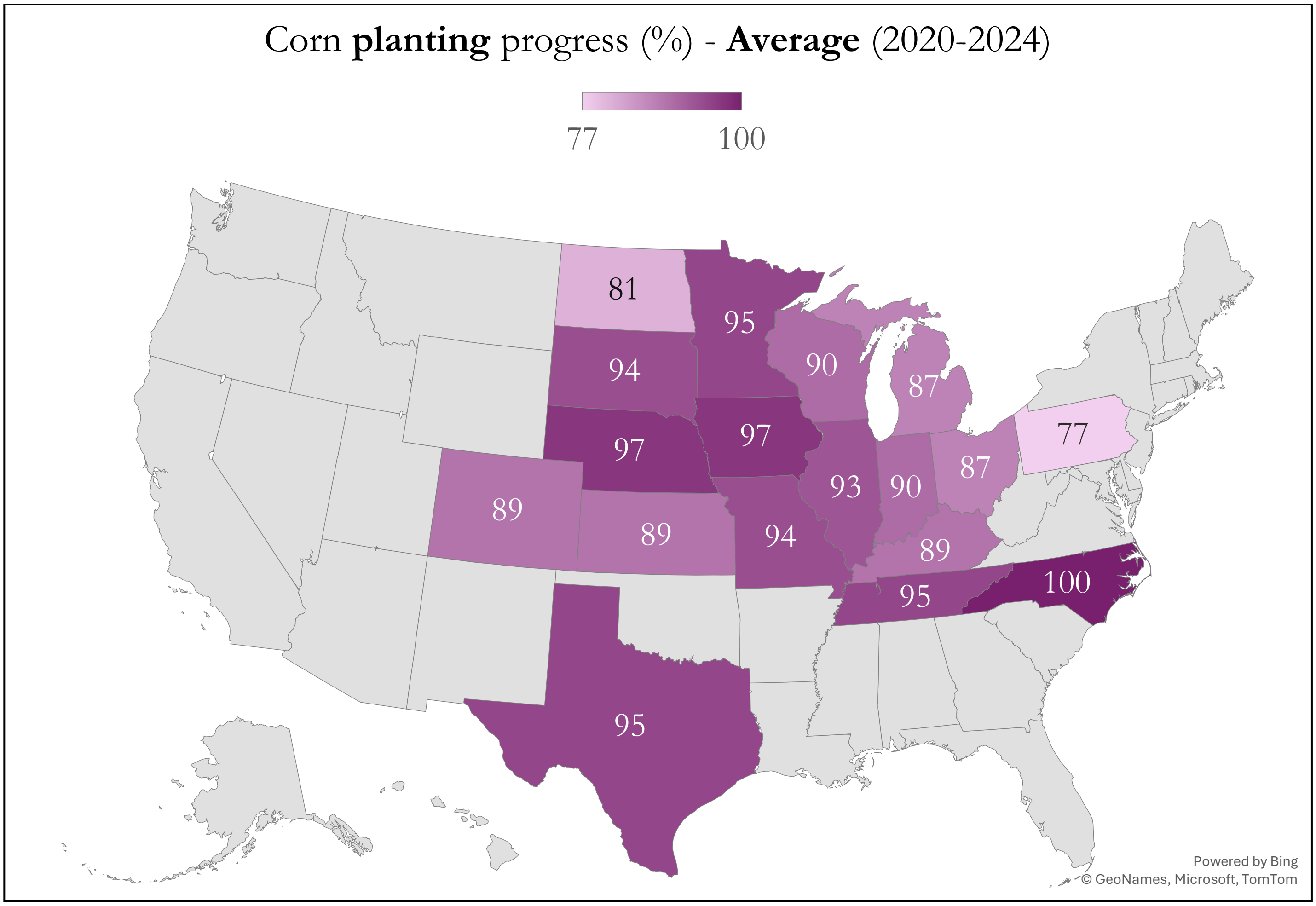

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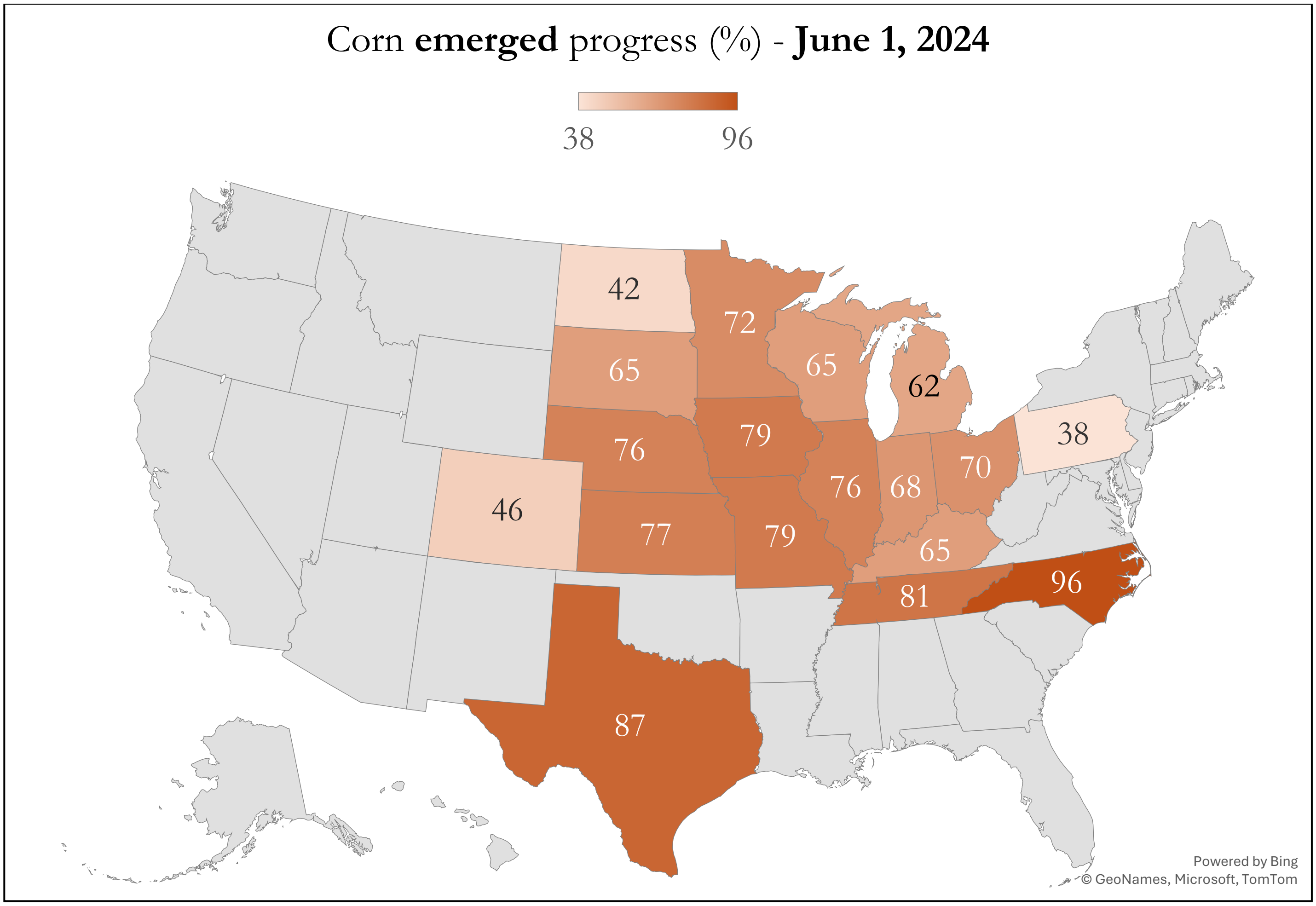

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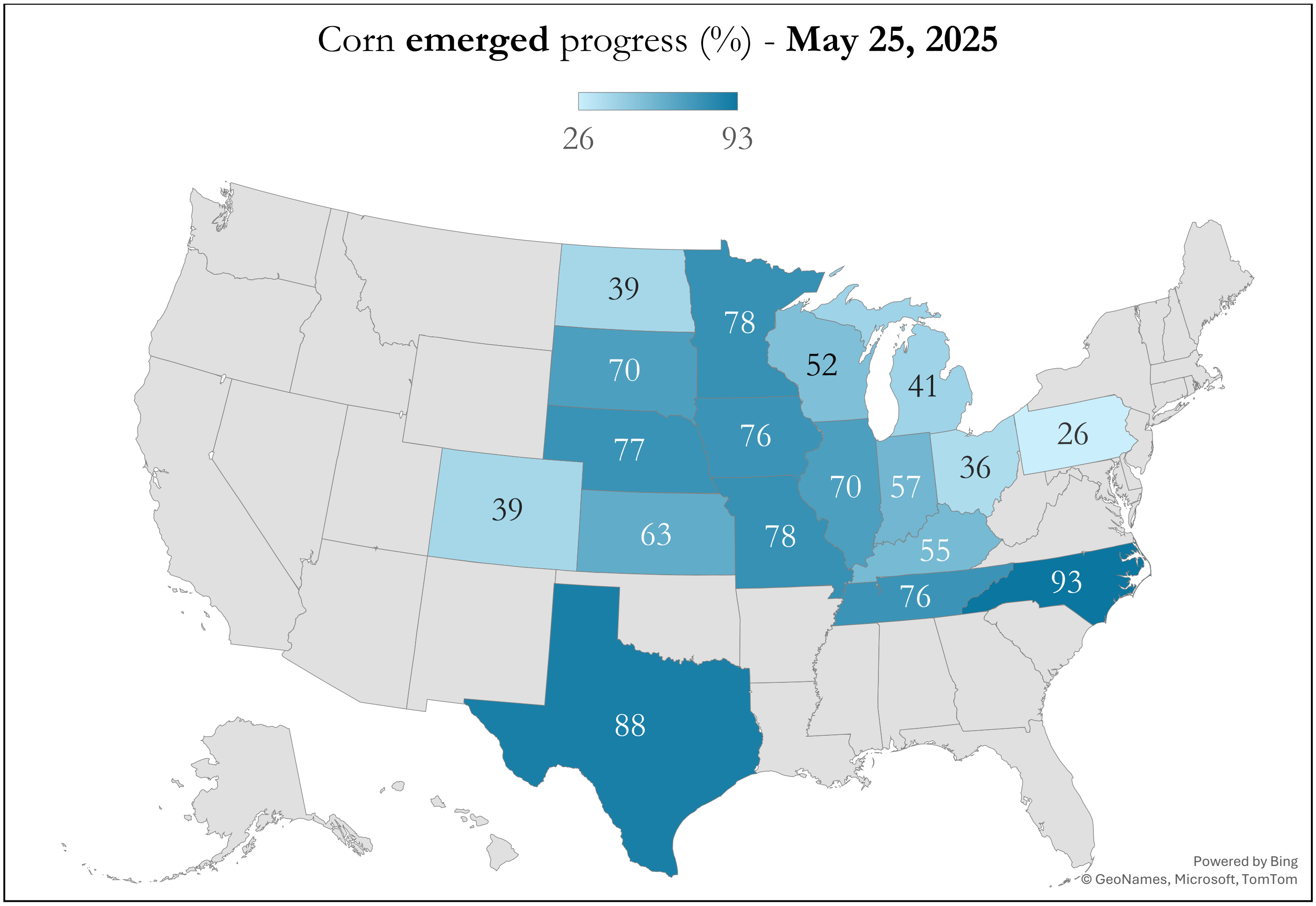

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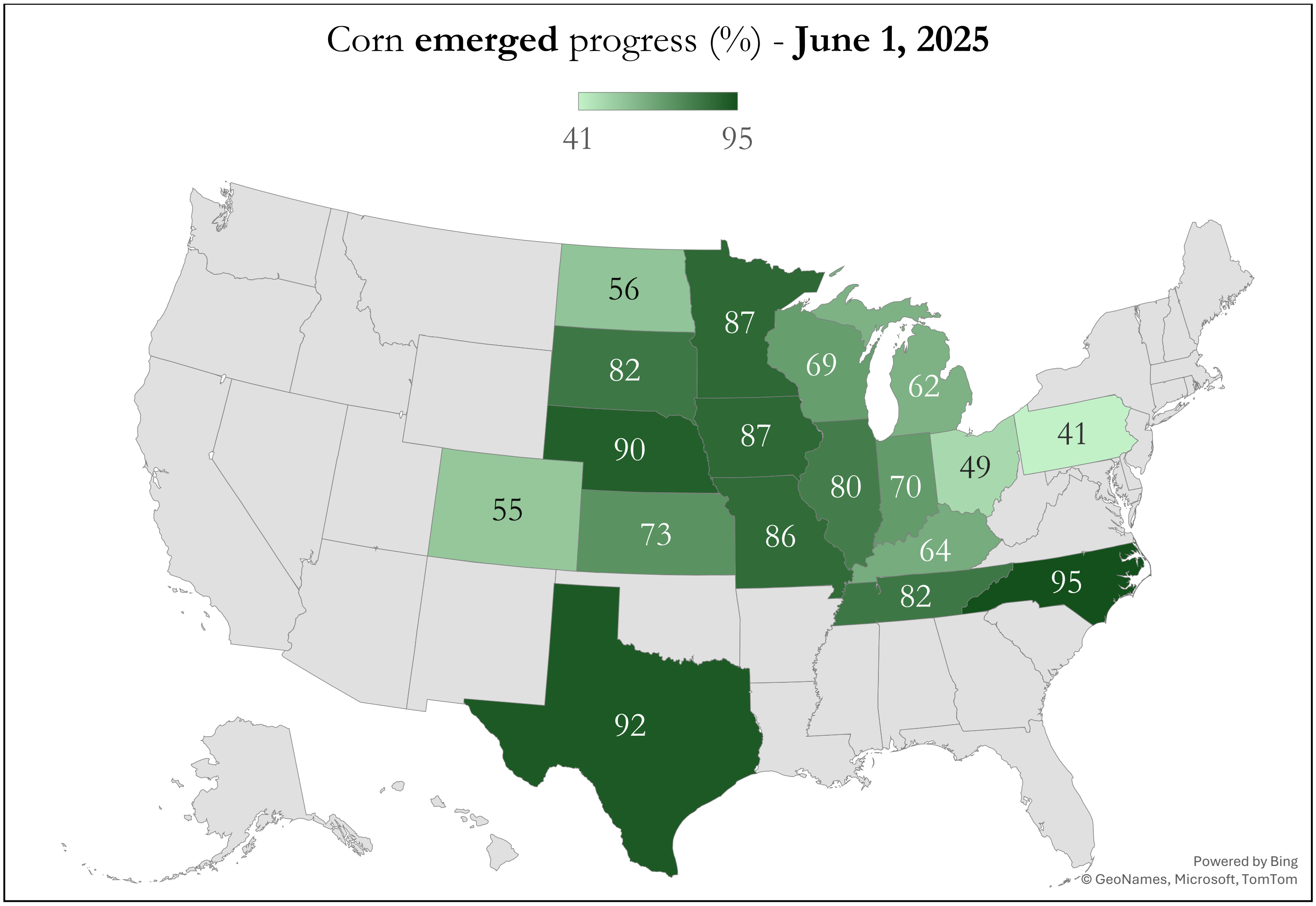

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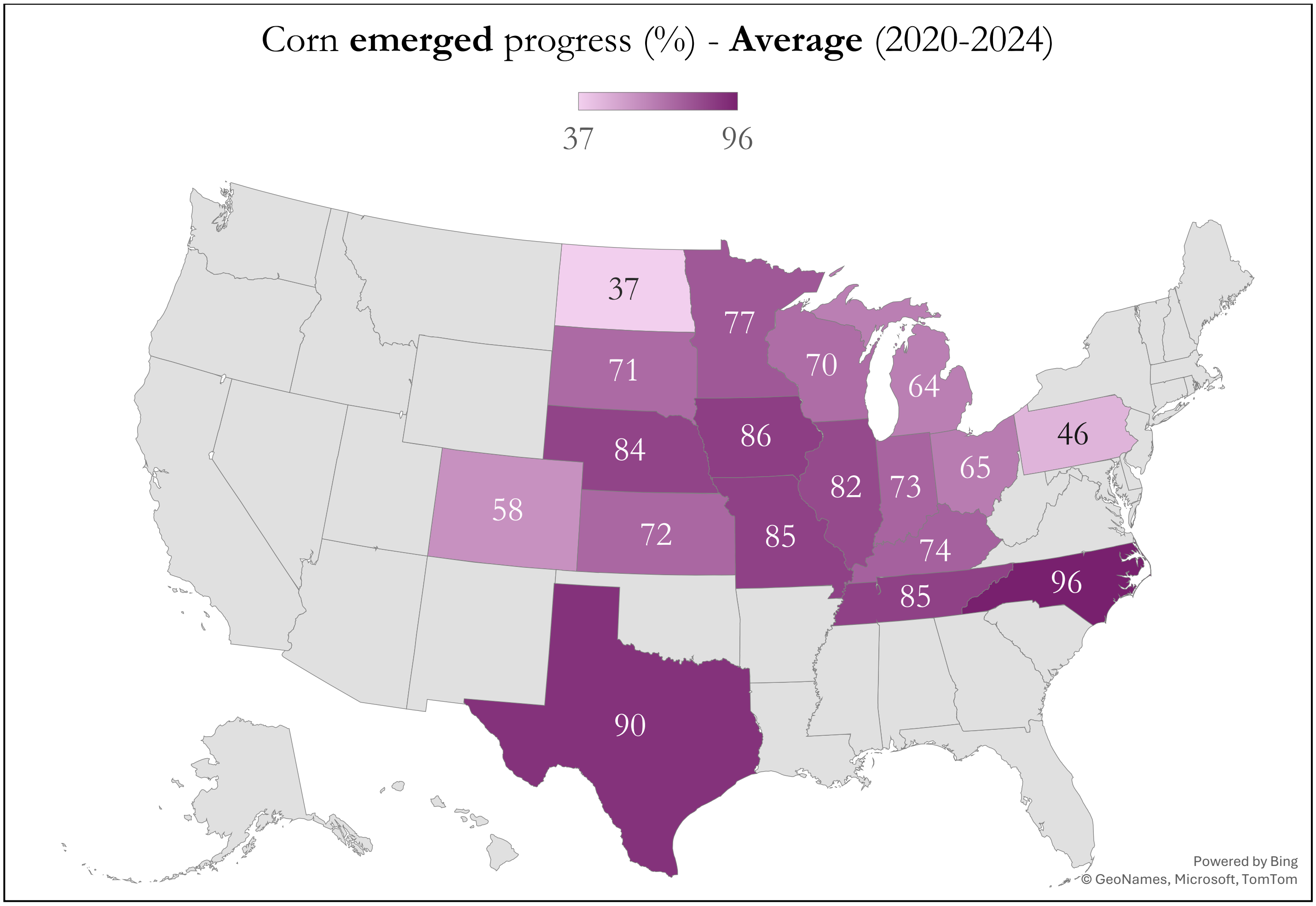

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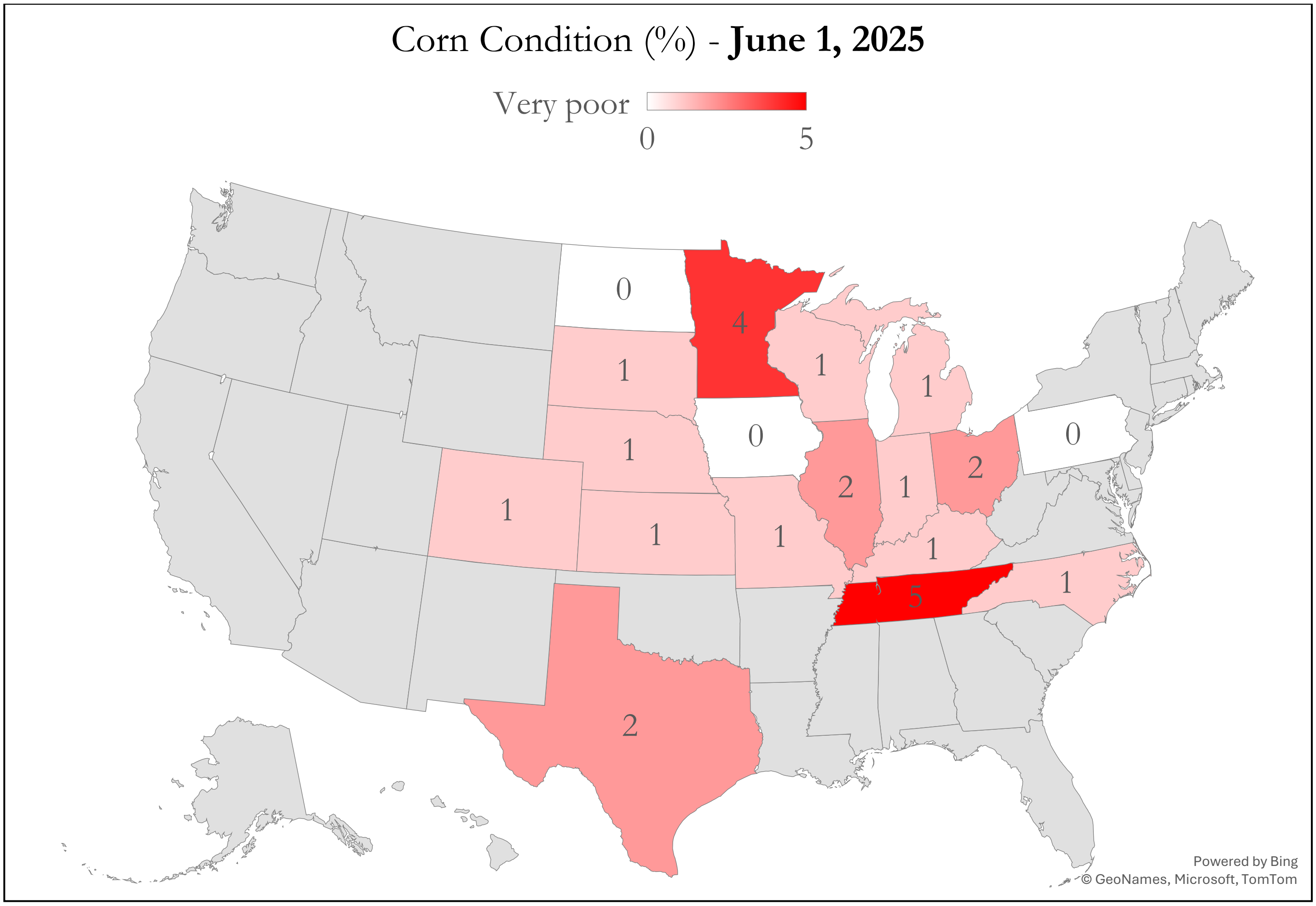

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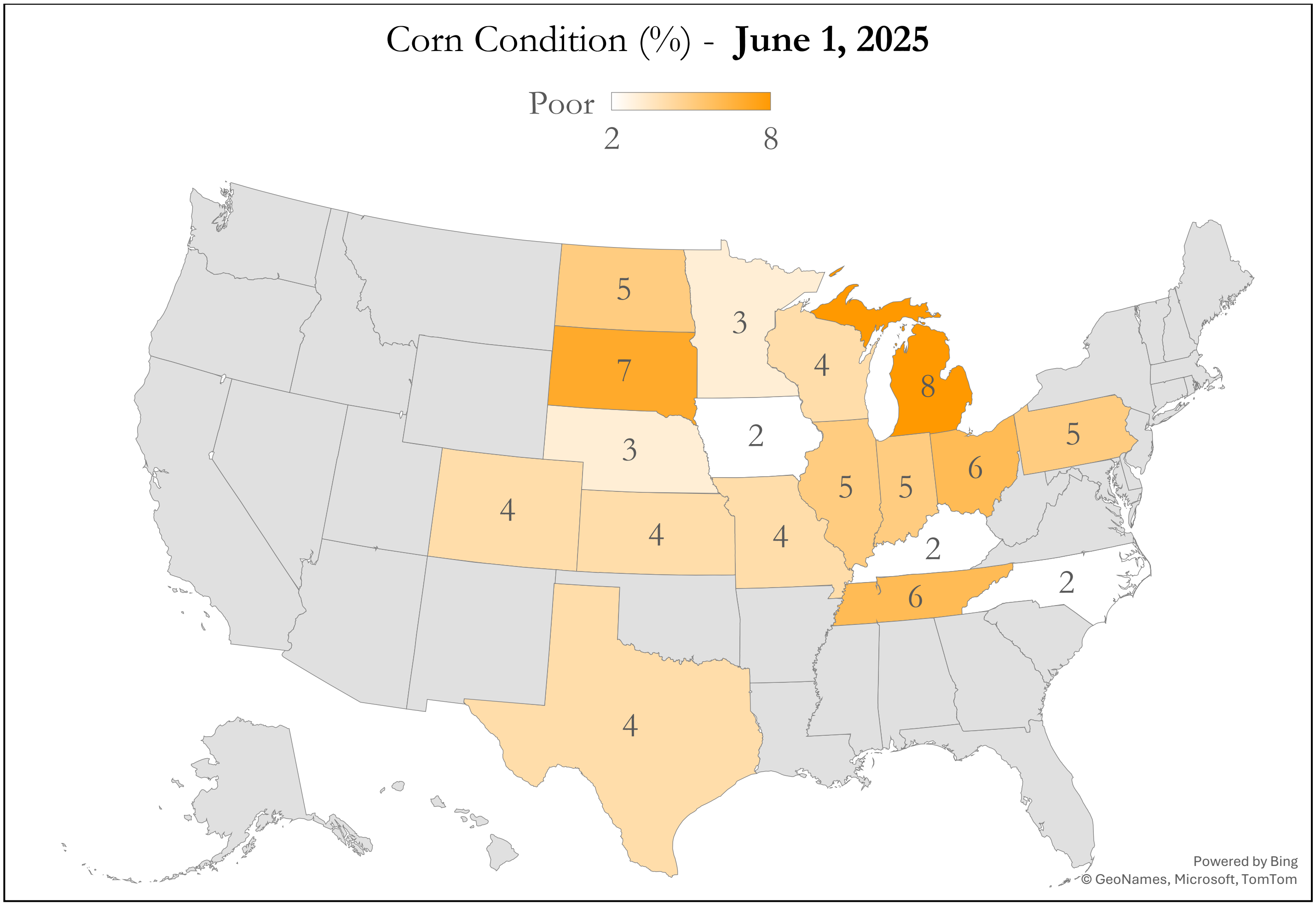

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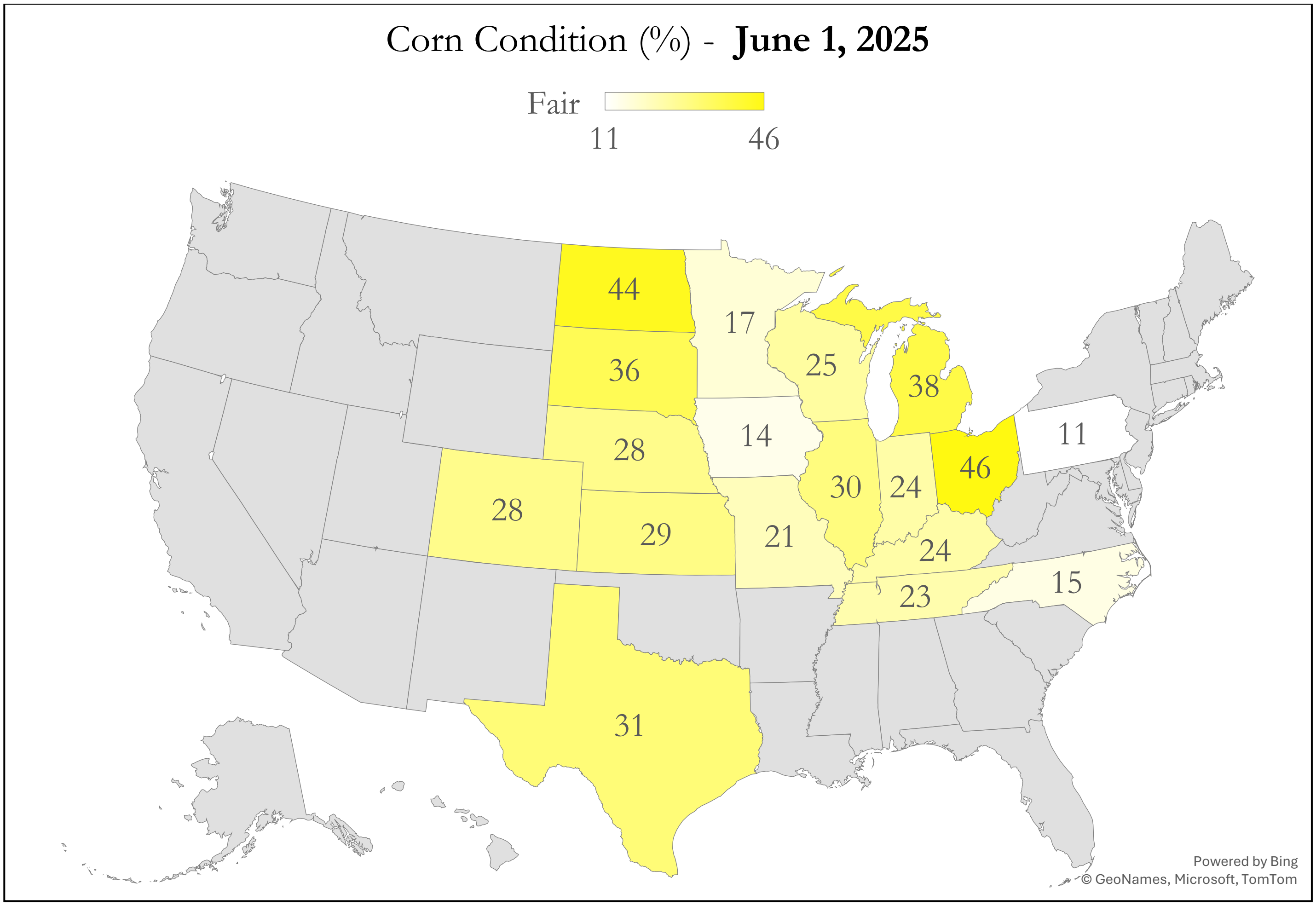

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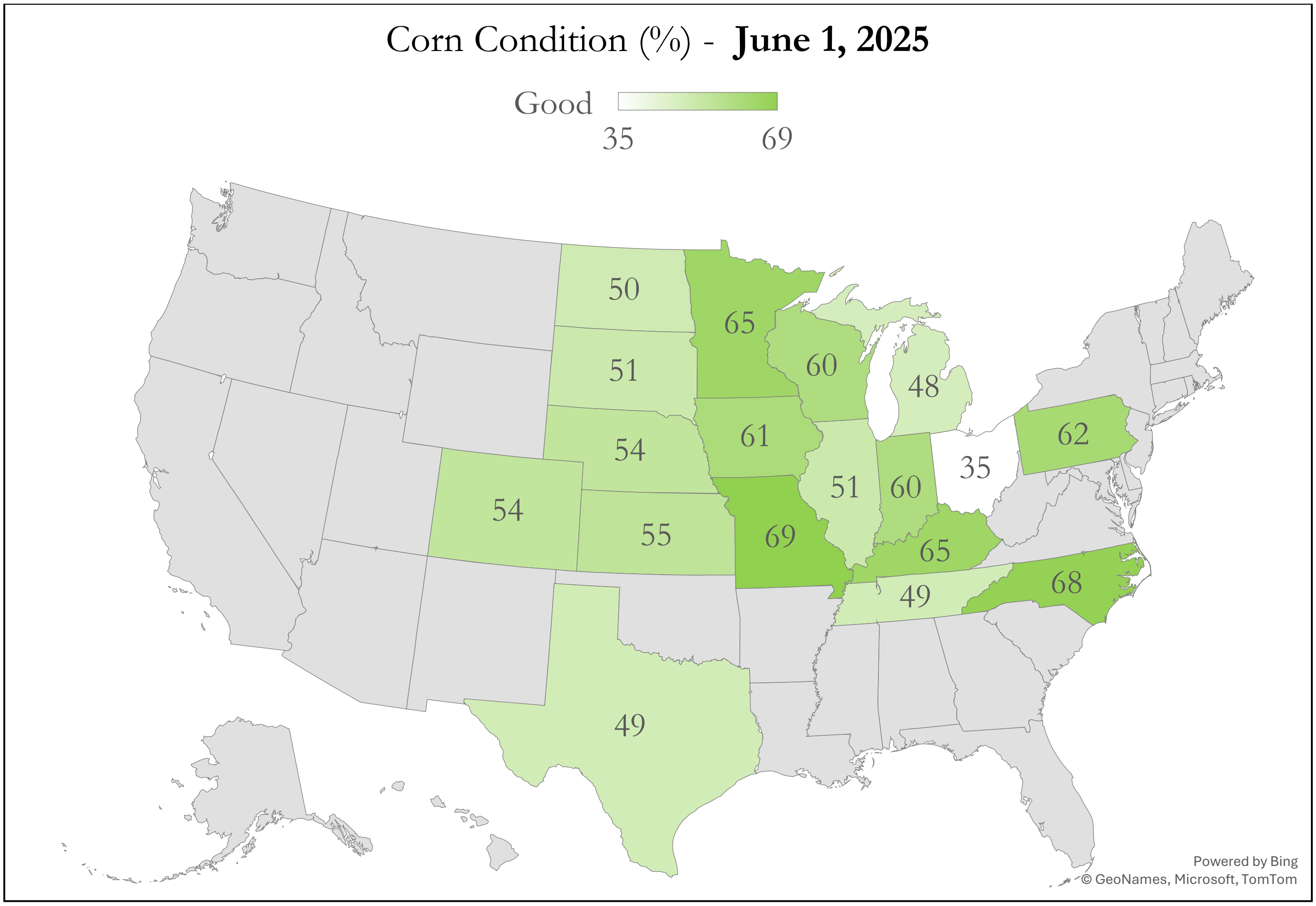

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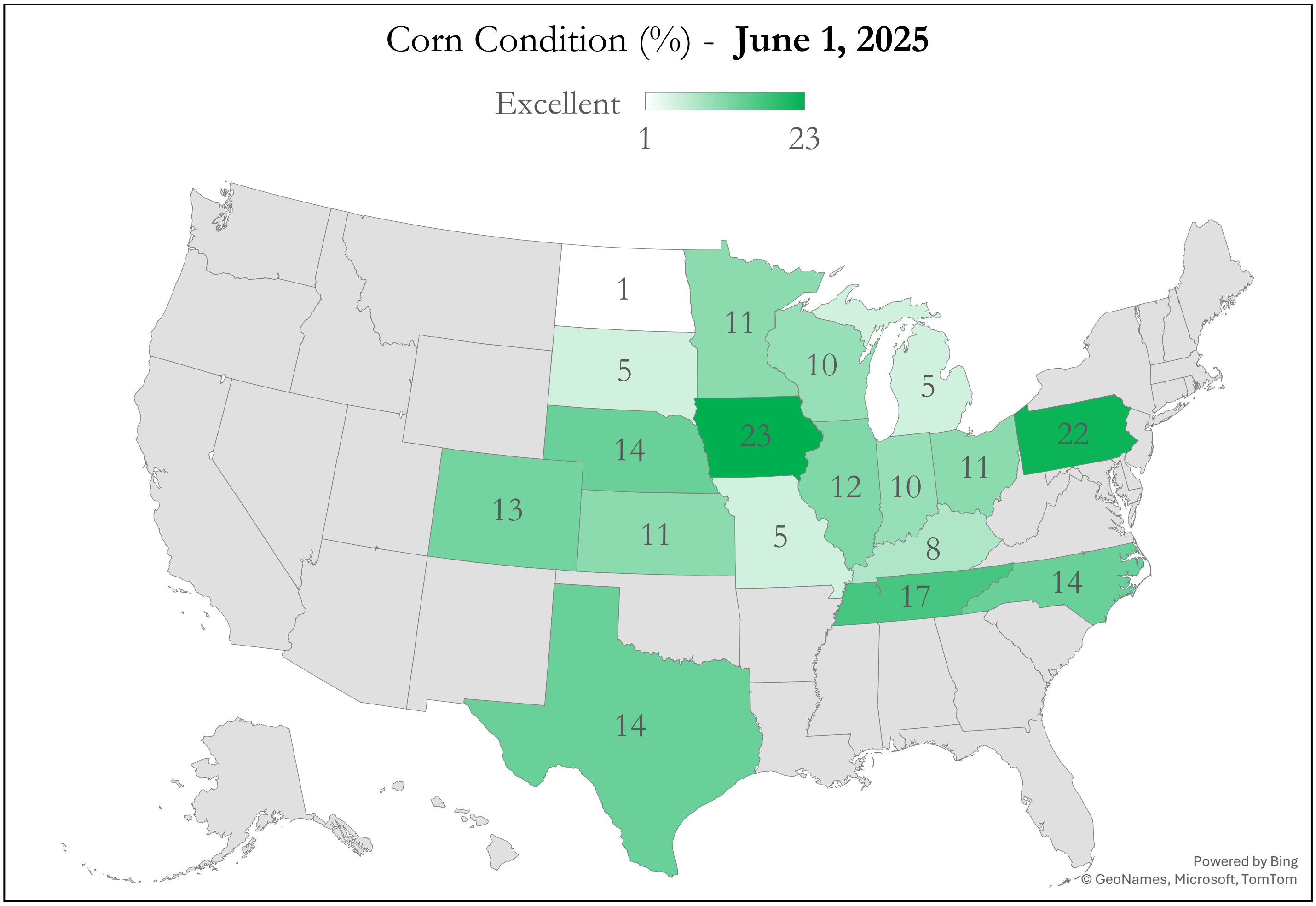

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