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Acres Decline**

**No-Till Yields
Steady Despite
Major Drought**



2024 BENCHMARK REPORT

Special No-Till Management Report No. 74

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Fungicide
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**No-Tillers Ready
to Buy New
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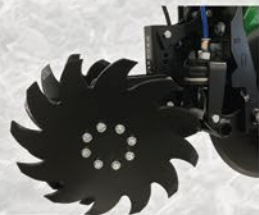
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Streamlined Survey Offers More Data, Insights about No-Till in US

By Michaela Paukner, Managing Editor

Just like you and the other no-tillers who read *No-Till Farmer* magazine, our staff is always looking for ways to maximize efficiency. In November, our team started a discussion about combining the annual no-till, strip-till and cover crop surveys into one all-encompassing assessment. The change would allow us to eliminate redundant questions and also gain some new insights about how a farmer's management practices change when no-till is the only or just the primary form of tillage used.



Michaela Paukner, Managing Editor

With an endorsement from the *No-Till Farmer* Advisory Board, we launched the 2023 Confidential Tillage Practices Survey in December. A total of 489 farmers took the survey, 426 of which use no-till on at least some of their acres (see p. 4 for more information about no-tiller demographics).

With so many additional data points to report, we decided to encapsulate the results into this 16-page special report, giving us enough pages to show all of the survey questions — or so I originally thought. I soon discovered that even 16 pages couldn't hold all of the charts, tables and graphs with the plethora of data points from the survey. Here are some of the items that didn't make the cut but still felt important enough to share:

- ✘ The no-tillers who responded to this survey own an average of 654 acres and cash rent an average of 614 acres. The 112 no-tillers who are share cropping averaged 701 acres in 2023.
- ✘ Among no-tillers who planted green, 65.6% planted corn green, and 74.1% planted soybeans green.
- ✘ 51% of no-tillers say they'll make a potassium (K) application to their 2024 corn crop. 74% will apply K to soybeans in 2024.
- ✘ 76.1% of no-tillers who applied insecticide to corn made a foliar application, compared to 35.2% in furrow.
- ✘ More than half of no-tillers (56%) test their soils every 3 or more years, compared to 24% who test every 2 years, 18% who test annually and 2% who are never testing.
- ✘ 56.5% of no-tillers plan to use a nitrification inhibitor or nitrogen stabilizer in 2024.
- ✘ 12.5% applied gypsum in 2023.
- ✘ 36.3% of no-tillers raised cattle in 2023, making beef the most popular livestock.
- ✘ 4% of no-tillers managed organic acres in 2023. The highest reported number of organic acres was 100, and the lowest was just 1 acre.

I hope these data points and the rest of the information in this report provide you with a benchmark to measure your own operation against and some insight about how to improve your own efficiency with some of these practices. Send me an email to share what did or didn't surprise you about this year's data.

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NO-TILL 2024 BENCHMARK REPORT

NO-TILLFARMER.COM PHONE: (262) 782-4480
 16655 W WISCONSIN AVE. BROOKFIELD, WI 53005
 P.O. BOX 624BROOKFIELD, WI 53008-0624
FOR CHANGE OF ADDRESS CALL:
 (800) 277-1570, (847) 513-6059
 FAX: (847) 564-9453 • EMAIL: NTF@OMEDA.COM

EDITOR

Frank Lessiter, lessiterf@lessitermedia.com

EXECUTIVE EDITOR

Kim Schmidt, kschiemdt@lessitermedia.com

MANAGING EDITOR

Michaela Paukner, mpaukner@lessitermedia.com

TECHNOLOGY EDITOR

Noah Newman, nnewman@lessitermedia.com

ASSOCIATE EDITOR

Mackane Vogel, mvogel@lessitermedia.com

EDITORIAL ASSISTANT

Audrey Woods, awoods@lessitermedia.com

CONTRIBUTING EDITOR

Dan Crummett, dmc@dcrummett.com

PRESIDENT

Mike Lessiter, mlessiter@lessitermedia.com

MANAGER OF PRINT & MAGAZINE PRODUCTION

Christopher Nielsen, cnielsen@lessitermedia.com

MANAGER OF CREATIVE & DESIGN SERVICES

Jeff Lazewski, jlazewski@lessitermedia.com

LEAD PRINT DESIGNER

Lewis Horn III, lhorn@lessitermedia.com

DIRECTOR OF SALES

Steve Beyer, sbeyer@lessitermedia.com

SENIOR ACCOUNT EXECUTIVES

Darren Foster, dfoster@lessitermedia.com

Jim Semple, jsemple@lessitermedia.com

MEDIA ACCOUNT REPRESENTATIVE

Logan Fitch, lfitch@lessitermedia.com

SENIOR MANAGER OF DATA & EVENTS

Bree Greenawalt, bgreenawalt@lessitermedia.com

CLIENT SERVICES COORDINATOR

Téalin Robinson, trobinson@lessitermedia.com

VICE PRESIDENT OF AUDIENCE DEVELOPMENT

Patrick Sharpe, psharpe@lessitermedia.com

BRAND MANAGER

Luke Weigel, lweigel@lessitermedia.com

MARKETING COORDINATOR

Kayla Waukau, kwaukau@lessitermedia.com

DIGITAL MARKETING COORDINATOR

Ashley Miller, amiller@lessitermedia.com

VICE PRESIDENT OF FINANCE & ADMINISTRATION

Michael Storts, mstorts@lessitermedia.com

NO-TILL FARMER ADVISORY BOARD

Adam Fennig, Angela Knuth, Randall Reeder,

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ON THE COVER:



55.3% of surveyed no-tillers planted into a living cover crop last year, a decrease of nearly 16 points from 2022. Drought is likely to blame. Photos by Jeff Lazewski



Despite Drought, No-Tillers Show Steady Yields in 2023

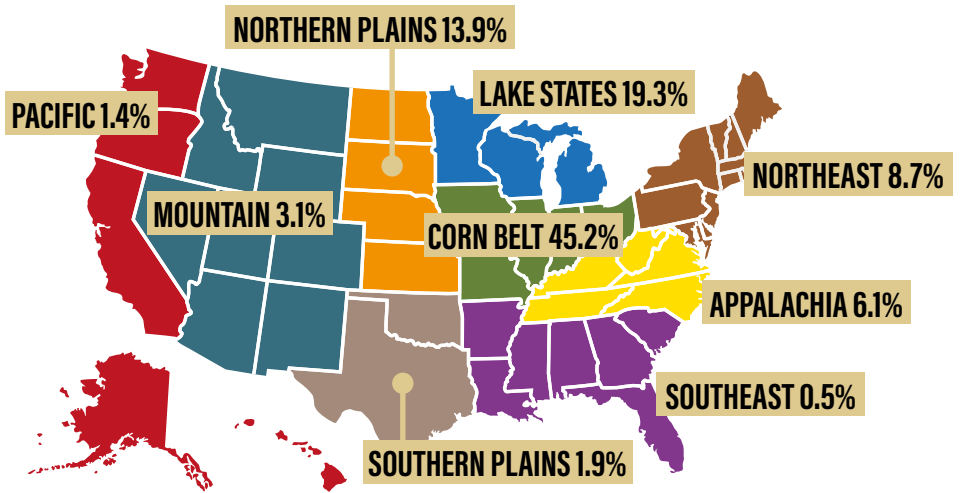
16th No-Till Operational Benchmark Study analyzes yields, planting practices & in-season management strategies of more than 400 U.S. no-tillers

By Laura Barrera, Contributing Writer

No-Till Farmer conducted its 16th annual No-Till Operational Benchmark Study at the end of 2023, and among the key findings were a significant pickup in fungicide application, cover crop use dropped slightly, and more no-tillers are keen to buy equipment after respondents experienced another year of strong yields.

Before diving into the results in the subsequent articles in this report, here's a look at the respondent demographics. The survey received 426 responses from growers across the U.S. Percentages represented in this report are based on the number of respondents for the individual question. The average no-tiller who responded to the benchmark survey is a little over 55 years old, with the majority (40.3%) being 65 or older. Those in the 55-64 age range make up the second largest group at 25.8%, followed by 45-54 (14.6%), 35-44 (11.2%) and 25-34 (7.6%). Less than 1% of respondents were under 25 years old. Given the average age, it's not surprising that nearly 60% have been no-tilling for at least 16 years, with 32.3% no-tilling for over 26 years.

NO-TILL BENCHMARK STUDY REGIONS



Farm Demographics

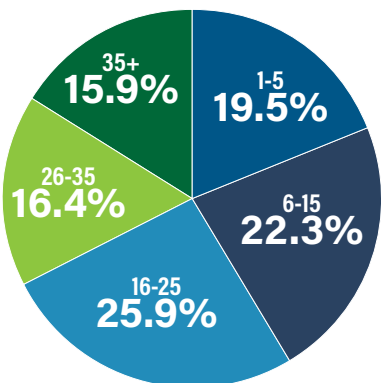
Most no-tillers are located in the Corn Belt (45.2%). Another 19.3% farm in the Lake states, while 13.9% are in the Northern Plains. Less than 10% of respondents were either from states in Appalachia, the Northeast, the Mountains, the Southern Plains, the Pacific, or the Southeast.

The average total farm size was lower than in previous years at 1,086 acres, and no-tilled acres were also a bit

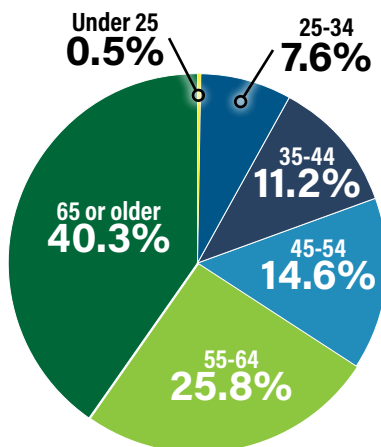
lower. The average number of no-tilled corn acres has decreased the last 2 years, from 446 in 2021 to 402 in 2022 to 342 in 2023. No-tilled soybeans are on a similar trend, down from 448 in 2021 to 433 in 2022 to 413 in 2023. No-tilled winter wheat clocked in at an average 411 acres in 2023, down from 572 in 2022 but up from 342 in 2021. Nationwide, winter wheat acreage is down across all tillage practices.

Corn was the most popular crop for no-tillers in 2023, with 88.3% of

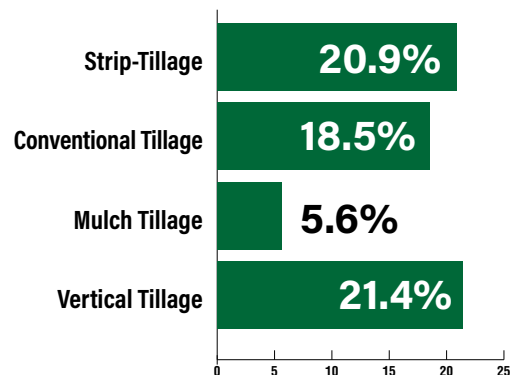
NUMBER OF YEARS NO-TILLING



AGE OF GROWERS



TILLAGE PRACTICES USED IN ADDITION TO NO-TILL



no-tillers growing it in 2023 (vs. 85% in 2022 and 82.4% in 2021). Soybeans were raised on 84.7% of no-tillers' farms, relatively unchanged from the past 2 years. Winter wheat's popularity fell slightly to 39.4%, after being at nearly 44% in 2021. 32.2% of respondents raised hay or alfalfa, 7.5% raised sorghum, 5.4% grew spring wheat, and 4% raised vegetables. Less than 2% grew cotton, canola, pulses, sugar beets, sunflowers or hemp. Nearly 19% reported raising a crop not listed.

In addition to no-tilling, 20.9% of respondents said they strip-tilled, which was a jump after declining in use from 2019-2022. Vertical tillage also saw a rebound to 21.4% last year, after dipping to 15.4% in 2022. 5.6% of no-tillers who responded to the survey mulch-tilled, and 18.5% still do some conventional tillage.

Steady Yields

No-tilled yields held steady in 2023, despite much of the country, especially the Corn Belt, experiencing a drought. The average no-tilled corn yield in 2023 was not even a bushel shy of the past 2 years' record-high averages of 185 bushels, at 184.3. That's 7 bushels higher than the 2023 USDA corn yield average of 177.3. East Troy, Wis., no-tiller Jim Stute attributed his good corn yields — some

2023 Average Corn Yields (in Bushels Per Acre)	
No-Till	184.3
Strip-Till	198.7
Vertical Tillage	204.2
Conventional/ Mulch Tillage	198.9
USDA Average (All tillage practices)	177.3


fields as high as 230 bushels per acre — to no-till's resiliency in helping his crop weather summer drought and early termination of his cereal rye cover crop.

"As soon as I planted, I terminated, and conserved all the moisture that was

2023 Average Soybean Yields (in Bushels Per Acre)	
No-Till	55.2
Strip-Till	67.5
Vertical Tillage	61.9
Conventional/ Mulch Tillage	58.2
USDA Average (All tillage practices)	50.6

yields of no-tillers' other tillage practices, vertical tillage had the strongest performance in 2023, with an average yield of 204.2 bushels per acre. Strip-till and conventional/mulch-tilled corn yields were nearly tied, averaging 198.7 and 198.9, respectively.

Strip-till had the highest soybean yield average of 67.5 bushels, which was also a 4-bushel increase from 2022. Vertical-tilled soybeans followed second with an average 61.9 bushels per acre, then conventional/mulch-till at 58.2.

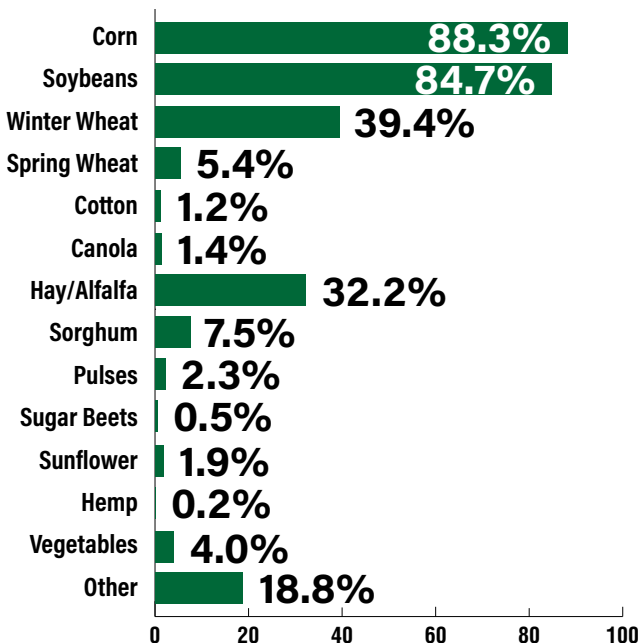
No-tilled soybeans yielded an average 55.2 bushels per acre, which was just over a bushel more than the 2022 average of 54 bushels and nearly 5 bushels above the 2023 USDA soybean yield average of 50.6 bushels. 

88.3% of no-tillers grew corn in 2023, making it the most popular crop...

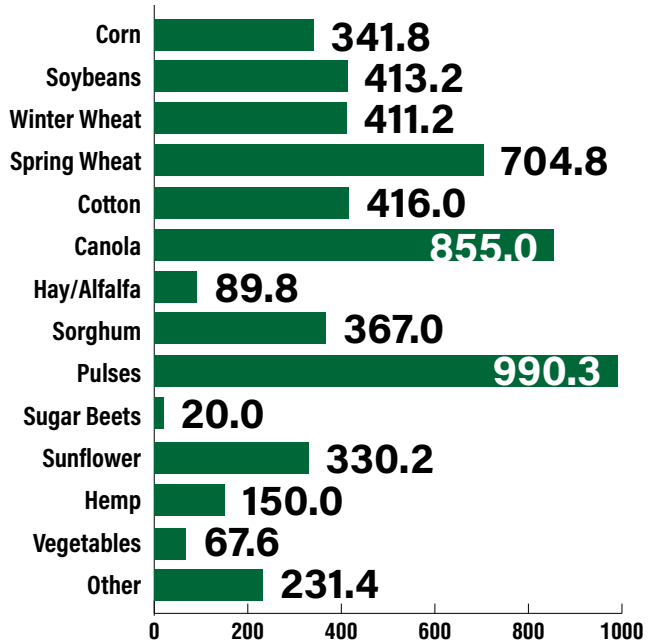
there," Stute says. "We used the cereal rye to dry out the seed bed and the residue to cut evaporative losses. This my 4th year using drought guard hybrids. I'm pleased at how they perform when it is so dry."

When comparing the average corn

CROPS RAISED IN 2023



AVERAGE NO-TILL ACRES OF EACH CROP



Herbicide Tank Mixes, Higher Nitrogen Rates Projected for 2024

While seeding & planting practices remained consistent, nearly half of no-tillers anticipate applying 0.8-0.99 pounds of nitrogen per bushel, an increase from 2023

By Laura Barrera, Contributing Writer

In 2023, no-tillers were consistent in their seeding and planting practices when compared to answers about the 2022 cropping season. The average no-till corn planting population in 2023 was 31,844, a slight decrease from 32,141 in 2022. The average no-till soybean population increased to 139,467 from 138,737. No-tillers did seed a higher population of soybeans when drilling (153,423) or air seeding (153,431), compared to the previous average seeding rate of 150,517.

But the number of no-tillers who use a drill or air seeder to plant soybeans is decreasing. 3/4 of no-tillers use a planter for their soybean crop, compared to 28.5% using a drill and 8.7% using an air seeder.

Those percentages are both down from 2022 by 5.6 and 0.8 percentage points, respectively. Forgey thinks the popularity of planting soybeans instead of drilling or air seeding them is

likely due to white mold, as planting in rows allows for more airflow between the plants and reduces disease pressure.

When it comes to row spacing on soybeans, just over half of no-tillers plant 15-inch rows, while 38.9% plant 30 inches and nearly 6% use 20 inches — all relatively unchanged from 2022. But the percent of no-tillers who are using an alternative spacing configuration, such as twin rows, 7½-, 22- or 36-inch spacings, nearly doubled — from 5% in 2022 to 9.1% in 2023.

For corn, 30 inches remains the most popular row width, with 88.4% of no-tillers using this spacing, although that is down slightly from the 90.5% in

the 2022 survey. The next most popular corn row spacing is 36 inches (3.5%), followed by 20 inches (2.9%), 15 inches (2.6%) and 22 inches (1.9%).

Use of a planter for soybeans may also explain why the number of no-tillers owning and using a drill is down 8.5 percentage points from 2022, while those owning and using a no-till planter is up slightly, from 88.6% to 90.2%. Another equipment shift is that nearly a quarter of no-tillers are using a vertical tillage rig, up about 5.5 percentage points from 2022, to 23.7%. That tracks with the percentage of no-tillers who are vertically tilling, which increased by 6 percentage points from last year.

Forgey is a little disheartened to see in increase in vertical tillage because

he thinks it's one of the most devastating things that a no-tiller can do to their soil. But he also knows someone who used vertical tillage to dry out their ground so they could plant their crop. The farmer saw a 20% yield hit, but without vertical

tillage, he wouldn't have gotten his crop planted.

"It's all a trade off," Forgey says. "You can't say you should never do it, but if a grower doesn't have to, I don't think you should."

Shying from Atrazine

Glyphosate is still the most popular herbicide among no-tillers, as 82.3% used it on their corn and 84.8% applied it to their soybeans, similar percentages to what was reported in 2022. While atrazine was still the second pick for corn, there was a 6.6-point drop in the number of no-tillers applying it, from 72.6% to 66%. Use of remaining her-

AVERAGE NO-TILL CORN PLANTING POPULATION

31,844

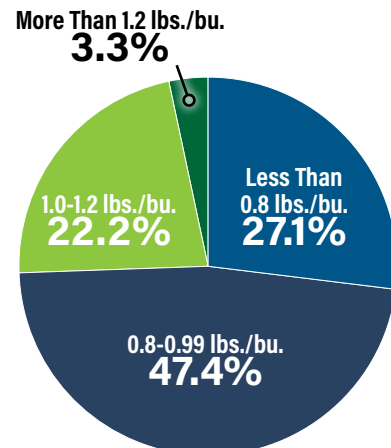
AVERAGE NO-TILL SOYBEAN PLANTING POPULATION

139,467

bicides in corn were only up or down slightly from 2022. Forgey suspects the change in atrazine use may be due to concerns around runoff.

"There's a lot of bad press about atrazine in the groundwater," he says. "The other thing is, just like glyphosate, it might be overused enough that it has decreased in efficiency."

ANTICIPATED NITROGEN APPLIED TOWARD 2024 NO-TILL CORN YIELD GOAL



If a grower doesn't have to vertical till, I don't think you should...

55.3%

PLANTED GREEN IN 2023

AVERAGE ACRES PLANTED GREEN IN 2023

405

On soybeans, 2,4-D was the second most popular herbicide, with more than half (51.4%) of no-tillers applying it. This marks an increase of 6.7 points from 2022. Glufosinate use also increased in soybeans, from 25.1% in 2022 to 34.4% in 2023. The only herbicide that saw a slight drop in use was dicamba. Just over 22% of no-tillers applied it, a 1.7-point decrease.

On top of glyphosate being the most common herbicide, the vast majority (83.7% for corn and 80.2% for soybeans) of no-tillers only use other herbicides when they are tankmixed with glyphosate. Only 12.7% of corn growers and 12.4% of soybean growers use other chemistries in rotation with glyphosate, while less than 5% don't use glyphosate at all.

Forgey is not surprised by this. He recently attended a meeting with North Dakota State University (NDSU) weed scientist Brian Jenks, who shared that NDSU studies from the past 2 years show growers gain performance on all of their chemicals when they mixed more than one mode of action together.

"I don't know anybody that makes just a single trip with glyphosate alone," Forgey says.

As for the seed that no-tillers are choosing, Roundup Ready remains the most popular corn hybrid, with 83%

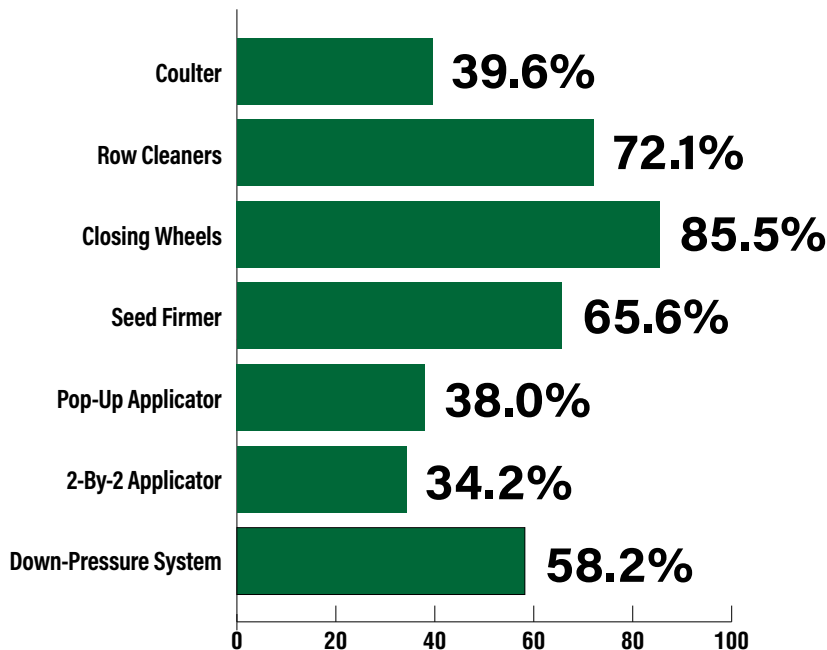
of no-tillers planning to plant it this year. Just over 1/3 (33.5%) will plant LibertyLink corn hybrids, a 5-point increase from 2023, while seed containing a corn rootworm or European corn borer trait both tied for third, with 32% of no-tillers choosing these hybrids, similar to what was planted in 2023. A little over 13% will plant a non-GMO hybrid, which is down from the 20.1%

last year. 8.5% will plant Enlist corn, which saw a 3-point drop from 2023.

When it comes to soybean varieties, Enlist is the most common seed choice, with 69.9% planning to plant it in 2024. Roundup Ready followed second

at 39.7%, and nearly a quarter (24.6%) will plant Dicamba-tolerant varieties. It's important to note that this survey was conducted in December 2023, about 2 months prior to a federal court ruling that found the EPA violated procedures mandating public input when it reauthorized dicamba registration in 2020. LibertyLink is the fourth most popular soybean variety, with 22.4% planning to plant it this year, and nearly 9% will plant non-GMO.

NO-TILL PLANTER ATTACHMENTS IN USE



Less than 2% of growers will plant another soybean variety.

Input Applications

One slight shift is a greater percentage of no-tillers plan on applying more

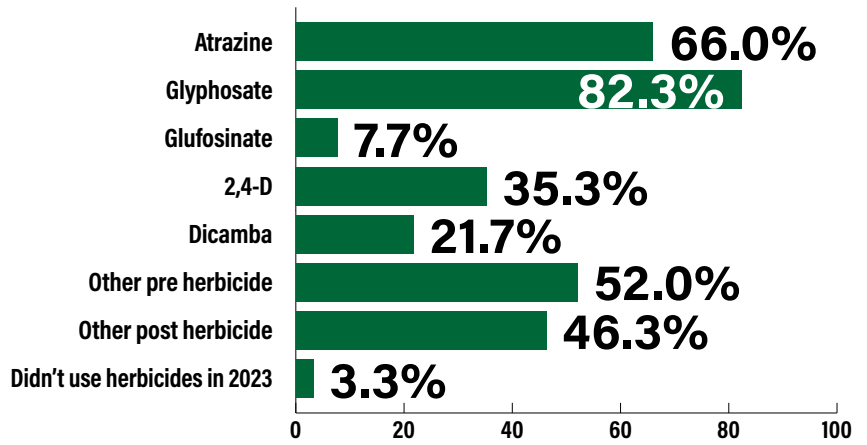
Foliar Fungicide Applications By Crop

Corn	73.7%
Soybeans	66.3%
Winter Wheat	32.0%
Spring Wheat	2.3%
Hay/Alfalfa	1.1%
Canola	0.6%
Sorghum	0.6%
Pulses	0.6%
Cotton	0.0%
Hemp	0.0%
Sugar Beets	0.0%
Sunflower	0.0%
Vegetables	0.0%
Other	3.4%

Glyphosate Application Timing		
Corn	Fall Burndown	2.6%
	Spring Burndown	56.1%
	Pre-Emerge	25.8%
	Post-Emerge	63.1%
	Harvest Aid	0.0%
Soybeans	Fall Burndown	1.8%
	Spring Burndown	51.3%
	Pre-Emerge	20.3%
	Post-Emerge	63.5%
	Harvest Aid	0.0%

Using Other Chemistries with Glyphosate		
Corn	Tankmix with Glyphosate	83.7%
	Rotated with Glyphosate Sprays	12.7%
	Exclusively (No Glyphosate on Farm)	3.5%
Soybeans	Tankmix with Glyphosate	80.2%
	Rotated with Glyphosate Sprays	12.4%
	Exclusively (No Glyphosate on Farm)	4.9%

HERBICIDES USED FOR CORN IN 2023



nitrogen (N) in 2024 than they did in 2023.


Nearly half of no-tillers (47.4%) plan on applying 0.8-0.99 pounds of N per bushel of their targeted corn yield goal. Although the majority (42.6%) of 2022 survey respondents fell in this range, another 34.1% planned on using less than 0.8 pounds per bushel for their 2023 corn, while only 27.1% plan to do so in 2024. Those planning to apply 1-1.2 pounds per bushel stayed around 22%. Only 3.3% say they will apply more than 1.2 pounds of N per bushel, but that number was 0.9% in 2023.

Despite the trend to use more N, those planning to use a nitrification inhibitor or N stabilizer did drop slightly. 58.8% said they would use one in 2023, while only 56.5% intend to in 2024.

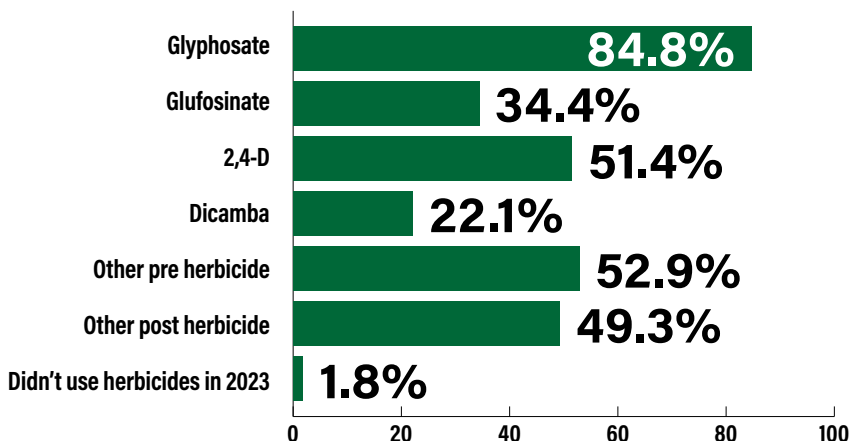
The number of no-tillers who plan to spring pre-plant N increased slightly, up to 39.3% vs. 37.5% in 2023. Most no-tillers will still sidedress N (66.3%) and apply at-plant (63%). Only 10% will foliar-apply N, while

15.9% already applied N in the fall.

Application of foliar fungicides practically doubled in 2023 for corn, soybeans and winter wheat compared to 2022. In corn, 73.7% of no-tillers made a foliar fungicide application last year, compared to 38.1% in 2022. Nearly 2/3 of no-tillers applied them to their soybeans vs. 34.8% the previous year, and nearly 1/3 of winter wheat growers sprayed them, compared to 15.8% the year before.

Biological use remains steady with 51% of growers planning to use products that claim to increase soil and/or plant biological activity in 2024, a slight tick up from 50.2% in 2022. But participating in a carbon credit program is not a top priority for most no-tillers. Over half of no-tillers said they do not plan to participate in one this year, compared to 17.7% who said they will. That percentage fell from the 20.5% who were participating in a program in 2022. The remaining 27.5% of surveyed no-tillers are still on the fence about joining one. 

HERBICIDES USED FOR SOYBEANS IN 2023



Healthy Soil, Healthy Profit

Montag precision metering equipment has gained a reputation for bringing accurate seed and fertilizer application to today's farm operations. This has resulted in two significant occurrences: major cost benefits and rewards from improved conservation practices. Farm operations from small to very large are employing the technology provided by Montag equipment to achieve their yield goals in any type of tillage. Major improvements, however, are realized with banding fertilizer in no-till and strip-till plantings. Original equipment manufacturers as well have boarded the Montag bandwagon and are designing more of their tillage and planting tools to be "Montag ready." Montag metering equipment can be mounted on many implements, or towed behind on Montag auto-steer carts that follow in the same wheel tracks on any terrain. These carts are capable of carrying multiple tons of dry fertilizer behind implements that are not designed for that load.

From the conservation perspective, Montag equipment is the ideal partner for banding fertilizer, minimizing run-off and thereby protecting streams, rivers and lakes. This is an issue that is focusing much attention on the agriculture industry of late, and likely to become more intensified in the near future. Another conservation benefit comes from the Montag ability to meter cover crop seed during tillage, or in standing crops. In a partnership with John Deere and Hagie, Montag has introduced the Fortifier system integrated onto a Hagie platform to deliver cover crop seed and/or side-dressed nutrients below the soybean canopy and into tall corn. Field measurements show an amazing 99%+ row-to-row accuracy.

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MonTag



Model 2224

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- Configure drives
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podcasts/Montag](https://www.farm-equipment.com/podcasts/Montag)**

Montag Mfg. Inc.

Iowa Location
Emmetsburg, Iowa
Nebraska Location
Seward, Neb.
Phone: 712-517-2775
Email: info@montagmfg.com
Website: MontagMfg.com

Contacts

Roger Murdock
Director of Sales & Marketing

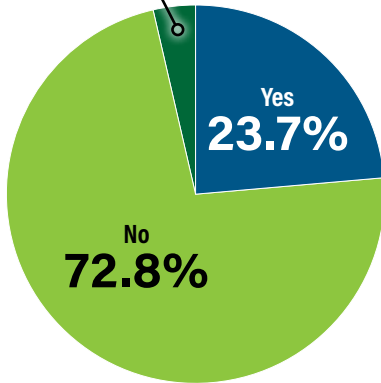
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USING VARIABLE-RATE SEEDING FOR CORN

No, but planning to in 2024

3.6%



Residual Herbicide Application Timing

	Residual Herbicide Application Timing	
	Application	Percentage
Corn	Burndown	34.6%
	Pre-Emerge	46.8%
	Post-Emerge	51.8%
	Didn't Use	7.3%
Soybeans	Burndown	38.5%
	Pre-Emerge	41.5%
	Post-Emerge	49.5%
	Didn't Use	9.3%

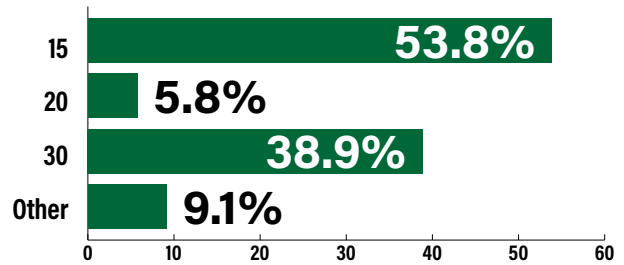
Number of Rows on Corn Planter

Number of Rows	Percentage
6	16.9%
8	11.9%
12	28.4%
16	27.3%
24	11.5%
36	1.4%
48	0.7%
Other	4.3%

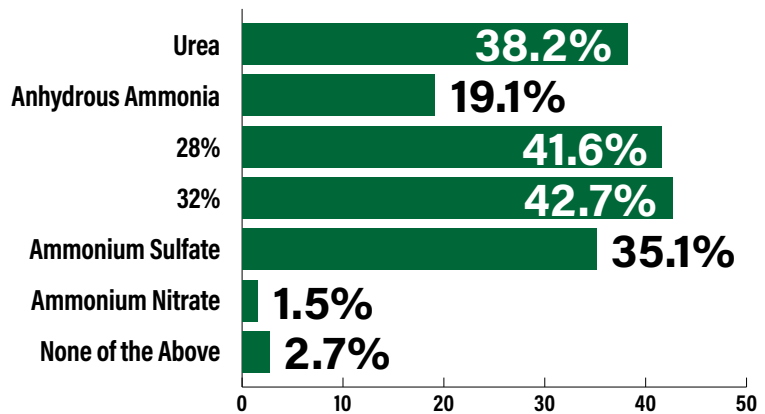
Anticipated Macro & Micronutrient Applications for 2024 Soybean Crop

Sulfur	70.7%
Boron	40.2%
Zinc	38.9%
Manganese	24.5%
Calcium	18.3%
Magnesium	15.7%
Molybdenum	12.7%
Copper	10.0%
Iron	9.2%
Chloride	1.3%
Other	1.7%
None	21.0%

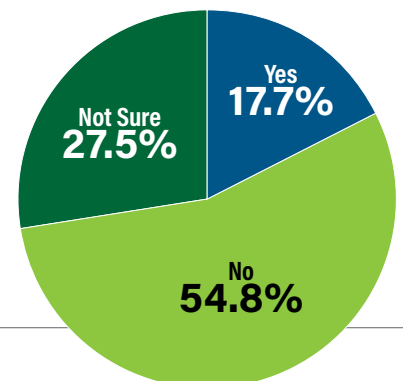
ROW SPACING FOR SOYBEANS



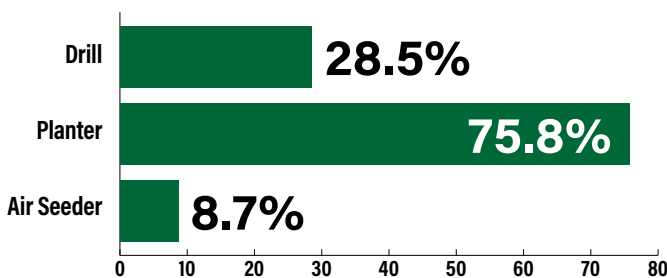
FORMS OF NITROGEN PLANNED FOR 2024 CORN CROP



CARBON CREDIT PROGRAM PARTICIPATION IN 2024



EQUIPMENT USED FOR NO-TILLING SOYBEANS



Purchase Plans Double for Most Types of Equipment

Several profitable years have no-tillers ready to buy drills, planters, vertical tillage tools & more

By *Laura Barrera*,
Contributing Writer

A trend of solid yields is likely why more no-tillers are planning to buy equipment this year. Compared to 2023, more than double the number of growers will purchase a drill (17.5% vs. 8.4%), planter (29.2% vs. 10.9%), strip-till rig (13.3% vs. 5.2%), vertical-till rig (11.7% vs. 3%), fertilizer applicator (8.3% vs. 3.7%) and pull-type sprayer (9.2% vs. 2.5%) in 2024. The percent of those planning to purchase an air seeder is also up from 4.5% in 2023 to 5.8% in 2024.

Changing Demographics

While a lot of it is likely due to several profitable years recently and accelerated depreciation, Dan Forgey, a 2022 No-Till Innovator award recipient and agronomy manager of Cronin Farms near Gettysburg, S.D., also thinks it's partly driven by the shift to larger farms.

"We're losing a lot of older farmers," he says. "It's unbelievable how growth has come about out here and how fast some farms are growing."

He's seeing a lot of farmers who were working with a 40-foot drill now going to 60-foot drills to accommodate the larger acreage they have.

Precision Picks Up

Use of precision technology also continues to grow. Compared to 2022, more no-tillers plan to use all categories of precision technology listed in the survey (see chart), with the exception of variable-rate fertilizer. Only 31% of no-tillers are going to variable-rate their fertilizer in 2024, compared to 35.1% in the 2022 survey.

GPS tractor auto-steer remains the top precision tech tool, with 69% of no-tillers planning to use guidance in 2024, a near 9-point increase from

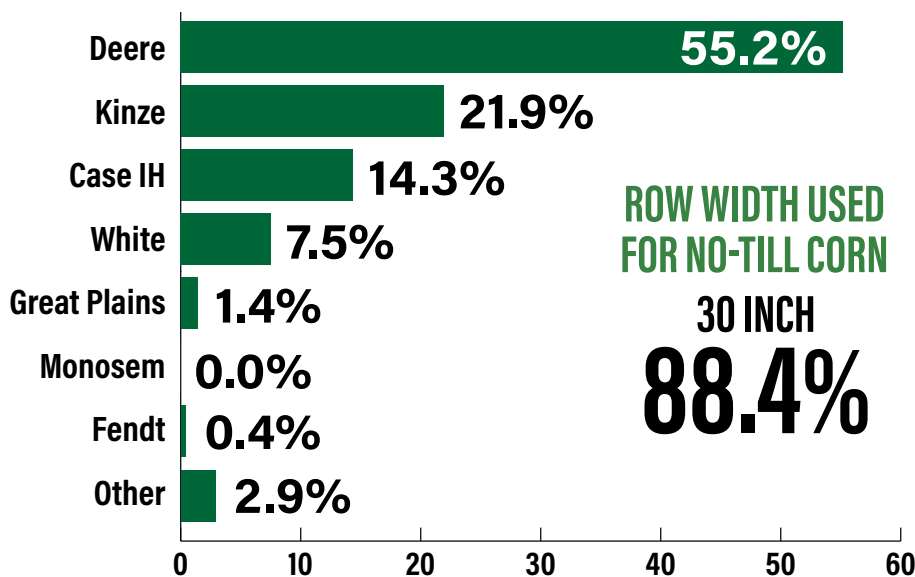
60.5%. Over half (56.7%) will use yield monitor data analysis, a 10-point increase from 2022. Nearly half of no-tillers will use auto-boom or nozzle

shutoffs, followed by field mapping (46.3%) and auto seed shutoff (41%).

Forgey is not surprised by the increasing popularity of precision ag, as its use has been aggressively adopted and used in his region for a long time.

A trend of solid yields is likely why more no-tillers are buying equipment this year...

PLANTER BRANDS USED FOR CORN



ROW WIDTH USED FOR NO-TILL CORN
30 INCH
88.4%

2024 Equipment Purchase Plans


Planter	29.2%
Drill	17.5%
Strip-Till Rig	13.3%
Draper Header	14.2%
Vertical-Till Rig	11.7%
Self-Propelled Sprayer	11.7%
Pull-Type Sprayer	9.2%
Fertilizer Applicator	8.3%
Air Seeder	5.8%
Roller Crimper	5.8%
Pull-Type Fertilizer Spreader	4.2%
Stripper Header	1.7%

“I would guess right now that 75% of the acreage in these 2 counties are variable-rate application,” he says.

He figures at least 1 acre on each end of the field gets overlapped if

I don't think it takes much for precision technology to pay for itself...

technologies like auto-shutoff and row guidance are not in use.

“I don't think it takes very much for it to pay for itself,” he says. “I believe that's a trend that's nothing but better for farming because it makes you so much more efficient.” 

Equipment Owned & Used

Planter	90.2%
Drill	58.3%
Self-Propelled Sprayer	42.7%
Pull-Type Sprayer	32.2%
Draper Header	31.9%
Fertilizer Applicator	24.1%
Vertical-Till Rig	23.7%
Air Seeder	19.7%
Pull-Type Fertilizer Spreader	19.7%
Strip-Till Rig	15.9%
Roller Crimper	13.2%
Stripper Header	7.5%
Other	2.0%

Precision Technology Usage in 2024

GPS Tractor Auto-Steer	69.0%
Yield Monitor Data Analysis	56.7%
Auto-Boom/Nozzle Shutoffs	47.0%
Field Mapping	46.3%
Auto Seed Shutoff	41.0%
Variable-Rate Fertility	31.0%
Satellite Aerial Imagery	27.3%
GPS Guidance-Lightbar	26.7%
Variable-Rate Seeding	26.0%
GPS Implement Guidance	18.3%
Drones	17.0%
Remote Sensing	3.0%
None Of The Above	8.7%

2023 Average Operational Expenses

	Average	Max
Fuel	\$18,040	\$400,000
Land Rent	\$67,192	\$480,000
Seed/Seed Treatments (Cash Crops)	\$39,669	\$270,000
Cover Crop Seed	\$6,646	\$53,000
Pesticides/Crop Protection	\$33,472	\$200,000
Fertilizer	\$54,261	\$300,000
Lime/Soil Amendments	\$4,145	\$40,000
Precision/Technology Services & Equipment	\$5,789	\$100,000
Equipment Purchases	\$66,047	\$600,000
Machinery Service/Parts	\$21,573	\$151,000
Custom Application/Hauling	\$9,682	\$290,000
Labor	\$25,161	\$350,000
Crop/Property Insurance	\$20,572	\$280,000
Loan Payments/Interest	\$36,090	\$500,000

2024 Average Operational Expense Estimates

	Average	Max
Fuel	\$15,274	\$200,000
Land Rent	\$55,707	\$480,000
Seed/Seed Treatments (Cash Crops)	\$40,757	\$300,000
Cover Crop Seed	\$6,291	\$40,000
Pesticides/Crop Protection	\$34,006	\$200,000
Fertilizer	\$54,243	\$300,000
Lime/Soil Amendments	\$4,500	\$60,000
Precision/Technology Services & Equipment	\$8,099	\$500,000
Equipment Purchases	\$46,991	\$1,000,000
Machinery Service/Parts	\$18,835	\$120,000
Custom Application/Hauling	\$6,781	\$85,000
Labor	\$23,256	\$375,000
Crop/Property Insurance	\$27,171	\$300,000
Loan Payments/Interest	\$37,093	\$500,000

Drought Likely Cause of Decline in Cover-Cropped Acres

Survey finds seeding strategies, proper growth among top challenges for no-tillers using cover crops

By Laura Barrera, Contributing Writer

The number of no-tillers planting cover crops slightly dropped in 2023. While almost all respondents have experimented with cover crops at some point — only 1% said they have never used cover crops — 80.3% seeded cover crops in 2023, a near 3-point decrease from the 83.2% that used them in 2022. However, the 2024 number is still higher than 76.9% who seeded them in 2021. Last year also ended a previous trend of no-tillers cover cropping an average 500-plus acres. The 2023 average was 7 acres shy at 493.

Erin Silva, University of Wisconsin-Madison professor and state extension specialist in organic and sustainable cropping systems, suspects the slight decrease was likely due to drought.

“Soil water management, particularly with cereal rye and the dry conditions experienced across much of the upper Midwest in 2023, was critical in considering the best management of cover crops,” she says. “Planting into extreme dry conditions can be very detrimental to crop performance.”

Cereal rye was no-tillers No.1 choice of cover crop, with 74% of no-tillers seeding it in 2023. Radishes followed at 37.3%, then oats at 33.6%, and nearly a quarter planted rapeseed. Wheat rounds out the top 5 species chosen for cover cropping, with 23.3% of growers seeding it.

Dry conditions were also likely to

blame for the decrease in no-tillers who planted green in 2023. Over half (55.3%) of survey respondents planted either soybeans (74.1%) or corn (65.6%) into a living cover crop last year, a decrease of nearly 16 points from 71% in 2022. The average number of acres planted green in 2023 was also down to 405 acres from 481 acres.

“As of now, the general recommendation with dry conditions is to terminate earlier rather than later, as the more that cereal rye puts on biomass, the more

moisture is pulled from the soil profile,” Silva says.

Of those planting corn on cover-cropped fields, 43.1% terminated their cover crops before planting, 16.6% did so at planting and 34.4% terminated after planting.

With soybeans, 38.1% terminated covers before

planting, 14.8% at planting and 53.3% after planting.

Herbicides are the most popular cover crop termination method, with 89.3% of cover croppers using this method in 2023. Winterkill followed second with 15.2% using species that will naturally die off. 9% use a roller crimper, followed by mowing (6.9%), grazing (5.5%) and tillage (4.2%). Nearly 7% of cover crop users don't terminate their cover crops.

The majority of no-tillers (75.3%) seed some of their cover crops after harvest. Just over a quarter (25.7%) seed at harvest, while 21.9% seed pre-harvest into the crop. Silva suspects the drought in 2023 could have pushed crop harvest back, shifting some of the

timing windows typically available for cover cropping.

Timely Seeding Strategies

Seeding timing appears to be the biggest challenge for no-tillers planting

80.3%
OF NO-TILLERS SEEDED
COVER CROPS IN 2023

493
AVERAGE TOTAL
ACRES OF COVER CROPS
SEEDING IN 2023

74.7%
USED MULTI-SPECIES
MIXES IN 2023

Top Cover Crop Species Seeded 2023

Cereal Rye	74.0%
Radishes	37.3%
Oats	33.6%
Rapeseed	24.0%
Crimson Clover	23.3%
Wheat	23.3%

The general recommendation with dry conditions is to terminate covers earlier rather than later...

cover crops. Most no-tillers indicated that getting fall growth was one of their top 3 challenges, followed by timely planting and establishing covers before frost.

Silva suggests that no-tillers develop strategies to expand their seeding windows so they can adapt in years where the weather may not be cooperating, such as interseeding into standing crops via aerial application or a highboy seeder.

No-tillers may even want to consider seeding earlier. Silva says on-farm research has proven that growers can get good establishment when cover

crops are interseeded into corn at V3, a growth stage that's a bit earlier than previous recommendations. Just shy of 20% of no-tillers interseeded their covers in 2023, and only 3.4% interseeded into an early emerging crop.

"Earlier interseeding allows for more establishment of the cover crop and more growth," she says, adding that researchers haven't seen any negative impact

on corn yields by interseeding earlier.

Silva says one change that she's seeing growers make to allow for greater cover cropping is widening their corn rows to anywhere from 45-60 inches, while maintaining the same plant population used on a typical 30-inch row system. University of Wisconsin-Madison research found wide-row corn for grain and silage yielded within 10% of typical row spacing.

She's also optimistic that there will be more interseeding equipment options available at reasonable price points in the near future. According to the benchmark survey, the most popular method for interseeding in 2023 was aerial seeding with an airplane or helicopter, used by 32.7% of no-tillers who interseeded. 20% opted for an interseeding device or toolbar, while broadcast spreading or using a drill tied for third most popular method in 2023 at 18.2%.

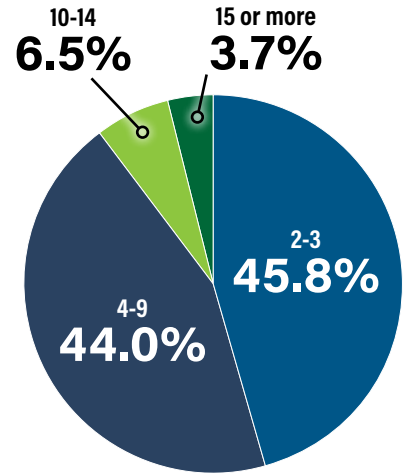
New Varieties

An upcoming development that should help with some of the cover-cropping challenges are new cover crop seed varieties bred for different applications.

"Cover crop breeding is something we're seeing


Seeding timing appears to be the biggest challenge for no-tillers planting cover crops...

MAXIMUM NUMBER OF SPECIES USED IN COVER CROP MIXES IN 2023

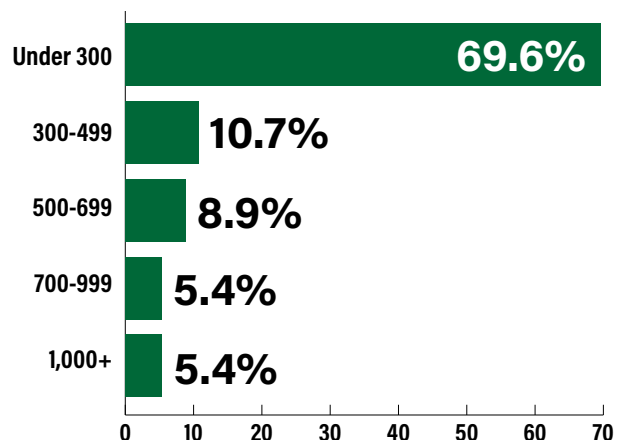


more investment in, including university and USDA positions specifically," Silva says.

Within the next couple years, she expects release of new legume varieties like hairy vetch and Austrian winter peas with increased winter hardiness. There's also breeding going on that will allow cover crops to establish under shadier conditions, which should help no-tillers see more success with interseeding.

"I think farmers should keep their eyes on seed catalogs, and instead of getting a Variety Not Stated (VNS), look specifically at what cover crop varieties are out there and what traits are associated with those varieties," Silva says. 

ACRES INTERSEEDED WITH COVER CROPS IN 2023



Equipment Used to Seed Cover Crops in 2023	
Drill	52.7%
Broadcast Spreader	21.2%
Air Seeder	15.4%
Airplane/Helicopter	15.4%
Planter	8.9%
Vertical Tillage Tool	8.6%
Interseeder Device/Toolbar	3.8%
Drone	3.4%
Highboy/Self-Propelled Sprayer	3.1%
On-Combine Seeder	2.4%
Pull-Type Sprayer	0.0%
Other	2.7%



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