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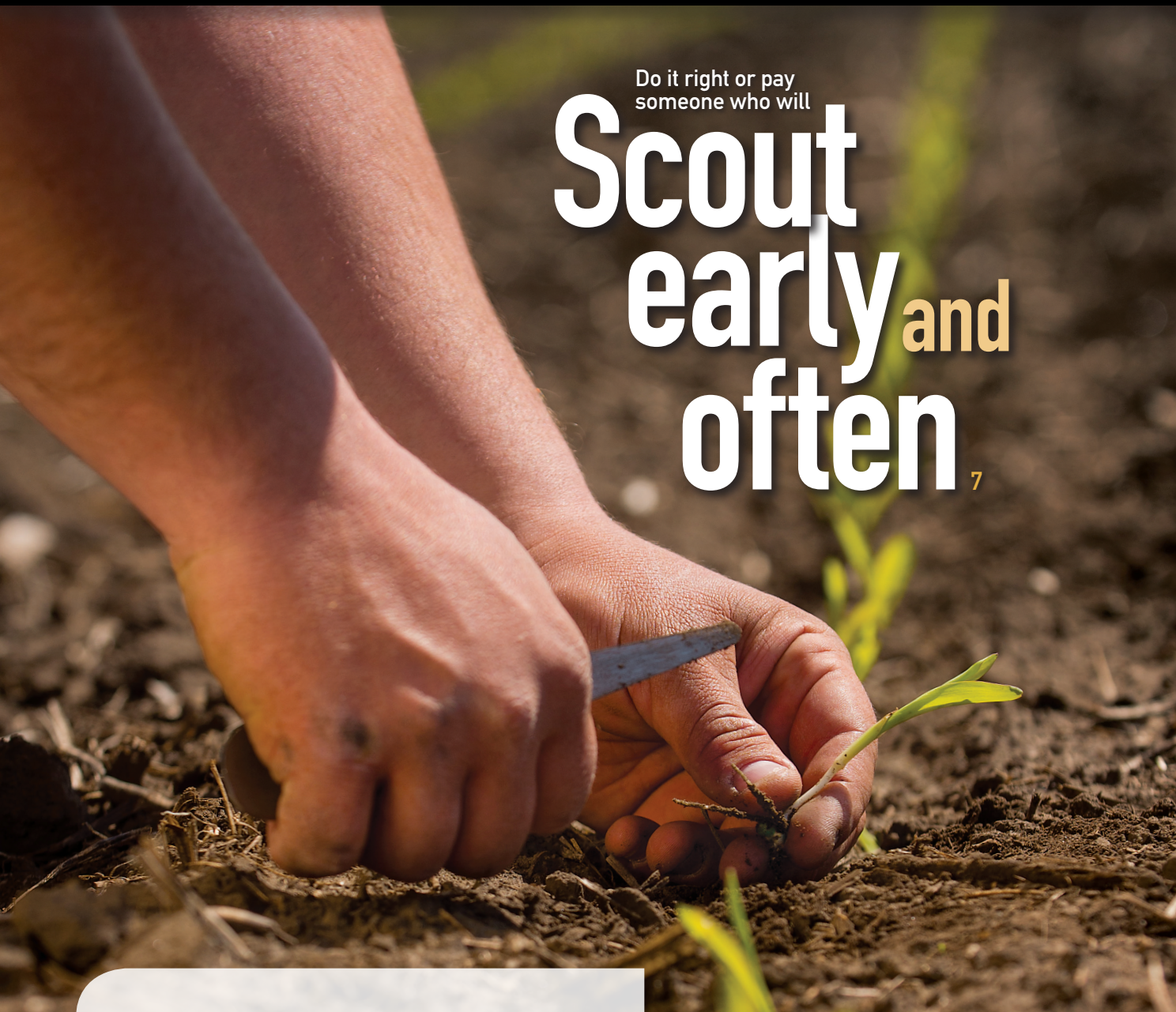
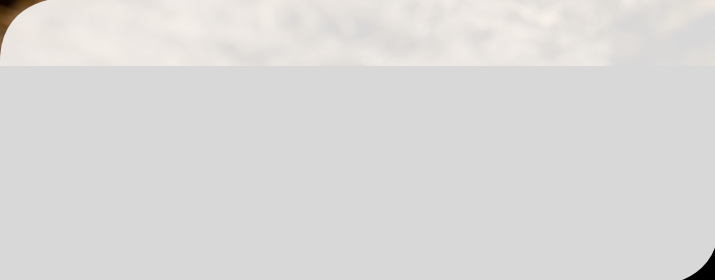
CORN+SOYBEAN

APRIL 2013

DIGEST®

Do it right or pay
someone who will

Scout early and often⁷

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Kurt
Lawton



think different

Mind your traits

Resistant weeds. Resistant rootworms. Who's at fault? Biotech traits, nature or you?

Genetic visions of grandeur were hailed from the very beginning. I remember visiting numerous biotechnology labs from Boston to St. Louis to San Francisco back in the 1980s to write one of the first futuristic stories (for sister magazine *Farm Industry News*) that detailed how this genetic technology was predicted to move crops and farming forward. Claims were amazing and unbelievable – visions that crops could reduce or eliminate pesticide use because of altered genetics.

Fast-forward to the mid-1990s; such visions became reality. Hundreds of millions of dollars in breakthrough research delivered the first soybean varieties that could tolerate glyphosate. This genetic technology changed an entire industry and made complex weed control simple with a safer lower-dose product. Roundup Ready soybeans became the fastest adopted and most widely used technology in the history of agriculture.

Next came impressive Bt corn hybrids that could safely kill the costly corn borer when it ingested some of the plant. This technology wiped out this insect across tens of millions of corn acres, and was widely and rapidly adopted. And in the South, Bt cotton also drastically reduced pest issues and chemical use.

Such success with biotechnology made farming easier, and was a main driver to expand farm size. Unfortunately, as predicted by some entomologists and agronomists, too much of a good thing led to overuse and improper management of these technologies (by both companies and farmers). Nature began to fight back.

In this issue, we examine another biotech Bt corn designed to kill rootworms, the most economically damaging pest to corn (see page 22). Just four short years after introduction, university entomologists found rootworms that could survive one Bt-RW trait. Fortunately, we've learned that continuous corn and continuous use of a single Bt-RW trait is the main culprit, and solutions are being implemented. But we're also seeing too much root feeding of other Bt-RW traits when rootworm populations are high.

Did previous successes with biotechnology (prior to Bt-RW hybrids) raise expectations of success and trust among farmers? Absolutely. But did farmers let their guard down and walk too far away from examining the lower-dose rootworm technology after planting? Or choose to not totally abide by recommended refuge rules? Only you can answer that. And did the EPA accept too small of a refuge acreage size or too distant a location – that may have added to the problem? Some entomologists think that is true.

In the end, further research will likely show fault among companies, traits, nature and farmers. And it will take proper action among all stakeholders to try and overcome what Mother Nature will continue to throw at new technologies. Like she always has.

I sincerely thank you for reading and for being willing to Think Different.

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letters

Farmers can solve their own problems

Dear Editor,

I am writing to compliment you on your January cover story, "The Brown Revolution: Profit from soil organic matter" (<http://bit.ly/T85yGf>). This is exciting to read.

After working with Iowa watershed groups of farmers who voluntarily set water-quality goals, this is the kind of information that we need to make strides in farmer-led efforts to improve water quality.

Before I retired, I facilitated farmer-led local watershed water quality groups. When surveyed, 92% of these farmers who had reduced their N and P contributions to streams said this also increased their profitability. They did this through reduc-

ing their phosphorus index, improving their soil condition index and lowering water nitrate levels through reduced tillage, calculating manure N credits, stalk nitrate tests and other BMP tools. The groups were the Hewitt Creek, Lime Creek and Coldwater-Palmer Creek

Iowa watersheds participating in an Iowa Extension Performance-Based Environmental Management program, where local farmers set watershed water-quality goals, incentives and priorities. By providing farmers the tools to assess their N and P use, they fixed the problem at a grassroots level and increased their profitability without regulation. (One example of this approach is at <http://bit.ly/W9pxCh>.)

Research found this voluntary grassroots approach to be six times more cost effective than a more top-down approach, without cost to the taxpayer. The program continues through Iowa Extension, providing technical expertise and education on agronomic practices and environmental performance measures available, without telling farmers what to do.

Farmers working in these watershed groups are quick to learn and enthusiastic about carrying the soil health message forward, they just need the tools and education to do so.

John Rodecap

Retired Iowa Extension
watershed project coordinator
Decorah, Iowa

Bee article oversight

Dear Editor,

Edith Munro's article on bees (p. 56 and 57 of the January issue, <http://bit.ly/UxPDk0>) did not touch at all on the reason why this threat to bees is happening: The air planters are the worst thing in the world to spread seed treatments. This is much, much more important than anything else in the article. Industry needs to be more responsible with its exhaust air.

The excess dust/seed coating attached to the seed rubs off as you suck and pull the seed through the air planter, and it's expelled into the air.

Bee colonies are hard to replace. I only recently realized that bees are so important that they are hauled from Indiana to California to pollinate almond trees.

The agricultural industry needs to put some kind of filter on that air planter exhaust air.

I'm not against the industry using air to move seed, I am advocating that we protect the atmosphere from the exhaust with a filter.

Mark Spurgeon

Seymour, Ind.

True vertical tillage

Dear Editor,

The article "Soil Warmer" by Liz Morrison, in your December issue (<http://bit.ly/ToMYqe>) was very interesting and well written. I am a farmer that started no-tilling 37 years ago; and 10 years ago I started using true vertical tillage with my homemade machine, that has blades different from any other blades that are on the 33 other machines on the market today classified as vertical tillage. I also believe that some of the machines are doing horizontal tillage, by disturbing all of the topsoil.

True vertical tillage is a hot topic these days and I know that with it, and cover crops feeding the soil animals, I am building soil faster than no-till alone. Keep up the good work of reporting about the true vertical tillage research.

Henry J. Falk

Effingham, Kan.

Corn & Soybean Digest welcomes your letters. Please send them to csd@csdigest.com or Editor, Corn & Soybean Digest, 7900 International Drive, #650, Minneapolis, MN 55425.



august
2013



headlands



Use Social Media to Connect with Consumers

Michele Payn-Knoper, founder, Cause Matters Corp., talks about how farmers can use social media to tell their stories and connect with consumers and those concerned about food.

"In today's time of information overload, it's about the one-on-one human connection," says Payn-Knoper. "Whether it happens through Facebook or Twitter, or in your shaking hands in your church parking lot, there are a lot of different ways to have that productive, civil conversation."

Bullish corn story might be developing in the far east

Chinese weather is becoming a little more of a concern. In particular I am hearing there could be a few weather worries popping up for Chinese corn producers. Nothing as of yet to get overly excited about, but we do have to recognize the fact China is the world's second largest corn producer, any type of production glitch will certainly cause extreme ripples across the market, especially since very few are looking that direction. From what I hear producers in China's north-east corn belt are running a couple of weeks behind in planting. This area is important because it produces about half of China's domestic supply. In fact, Heilongjiang, the top corn producing province, has had its wettest winter in 50 years, leaving more than 12 million acres extremely wet. On flip side some areas to the northwest are too dry and are starting cause some concern as it threatens emergence. Bottom-line, with China's domestic corn production being critical the market could quickly get more nervous if weather issues become a more threatening concern.

Supreme Court Rules in Favor of Monsanto

The Supreme Court has ruled in favor of Monsanto in the case of *Bowman v. Monsanto*, saying, "Patent exhaustion does not permit a farmer to reproduce patented seeds through planting and harvesting without the patent holder's permission."

Justice Kagan delivered the court's decision. "Under the doctrine of patent exhaustion, the authorized sale of a patented article gives the purchaser, or any subsequent owner, a right to use or resell that article. Such a sale, however, does not allow the purchaser to make new copies of the patented invention. The question in this case is whether a farmer who buys patented seeds may reproduce them through planting and harvesting without the patent holder's permission. We hold that he may not."



"Farming looks mighty easy when your plow is a pencil, and you're a thousand miles from the corn field."

—Dwight Eisenhower

Scout Corn Fields for These 5 Weeds

With more weeds becoming glyphosate-resistant or surviving glyphosate-only applications, corn growers continue to rely on residual herbicides to manage tough weeds and protect their yield. "We need to maximize the number of sites of action," says Travis Legleiter, weed program science specialist at Purdue University. "We don't have a lot of sites of action left to us, so we need to maximize what we do have available and rotate them as much as we can. Avoid applying any site of action more than two times in a growing season. By applying a site of action more than two times in a growing season, we're putting pressure on those weeds to become resistant to it."



Corn Replant Calculator Available for Mobile Devices



Are you considering replanting corn due to poor stands, seedling disease or pest damage? Before you go ahead and replant, check out the corn replant calculators available from the University of Illinois. They've been optimized for use on mobile devices.

The Droid version requires a registration to download an app for the calculator. The iPhone/iPad version is available as an online spreadsheet that's been optimized for mobile device viewing. The calculator can also be used on your desktop computer.

Access the calculators here:



In checking out the calculators, the spreadsheet available for PC can likely be accessed through any mobile device using a web browser and inputting the url (<http://ow.ly/IMtGS>). I tried it and it worked just fine on my iPhone.



Variable-rate planting
can boost profits
but requires
good data.

SCAN
& READ



ONLINE

Make variable seeding work

Ron (left) and Keith Alverson

By Liz Morrison

Keith Alverson and his family started to variable-rate plant in the 1990s, and now find benefit with the practice on every corn acre. He, his father Ron and uncle grow corn and soybeans on rolling land near Chester, S.D.

In the early 1990s, they started reducing seeding rates manually in the dry corners of pivot-irrigated fields, where yield potential is always much lower. The practice cut seed costs by 25% in unwatered sections, and was especially beneficial in dry years, Alverson says.

Eventually, they extended the practice inside their irrigated circles and then to non-irrigated fields, where soils are characterized by bands of gravel glacial outwash and eroded clay knobs that lend themselves to variable-rate planting.

Now, they use it on every corn acre, Alverson says. "We've found it pays off in good years and bad years. It not only reduces seed costs, but makes us money by reducing lost yield and placing seeds where they need to be."

There's a lot of interest in variable-rate seeding (VRS) for corn, which tries to match planting rates and yield potential, says Gregg Carlson, South Dakota State University (SDSU) plant scientist. "The concept makes good sense to producers."

Yield maps clearly show significant spatial variability within fields. Valuable seeds and crops boost potential returns from VRS. And many farmers already own software that can generate prescription maps and planters that can do variable-rate seeding on-the-go.

Think Different

Localized field tests are best

The interactions between corn plant population, genetics, soil type, fertility, crop rotation, pest control, tillage and weather are very complex, says Joel Wipperfurth, master agronomy adviser for Winfield, Owatonna, Minn. That's why it's important to evaluate the effectiveness of a variable-rate seeding program on a farm-by-farm basis, he says.

One way to do that is to plant check strips of higher and lower seeding rates alongside the prescribed rate in each management zone within a field. If a lower seeding rate produced the same yield as the prescribed rate, for example, you might want to adjust the prescription the next year.

To make it easier to measure the results of VRS, Bob Gunzenhauser, DuPont Pioneer, suggests that growers try three or four different seeding rates, each differing by about four thousand seeds/acre.

Soil warm

Think *Different*

Shallow vertical tillage is hot these days, to manage residue with the least amount of tillage. “True” vertical tillage tools don’t invert soil or move it from side to side, making them different from disks or field cultivators, which move soil horizontally. If your object is to break down residue faster, a fall pass gives soil microbes more time to work. But you sacrifice the conservation benefits of leaving residue intact over the winter. Vertical-tillage tools’ drawback is they don’t anchor residue in the soil. They cut residue well and leave it on the surface.



By Liz Morrison

Cold spring soils are sparking a hot new form of tillage. Shallow vertical tillage tools slice crop residue and loosen the top layer of soil while leaving most of the residue on the surface to protect soil from erosion. The practice speeds up residue breakdown and improves spring planting conditions – without sacrificing the soil conservation benefits of high residue cover.

Shallow vertical tillage is hot these days, says Mike Staton, Michigan State University soybean agronomist. What’s driving it, he says, is the goal to manage an increased amount of corn residue with the least amount of tillage. Higher corn populations and yields, stronger stalks and more years of continuous corn are generating mounds of sturdy stover. All that residue slows soil warming and makes it tougher to achieve good seed-to-soil contact.

er

Shallow vertical tillage aids residue management and seedbed prep.



KEVAN KLINGBERG, UNIVERSITY OF WISCONSIN (2)

better mineralization of nitrogen and we can do a better job with the planter."

Jay Furseth used to be all no-till for soybeans at his Stoughton, Wis., grain and dairy farm, but the heavy accumulation of corn stalks interfered with soil warm-up and planting, and soybean harvesting. "All the residue made it hard to keep the combine heads close to the ground."

Last fall, the Furseths ran a 30-ft. Great Plains Turbo Max shallow vertical-tillage tool over corn stalks. This spring, "the planter pulled easier, versus straight no-till," Jay says, and less down pressure was needed for good seed placement. The Furseths dropped their soybean population by about 10,000 seeds/acre "because of the better seedbed."

This fall, the Furseths used the tool to help incorporate dairy manure on harvested corn silage fields. Mixing "top layers of soil with a conservative tillage pass that maintains large amounts of residue" can help reduce phosphorus losses, says Kevan Klingberg, University of Wisconsin Extension outreach specialist.



A single pass with a shallow vertical tillage tool left 70% - 80% of corn residue in place after planting, in trials by the University of Wisconsin Discovery Farms. Most residue was cut into pieces 12 in. or smaller.

A Summers Supercoultter Plus with rolling chopper (above) is one of several shallow vertical tillage tools on the market that size crop residue and loosen the top layer of soil while leaving as much residue as possible on the surface.

Curt Weisenbeck, Agronomic Consulting, Durand, Wis., works with quite a few former no-tillers who now use shallow vertical tillage to handle "quite an accumulation of residue. With our cold soils in the spring, you can have some decline in yield potential." For preparing the seedbed, "it's as good a tool as you will find for a one-pass system," he says. "It helps tremendously with warming cold soils." That can improve yield potential 10%-15%, he estimates. "We're able to warm up the soil better, we get better fertilizer incorporation,

Shallow vertical tillage is also an option for growers who want to reduce – but not eliminate – tillage, says Trevor Dybevik, Great Plains territory manager for Wisconsin and Minnesota.

Doug Olson raises corn and soybeans on the erodible hills of Wisconsin's Driftless Area, near Mondovi. He has used shallow vertical tillage for several years to manage crop residue on his sensitive terrain. "I like leaving the residue on top of the soil. That's how our topsoil is made – not by plowing." Shallow vertical tillage, at 8-10 mph, "gets my stalks chopped in the fall very quickly," he says. "I like it on our side hills." In the spring, the chopped residue flows through the planter better, he says, "so we get good seed placement." He gets good water infiltration, it saves time, and he hasn't seen any yield loss, he says.

Vertical tillage concept

Many different implements are marketed as shallow vertical tillage tools. All are designed to cut residue at high speed and penetrate 1-4 in. into the soil. But not all are strictly vertical, Dybevik says. "True" vertical tillage tools don't invert soil or move it from side to side, he says, making them different from disks or field cultivators, which move soil horizontally, as well as vertically, and may create a compaction layer.

Jay Furseth (left) and his cousin Craig Furseth are part of a family group that raises grain and milks 190 dairy cows near Stoughton, Wis. The family uses an adjustable Great Plains Turbo Max to manage residue and prepare the seedbed. They run the coulters blades at an angle on flat ground, where erosion risk is low. On slopes, they shift the blades to the straight position, which disturbs less soil. The coulters cut corn root balls, Jay says, but leave them fairly well anchored in the soil, a benefit for erosion control. The Furseths also used the tool on soybean residue last spring in a few wet fields, running about 1.5 in. deep ahead of the corn planter.



CATHY FURSETH

Shallow vertical tillage machines consist of smooth, fluted or notched blades, which are mounted straight-up-and-down on the toolbar, either in gangs or individually, and cut a strip about 2 in. wide. Rear finishing attachments, such as tine har-

rows and rolling baskets, mix some soil with the residue and level the surface a bit. The tillage operation is usually done at a diagonal to the crop rows.

More aggressive implements have angled gangs, narrower blade spacings or concave, curved or rippled blades, which throw more soil sideways. Some models have adjustable gang angles, allowing growers to increase or decrease tillage intensity on the go.

These implements require about 10 hp/ft. to pull, and cost around \$2,000/ft., Dybevik says. Ownership, fuel and labor costs run about \$10/acre, Michigan's Staton estimates.

Fall or spring?

Doug Olson owns three 30-ft. Summers Supercoulters Plus vertical-tillage machines with rolling choppers – each with a different blade configuration. After corn harvest, he uses a machine equipped with wavy blades to slice stalks into 5- or 6-in. pieces. The wavy blades also throw some



KEVAN KLINGBERG, UNIVERSITY OF WISCONSIN

A Great Plains Turbo Till with rolling spike and reel is one of several shallow vertical tillage tools on the market that size crop residue and loosen the top layer of soil while leaving as much residue as possible on the surface.

Vertical tillage should be ‘conservative and shallow’

One pass preserves residue cover, but conservation advantage declines after second pass, study concludes.

By Liz Morrison

How much soil is disturbed by shallow vertical tillage?

The answer depends on the tool, the soil and the tillage depth, says Kevan Klingberg, a University of Wisconsin Extension outreach specialist. Many farmers value these implements to size residue, condition the seedbed and incorporate nutrients, he says. But using these tools on erodible cropland, the watchwords should be “conservative and shallow.”

In 2010, The University of Wisconsin’s Discovery Farms program evaluated the effects of spring shallow vertical tillage on soil disturbance and residue cover. Tools from Great Plains and Summers were tested on 14 fields at five farms.

The study concluded that, on average, a single pass on silt loam soil tilled about 40% of the field to a 2-in. depth. About 60% of the field was undisturbed. In addition, the study found that 80% of corn residue remained on the surface after one pass, and 80% of

Not a yield driver

Fine-textured soils and early planting are the two conditions where shallow vertical tillage may provide a yield benefit, compared to no-till, says Mike Staton, Michigan State University Extension soybean agronomist, in reference to studies from Michigan, Indiana and Canada.

Details of the yield trials are posted at <http://bit.ly/TqLaNp>, along with vertical tillage tips and more photos.

the previous year’s corn roots stayed in place. Intact roots “help minimize soil loss,” says Klingberg, who led the research.

However, soil disturbance and residue cover varied significantly,

depending on soil type, tillage machine characteristics and operating depth, Klingberg says. Sandy soils, aggressive blades and deeper operation all moved more soil and left less residue cover.

In addition, the soil conservation benefits of one-pass shallow vertical tillage disappeared with two passes, which disturbed just as much soil as tandem disking, Klingberg says. Likewise, vertical tillage tools with concave blades mounted on angled tool bars dislodged more corn roots and exposed more soil.

Research from 2010 to 2012 also measured residue disturbance after shallow vertical tillage. A single spring pass with a Salford RTS or Summers Super Coulter vertical tillage tool left about 70% corn residue cover – comparable to strip-till, says Jodi DeJong-Hughes, University of Minnesota Extension tillage expert. Two passes with a Salford RTS left 21-30% soybean residue cover and 39-58% corn residue cover.



A single pass with a shallow vertical tillage tool disturbed about 40% of soil surface, according to University of Wisconsin Discovery Farms research. The white pins mark coulter blade depth of a Summers Supercoulter Plus vertical tillage machine. The colored pins mark soil disturbance width.



Motivation mounts for libertylink beans

Think Different

When you've got herbicide-resistant weeds, variety selection can't be all about yield, says Lisa Behnken, University of Minnesota Extension regional educator. "If I have giant ragweed in my Roundup Ready beans that I can't control, those yields will definitely be affected." Growers should first be looking at the top third of the varieties, based on yield, she says. "But from there you need to consider disease resistance and physical characteristics that best fit your fields. Those are often more important than getting the top yielder."

Expanding weed resistance plus new LL varieties could entice more Midwest growers.

By Peg Zenk

Most people know they should eat a healthier diet, but it often takes a medical scare to motivate them to change. Most soybean growers know they should add more diversity to their weed control plans, but it often takes herbicide-resistant weeds in their fields to motivate them to try a new system.

The hesitation to move away from the simplicity of glyphosate has been one of the biggest reasons many soybean growers in the northern half of the country haven't tried LibertyLink soybean varieties. But as glyphosate-resistant weeds continue to appear in an increasing number of Midwest fields, more growers may soon be motivated.

"We have glyphosate weed-resistance issues across most of the state of Minnesota," says Lisa Behnken, University of Minnesota Extension regional educator based in Rochester. "Giant ragweed and waterhemp

are the two big ones that have confirmed resistance to glyphosate, but there are others in development."

While there are several robust herbicide systems for corn, and a lot of herbicide options, she notes that herbicide choices in soybeans are still somewhat limited. "The LibertyLink system is a good option for growers who have weeds resistant to both glyphosate and ALS inhibitors," she says. "We tell growers they need to develop a five-year weed-control plan to help avoid herbicide-resistant weed issues, and LibertyLink could fit nicely into that plan."

Early limitations

Incorporating the LibertyLink system into a crop rotation requires planning, she notes. "It's not just a one-year thing. That's one of the reasons some Midwest growers have been resistant to try it – they just don't want to commit."

Another drawback to the system was that some early LibertyLink varieties weren't as strong as their

In the span of one year, this same Missouri field went from Roundup Ready soybeans being overrun by glyphosate-resistant Palmer pigweed (far left), to the following year of LibertyLink soybeans (left) with different modes of action that controlled the problem.

Roundup Ready counterparts, notes Behnken. She and colleagues have done field trials measuring the performance of LibertyLink soybean varieties for four years at several locations in southern Minnesota. "In the first few years, some of the LibertyLink varieties didn't always yield as well as Roundup Ready versions. In the last two years, though, we've seen those differences tighten up. Some of the top-performing varieties this past year were LibertyLink.

"The main reason growers are going to LibertyLink is a problem with glyphosate resistance," she continues. "As we see more of those problems, we'll see more adoption of the LibertyLink system."

That's definitely been the case where sugar beets are grown, specifically Roundup Ready sugar beets. Glyphosate-resistant waterhemp has been documented in western Minnesota and has prompted growers there to try LibertyLink soybeans,

says Clara City, Minn., seed dealer Mike Bosch. "I've had several customers try them over the past three years. The big question was always about yield. This past season we saw that the yields for LibertyLink varieties were very competitive with Roundup Ready 1 varieties and are close to catching up to Roundup Ready 2s.

"Another advantage I've heard from customers is that LibertyLink soybeans seem to respond better on high-pH soils, which are common in our area," he adds.

Overall performance and yield of the LibertyLink varieties have pleased one of Bosch's toughest customers – his dad Lee. "About 20% of our soybeans are LibertyLink, and over the last two years they've yielded as well as the Roundup Ready fields," he says.

Timing the herbicide application can be trickier than with glyphosate, he notes. "Last spring we made our first Liberty application when it was cold and wet, and didn't get much control. But two weeks later, after things had warmed up a bit, we re-sprayed the field"

More northern varieties

Because of early weed resistance issue in the southern states, many of the early LibertyLink soybean varieties were developed for Group 3, 4 and 5. "Growers in the South have been dealing with glyphosate-resistant Palmer amaranth for several years," explains Arlene Cotie, soybean product manager, Bayer CropScience.

"Agronomists in the Corn Belt estimate that the Midwest is about three years behind the South in weed resistance development. In the next few years we could see some significant increases in resistance issues."

The company's annual grower surveys on the topic show a increase over 2011 in the number of farmers saying they have resistant weeds on their farms, says Cotie. "That number is now in the double digits, according to the May 2012 survey."

She says Bayer CropScience and the seed companies offering LibertyLink soybeans anticipated that growth and will be offering a record number of Group 0 to 3 varieties for 2013. "The biggest increase will be in the Group 2.5 to 4 varieties, but there are also a lot of new numbers for the northern tier of states."

Stine Seed will be offering almost 60 LibertyLink varieties for 2013, which is up from just under 45 last season. "Of the 60, almost 40 of them are new numbers," says Stine's David Thompson. "We're definitely seeing more interest from growers in the Midwest, especially where there are multiple Roundup Ready crops grown. Growers want to preserve Roundup Ready technology's effectiveness. That's why they're interested in adding LibertyLink soybeans. They won't replace Roundup Ready – they complement it."

"But it's just not as convenient as glyphosate, and that has held some growers back from trying it," he adds. "Herbicide application is more involved, with a tighter application window in the spring."

A shortage of Liberty herbicide last season didn't help product image, he notes. "We're working closely with Bayer to make sure that doesn't happen again, and we're telling customers who order LibertyLink seed to purchase their herbicide right away."

According to Cotie, last season's herbicide shortage was due to an increase in product demand worldwide. "We've got our plants running at full capacity now, so there should be adequate supplies in the 2013 season." **CSO**

"We saw that the yields for LibertyLink varieties were very competitive with Roundup Ready 1 varieties and are close to catching up to Roundup Ready 2s, says Clara City, Minn., seed dealer Mike Bosch. Timing the herbicide application can be trickier than with glyphosate, he notes.





Get the most from soil-applied herbicides.

Relearn residuals

By Liz Morrison

In 2012, Greg Kerber attacked the weeds in his no-till soybean fields with six herbicide modes of action – including three effective pre-emergence herbicides. An early April burndown included full rates of 2,4-D and glyphosate plus soil-residual products Prowl and Sonic, followed by an early postemergence application of Liberty. Sites of action: 2, 3, 4, 9, 10 and 14.

It was the second year that Kerber used pre-plant residual herbicides on every soybean acre “to try to get more modes of action out there. I’m worried, like everybody, about resistant weeds, especially waterhemp,” says the Gibson City, Ill., corn and soybean producer. Growers to his south are battling multi-herbicide-resistant waterhemp, and to his east, glyphosate-resistant marestail. Fortunately, “Glyphosate is still effective here,” he says, “and if we mix it up, we can keep it effective.”

Kerber spent about \$35/acre on his soybean weed program this year and had fairly clean fields, although the drought hindered residual herbicide performance.

As glyphosate-resistant weeds multiply, Midwest growers are relearning the strengths – and shortcomings – of pre-emergence (pre) soil-applied herbicides, says Jeff Gunsolus, University of Minnesota Extension weed scientist.

For two decades, Corn Belt farmers have relied on broad-spectrum, postemergence (post) weed control, especially in soybeans: first Scepter, Pursuit and Classic in the early 1990s, then Roundup. Consequently, “People have lost the knack of using pres,” Gunsolus says. Today, farmers who came of age in the total post era “have little experience with this chemistry.” Simply putting down a pre-plant herbicide doesn’t guarantee good weed control, Gunsolus says. The success of a residual herbicide program depends not only on environmental factors, but also on weed biology and densities, herbicide selection, application rates, and application timing. “We need the right pre for the right weeds, at the right rate and the right time,” Gunsolus says.

He and other Midwest weed management experts offer tips for improving soil-residual herbicide effectiveness in soybeans:

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ONLINE



HARLEN HERICKHOFF

Target the dominant weed for pre-emergence control

Select the best residual herbicide for the primary weed species in each field, says Aaron Hager, University of Illinois Extension weed scientist.

And keep in mind that the dominant weed may vary from field to field.

Waterhemp drives Craig Herickhoff's residual herbicide choices. He and his father Mark grow corn, soybeans, sugar beets and wheat near Belgrade, Minn. Like many Midwest farmers, the Herickhoffs were having

trouble controlling waterhemp with glyphosate, especially in soybeans. And they wanted to preserve the effectiveness of glyphosate for sugar beets, a crop for which there are few cost-effective post herbicides. So in 2011 and 2012, they applied Valor to all their soybean acres before planting.

The PPO-inhibitor provided good control of waterhemp, as well as lambsquarters, another problem weed in their fields. "We got about five weeks of weed suppression" for \$10/acre more than two glyphosate passes, says Herickhoff. "We wouldn't go back to a total post program again for soybeans."

If you select a premix, think about how much of each active ingredient will be applied at the full labeled rate, Hager says. If you select a premix, think about how much of each active ingredient will be applied at the full labeled rate, Hager says. For example, sulfentrazone, an active ingredient in premixes such as Authority XL, Authority MTZ and Authority First, is effective on waterhemp. But the amount of sulfentrazone – and consequently the duration of waterhemp control —

varies by product, Hager says. So if waterhemp is the dominant weed in a field, select the premix that supplies the most sulfentrazone.

Apply full rates

Apply the full labeled rate for the soil texture and pH, organic matter content and time of applica-

Think Different

A good day to plant is a good day to apply a pre

John Wold missed the two best weather days of 2012 for applying a postemergence herbicide on his corn crop – but he didn't mind. Why?

"I didn't have anything to spray!" says the Underwood, Minn., grain and livestock farmer.

Wold applied SureStart before planting, which provided good control of common ragweed, lambsquarters and waterhemp, three of his top weed targets. He incorporated the soil residual herbicide with the field cultivator, and timely rains soon after application resulted in very good herbicide activity.

Four weeks later, when weeds were barely coming out of the ground, he followed with a well timed post application. The result: "Clean fields all year, even at harvest," Wold says.

Pre-emergence residual herbicides lower weed densities, improve early season weed control, extend the window for post-emergence applications, and lower the potential for crop yield losses from weed competition, says Minnesota Weed Scientist Jeff Gunsolus. That's why he likes to say: "If it's a good day to plant, it's a good day to apply a pre."



For the past two years, Craig Herickhoff, H & H Acres, Belgrade, Minn., has applied a soil-residual herbicide to all his soybean acres. "I try to put different modes of action in different fields to get the full advantage of diversifying our herbicide chemistry," he says. "It used to be, we'd just load up with one product and put it on everything. Now, we're having to go field-specific."

LIZ MORRISON

Residual herbicide use up sharply in soybeans

Pre-emergence residual herbicide use for soybeans appears to be up sharply in the Corn Belt.

A March 2012 survey by Monsanto found that the number of U.S. soybean acres treated with a residual herbicide rose from about 33% in 2010 to 55% in 2012, says John Combest, Monsanto crop protection products spokesman. But usage varies widely by region, he notes.

"Use is most definitely increasing," says Andrew Schmidt, regional agronomist with Winfield Solutions, Columbia, Mo. He estimates that 60% of Missouri soybean growers applied a pre in 2012, "a big

change from five years ago." Likewise, in Illinois, where multi-herbicide-resistant waterhemp has been detected in the southern two-thirds of the state, residual herbicide use in soybeans "is upwards of 50% statewide," estimates Aaron Hager, University of Illinois Extension weed scientist.

In Minnesota, where glyphosate-resistant weeds have been detected but are not widespread, about 30% of soybean acres were treated with a soil-applied residual in 2012, estimates Jeff Gunsolus, University of Minnesota Extension weed scientist. That's up from about 5% just five years ago, he says.

tion, says Andrew Schmidt, regional agronomist for Winfield Solutions, Columbia, Mo. The common practice of applying reduced, or "set-up," rates is not recommended these days, he says. In the past, reduced rates were an option when growers knew they could clean up the field later with glyphosate. But with more weeds resistant to one or more post

herbicides, that's no longer smart, Schmidt says.

Balance application time with duration and weather risk

To maximize weed suppression after crops emerge, it's critical to apply a soil-residual herbicide as close to planting as possible. That's especially

important when battling weeds with a long germination period, such as waterhemp.

For no-tillers, "the timing of the burndown can be tricky," says Kerber, the Illinois farmer. "You don't want the residual to run out before the canopy forms." In 2012, weeds in his fields started emerging earlier than usual because of warm weather, but Kerber held off on his early preplant application until April in order to get as much residual control as possible while soybeans were growing.

If you're battling waterhemp, which has a long germination period, "you'll want to apply the pre as close to planting as you can," Schmidt says. Products such as Valor, Gangster or Authority must be applied no later than three days after soybean planting, Gunsolus notes, so have a backup plan in case you get rained out. "You have the option of putting on a post residual like Prefix or Warrant."

Because there are no herbicides that last all season, parts of the Corn Belt infested with resistant waterhemp may have to resort to an approach called "overlapping residuals," says Kevin Bradley, University of Missouri weed scientist. Growers apply a pre herbicide at planting, then follow up with a post residual herbicide 14-21 days later to suppress later-emerging waterhemp. Waterhemp seed is fairly short-lived in the soil, so if you prevent plants

Control of glyphosate-resistant waterhemp with soil-residual herbicides applied at planting

Product	Rate/acre	Average % waterhemp control, 2007-2012 (range)	
		30 Days after treatment	60 Days after treatment
Authority	5.33 oz.	95 (86-99)	91 (75-99)
Valor	2 oz.	95 (83-99)	92 (77-99)
IntRRo	2 qt.	82 (43-99)	76 (37-95)
Outlook	18 fluid oz.	87 (60-99)	77 (47-95)
Dual II Magnum	1.32 pints	81 (70-99)	70 (50-95)
Linex	24 fluid oz.	93 (88-99)	87 (77-98)
Sencor	8 oz.	76 (57-96)	67 (47-96)
Prowl H ₂ O	2.5 pints	76 (57-93)	72 (47-90)
atrazine	2 lbs. ai	75 (57-92)	57 (50-65)
Pursuit	4 fluid oz.	6 (0-13)	3 (0-10)

Source: "Revisiting the Realm of Residuals," University of Illinois

There are many soil-applied residual herbicides available to control waterhemp in soybeans. The wide range in efficacy seen in the Illinois trials above is primarily due to different environmental conditions from year to year, which affect herbicide performance, says Aaron Hager, University of Illinois Extension weed scientist.

from producing seeds for three or four years, “you can virtually eliminate this weed as a problem,” he says.

Understand crop injury potential

Crop injury from soil-applied herbicides is often related to application timing or environmental conditions, Hager says. Applications made right before or after planting result in a high concentration of soil-applied herbicide near the emerging seedlings. Stressful growing conditions hinder plants’ ability to metabolize the herbicide.

It’s also important to understand herbicide crop rotation restrictions, Gunsolus says, especially for growers who raise sugar beets, dry beans, peas, sweet corn or canola in the rotation. “These are a big deal.”

Craig and Mark Herickhoff, the Minnesota farmers, grow sugar beets, which narrows their corn and soybean herbicide options considerably, says Darrol Ike, a Delano, Minn., crop consultant, who’s helping them diversify their weed control chemistry. For example, Authority products are a good pre-emergence complement to glyphosate for soybeans. But the long crop rotation intervals for sugar beets – roughly 40 months – takes them off the table in a beet rotation.

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Craig and Mark Herickhoff, the Minnesota farmers, grow sugar beets, which narrows their corn and soy-

Rotate modes of action

Weeds can become resistant to any herbicide that is used repeatedly.

But the risk is lower with soil-applied residual herbicides than with postemergence herbicides, says Kevin Bradley, University of Missouri Extension weed scientist. In part, that’s because residual herbicides often have complex modes of action, “so it takes longer for weeds to develop resistance.”

Also, within the soil residual herbicide category, there are quite a few different modes of action, which you can – and should – rotate, Bradley says.

Using two or more modes of action can help slow the development of herbicide-resistant weeds – but “only if you have a high level of effectiveness for both modes of action,” says Jeff Gunsolus, University of Minnesota Extension weed scientist. For example, if you spray ALS-resistant waterhemp with an ALS-glyphosate tank mix, it’s the same as using glyphosate alone. These same resistance management strategies will also apply when Dow’s Enlist and Monsanto’s Xtend seed technologies become available, Gunsolus adds.

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Incorporate, if possible

All soil-applied residual herbicides have the same Achilles heel, Hager says: They have to be dissolved in the soil through mechanical incorporation or a rain within seven to 10 days.

“We dig everything in,” says Herickhoff. “Yes, it’s a hassle in the spring, but if you don’t get a timely

rain, it’s a lot better to have it incorporated.” In 2012, though, seedbeds were dry and cloddy, so he set the planter’s row cleaners deeper than usual. That affected pre placement. “It was perfectly clean between the rows, but in the rows, there was more weed pressure. I think it was because we went deep with the row cleaners, and when we pushed the dirt aside, we pushed some of the herbicide aside, too.”

If incorporation isn’t an option, “you can try to hedge rainfall risk by putting the herbicide out a little sooner,” Hager says. In 2012, though, many parts of the Corn Belt did not receive enough rainfall to move the pre into the soil solution, so weed control suffered.

Nevertheless, “I still believe it was beneficial,” Missouri’s Bradley says. “Our own evaluations showed us there was still some residual weed control, just shorter than normal.” Weed suppression “probably lasted two weeks, where typically it would be about twice as long.”

If it stays dry into 2013, should growers apply a pre-plant herbicide next spring? Yes, Gunsolus says. “We can’t predict the weather. The bottom line is, it’s a risk management tool.” **CSD**

Online links for tips on residual herbicide selection and use:

weedsience.org
<http://weedsience.missouri.edu/>
<https://www.roundupreadyplus.com/Pages/croprecommendations.aspx>
<http://www.glyphosateweedscrops.org/>



How I view 2013

Forecasting and decision-making in 2012 turned out to be a difficult year for many as the drought changed market direction for many commodities. 2013 will likely see continued volatility and tough decisions. There are three key fundamentals that will likely affect all of our decisions, and these fundamentals are essentially out of our control. The three that I am talking about include:

1. The world and U.S. economy. We all know that Europe is on the brink of bankruptcy and that it has had a negative impact on the demand of many products. The recovery in Europe will be long and slow, and it is perpetuating weakness in China and in the U.S. The good news – all of this is well known and thus likely discounted in the world markets. 2013 will likely be an economic recovery year, and I would plan on the news in the U.S. economy being better than expected.
2. **Demand.** While all corn and soybean producers are enjoying these high prices, the longer they stay at these lofty levels, the more demand is being hurt. High prices are good if they don't last long – then demand is not hurt. But \$7.50 corn for six months

is going to result in some bad consequences down the road. There's an old saying that the cure for high prices is high prices – and we are witnessing that now.

- c. **Weather.** Obviously this one is out of our control. With record corn acreage being planted this spring, in some ways weather is less critical than it was this past year. By increasing acreage even if near perfect conditions don't exist, corn supplies are still going to go up. If good growing conditions exist after planting 98 million acres of corn, \$7.50 corn is going to become \$4 corn.

September was the peak

Making decisions in this environment is not going to be easy. Here are some thoughts, however, to throw into your "think tank" for the coming year.

- a. What worked last year in marketing will not likely work this year. The same strategies rarely work two years in a row.
- b. My assumption is that the corn and soybean marketing prices peaked for this marketing year in September. Rallies between now and spring are rallies in a bear market.
- c. Some old sayings – "short crops peak early and have a long tail"; "never store a short crop, always store a record crop."

- d. Is this a year to be selling two years' crops? Personally, I am in that camp. For subscribers to *The Brock Report*, we are already 100% sold on the 2012 crop and 50% priced on the 2013 crop. These prices are extremely profitable. Farming is cyclical. Good times don't last forever, and fortunately bad ones don't either. The odds favor aggressive marketing in 2013.

One last thought: input prices. Fertilizer prices have likely already discounted high-priced corn, and fertilizer prices follow corn – not the other way around. If my assumption is correct on the downward trend of corn, you will likely see softening fertilizer prices as well. Land prices will stay strong throughout this year. Agriculture has never been in a stronger financial footing than it is today. Even weaker prices are not going to change that. But also remember that sometimes when people have made too much money, they often lose focus on making marketing decisions because it is easy to put them off with money in the bank. Good luck in 2013. **CSO**

Richard Brock is president of Brock Associates, a farm market advisory firm, and publisher of *The Brock Report*. For a trial subscription and information on Brock services, call 800-558-3431 or visit www.brock-report.com.



Trials of African corn

Rain makes grain. This is something that almost every U.S. farmer hasn't had enough of this year, and yields have suffered because of it. We, too, had that problem last year at our farm on the Afram Plains in Ghana, West Africa. We'd planted a 140-day maturity, No. 2 yellow corn Pioneer hybrid, which was produced in Brazil and imported into Ghana. I was confident the genetics were good, but due to the lack of rain/irrigation, we ended up with a 27-bu./acre yield.

This was a wake-up call for me to get our irrigation system running. We had a 4-span Zim-matic system from the local dealer, but they had never actu-

ally sold or installed a system. Once I finally found an independent contractor with center-pivot experience in West Africa, our system was up in a week and was running for the crop we planted on April 22.

In our tropical climate, there are two rainy seasons, in June and October, when we receive the majority of our rain. We can get anywhere from 0.1 in. to more than 2 in. at a time. June provided good rains, but we relied heavily on our irrigation system for moisture in the other months. Our irrigation system was the best crop insurance we could find, since crop insurance is not available in Ghana. June provided good rains, but we

relied heavily on our irrigation system for moisture in the other months. Our irrigation system was the best crop insurance we best crop insurance we could find, since crop insurance is not available in Ghana.

We receive 30-35 heat units/day. Our corn comes out of the ground in about four days, tassels at day 50 and has 24% moisture at day 120. This potentially allows for three crops a year if everything goes perfectly. While this is not likely, we will try to achieve 2.5 crops of corn per year.

We started harvest on Aug. 20, picking 40 acres by hand with about 25 women working each day. The local women filled pans of corn, which were carried to a barge wagon pulled by a tractor through the field. The corn was then dumped in piles where it was again picked up and carried to a sheller. After shelling it was put in bags until we accumulated enough shelled corn to fill our 800-bu. dryer.

After drying, we load the dry corn back into barge wagons where it is bagged from the wagons into 110-lb. bags.

We finished harvest on Sept. 12. It was a long, drawn out harvest with many processes, but our 87-bu./acre corn yield is more than three times our dry-land yield.

This year our yield is better than my dad's, who farms in central Illinois! After the challenges we've had, it is a great feeling to be able to make a difference in the developing world. We've carried out with varieties, irrigation, and running a business in a developing country, we will be economically viable once our venture is at full scale. **CSD**

Kristopher Klokkenga is a 32-year-old Illinois farmer who co-founded Africa Atlantic Franchise Farms in June 2010, where he's managing director on Ghana's Afram Plains. Africa Atlantic is a farm-management/farm-development company focused on production agriculture in Ghana.



This mechanical corn sheller is loaded and unloaded by hand, and powered by a small tractor. The dryer (inset) has almost finished drying this batch of corn and is ready to be loaded into wagons.