

2023 AGRICULTURAL CHEMICAL USE SURVEY

Soybeans

Nineteen states . . .

. . . accounted for 96.3% of the 83.6 million U.S. acres planted to soybeans in 2023.

About the Survey

The Agricultural Chemical Use Program of USDA's National Agricultural Statistics Service (NASS) is the federal government's official source of statistics about on-farm and post-harvest commercial fertilizer and pesticide use and pest management practices. NASS conducts field crop agricultural chemical use surveys as part of the Agricultural Resource Management Survey. NASS conducted the soybean chemical use survey in the fall of 2023.

Access the Data

Access 2023 soybean chemical use data as well as results from prior surveys of soybean chemical use, through the Quick Stats 2.0 database (<http://quickstats.nass.usda.gov>).

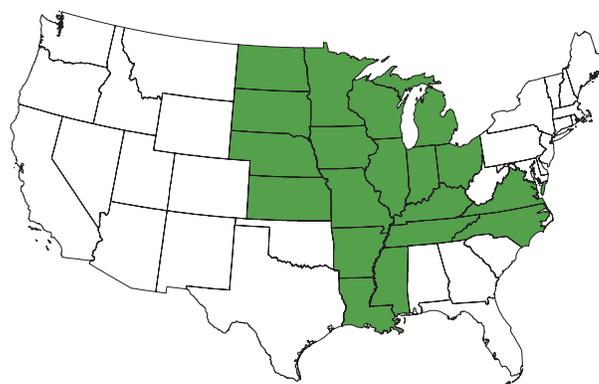
- In Program, select "Survey"
- In Sector, select "Environmental"
- In Group, select "Field Crops"
- In Commodity, select "Soybeans"
- Select your category, data item, geographic level, and year

For pre-defined Quick Stats queries, go to <http://bit.ly/AgChem> and click "Data Tables" under the 2023 Barley, Oats, Peanuts, and Soybeans heading. For methodology information, go to <http://bit.ly/AgChem> and click "Methodology."

The 2023 Agricultural Chemical Use Survey of soybean producers collected data about fertilizer and pesticide use as well as pest management practices in growing soybeans. NASS conducted the survey in 19 states that accounted for 96.3% of the 83.6 million acres planted to soybeans in the United States in 2023: Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Ohio, South Dakota, Tennessee, Virginia, and Wisconsin. (Fig. 1 and Table 4)

Data are for the 2023 crop year, the one-year period beginning after the 2022 harvest and ending with the 2023 harvest.

Fig. 1. States in the 2023 Soybean Chemical Use Survey



Fertilizer Use

Fertilizer refers to a soil-enriching input that contains one or more plant nutrients. Nitrogen, phosphate, potash, and sulfur were the most widely used fertilizer materials on soybeans. For the 2023 crop year, farmers applied potash to 46% of planted acres, at an average rate of 88 pounds per acre, for a total of 3.3

billion pounds. Farmers applied phosphate to 44% of planted acres and nitrogen to 30% of planted acres. (Table 1)

Table 1. Fertilizer Applied to Soybean Planted Acres, 2023 Crop Year

| | % of Acres with Nutrient ^a | Average Rate for Year (lbs/acre) | Total Applied (mil lbs) |
|--|---------------------------------------|----------------------------------|-------------------------|
| Potash (K ₂ O) | 46 | 88 | 3,287.0 |
| Phosphate (P ₂ O ₅) | 44 | 57 | 2,041.6 |
| Nitrogen (N) | 30 | 22 | 537.0 |
| Sulfur (S) | 14 | 20 | 230.8 |

^aAcres with multiple nutrients are counted in each category.

Pesticide Use

The pesticide active ingredients used on soybeans are classified in this report as herbicides (targeting weeds), insecticides (targeting insects), fungicides (targeting fungal disease), and other chemicals (targeting all other pests and other materials, including extraneous crop foliage). Herbicides were used most extensively, applied to 96% of planted acres. Fungicides were applied to 22% of planted acres, insecticides to 21%. (Fig. 2)

Among herbicides, glyphosate isopropylamine salt was the most widely used active ingredient (applied to 46% of planted acres), followed by 2,4-D; choline salt (37%). (Table 2)

Fig. 2. Pesticides Applied to Soybean Planted Acres, 2023 Crop Year
(% of planted acres)

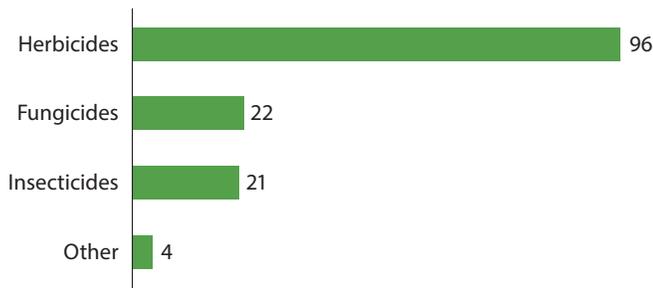


Table 2. Top Herbicides Applied to Soybean Planted Acres, 2023 Crop Year

| Active Ingredient | % of Acres with Ingredient ^a | Average Rate (lbs/acre) | Total Applied (mil lbs) |
|--------------------------------|---|-------------------------|-------------------------|
| Glyphosate isopropylamine salt | 46 | 1.106 ^b | 41.2 ^b |
| 2,4-D; chlorine salt | 37 | 0.713 ^b | 21.4 ^b |
| Glyphosate dimethylamine salt | 25 | 0.559 ^b | 11.1 ^b |
| Glufosinate-ammonium | 23 | 0.526 | 9.7 |
| Glyphosate potassium salt | 22 | 1.407 ^b | 24.7 ^b |

^a Acres with multiple ingredients are counted in each category.

^b Expressed in acid equivalent.

Pest Management Practices

The survey asked growers to report on the practices they used to manage pests, defined as weeds, insects, or diseases. Soybean growers reported practices in four categories: prevention, avoidance, monitoring, and suppression.

- *Prevention* practices involve actions to keep a pest population from infesting a crop or field.
- *Avoidance* practices use cultural measures to mitigate or eliminate the detrimental effects of pests.
- *Monitoring* practices involve observing or detecting pests through systematic sampling, counting, or other forms of scouting.
- *Suppression* practices involve controlling or reducing existing pest populations to mitigate crop damage.

Table 3 shows the top practice in each category. For example, the most widely used prevention practice in growing soybeans in 2023 was no till or minimum till.

Table 3. Top Practice in Pest Management Category, 2023
(% of soybean planted acres)

| | |
|--|----|
| <i>Prevention</i> : No till or minimum till | 62 |
| <i>Avoidance</i> : Rotated crops during last three years | 81 |
| <i>Monitoring</i> : Scouting for weeds (deliberately, or by general observations while performing tasks) | 62 |
| <i>Suppression</i> : Used pesticides with different mechanisms of action to keep pests from becoming resistant to pesticides | 40 |

Table 4. Surveyed States: Acres of Soybeans Planted, 2023

| U.S. Total | Millions of Acres | % of U.S. 100 |
|-------------------------------|-------------------|---------------|
| Illinois | 10.35 | 12.38 |
| Iowa | 9.95 | 11.90 |
| Minnesota | 7.35 | 8.79 |
| North Dakota | 6.20 | 7.42 |
| Missouri | 5.60 | 6.70 |
| Indiana | 5.50 | 6.58 |
| Nebraska | 5.25 | 6.28 |
| South Dakota | 5.10 | 6.10 |
| Ohio | 4.75 | 5.68 |
| Kansas | 4.43 | 5.30 |
| Arkansas | 2.98 | 3.56 |
| Mississippi | 2.18 | 2.61 |
| Wisconsin | 2.11 | 2.52 |
| Michigan | 2.04 | 2.44 |
| Kentucky | 1.83 | 2.19 |
| North Carolina | 1.64 | 1.96 |
| Tennessee | 1.60 | 1.91 |
| Louisiana | 1.03 | 1.23 |
| Virginia | 0.58 | 0.69 |
| Total, Surveyed States | 80.47 | 96.26 |