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STEEL IN THE FIELD
A Farmer’s Guide to Weed Management Tools

EDITED BY GREG BOWMAN

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Other SAN Handbook Series titles in print include Book 3: Managing Cover Crops Profitably; Book 4: Building Soils for Better Crops; and Book 5: How to Manage the Blue Orchard Bee as an Orchard Pollinator.
Brothers perfect disking, cultivating that beats no-till on sloping land

Glenn and Rex Spray
Mount Vernon, Ohio
• 500 acres • corn, soybeans, small grains, hay • disk tillage (30 percent residue)
• red clover cover crop

Weed management highlights
Strategies: delayed planting into warm soil... crop rotation... high-tilth soil with increasing organic matter... mechanical controls
Tools: spike-tooth harrow... standard rotary hoe... four-row low-residue cultivators...
rolling shields... tent shields

Two Ohio brothers understand the adverse impact of tillage on soil but demonstrate how a four-crop rotation helps them actually build soil on their rolling crop acres. Data from a nearby USDA research station and calculations from a county corn yield contest illustrate their system even beats many no-till systems in production and soil protection. (See “Disking down clover secures sloping soil,” page 111.)

Mechanical weed control has been routine for more than two decades on the farms of Glenn and Rex Spray, two of Ohio’s organic-farming pioneers. Their fields are made up of more than a dozen soil types with some bottom land, many hills and some slopes exceeding 7 percent. They plant their steepest fields to erosion-prone soybeans only in years when soil conditions are suitable.

Their soil-building cornerstone is a cover crop of Kenland red clover, which they grow the season before they plant a corn crop. They value Kenland (a certified variety of medium red clover) for its vigorous germination and growth. The legume is “frost seeded” by broadcasting into wheat or spelt from late February to April at about 8 pounds per acre. The first clover growth after grain harvest becomes hay for beef cattle, with the regrowth left for seed harvest of 1 to 4 bushels per acre in late August.

Two fall passes with a 12-foot offset disk with notched blades kills the clover and incorporates some of the residue to start decomposition. A drag harrow added on the second pass smothers the surface enough for winter application of about 8 tons of straw-pack beef manure. In spring, one or two diskings may be necessary to incorporate the manure, with two or three passes of a field cultivator with flat, 8-inch sweeps to kill successive flushes of weeds.

From pre-plant disking to canopy (when crop leaves shade out weeds between rows) is when the Sprays’ row-crop fields have the least protection against erosion. Yet their corn ground readily absorbs water because it is soft, loose and spongy, the direct result of the previous year’s red clover.

The brothers say that this soil condition is the key that allows them to use simple weed-control methods with simple tools, including

• Spike-tooth trailer harrow. This is the first tool into their fields after the planter. They use the harrow just as corn “spikes” at about 1 inch tall and before preemergent soybeans reach the brittle “crook” stage. The Sprays set their 24-foot, trailer-type McFarlane harrow to work in the top three-fourths-inch of soil. “A harrow
moves 100 percent of the soil and disturbs every germinating weed, while a rotary hoe sometimes seems more limited to poking. It seems to depend on the year which works best,” says Rex.

• **Re-pointed rotary hoe.** Within 3 to 10 days after harrowing, the Sprays are back in their fields when corn is about 1.5 inches tall with their 16-foot rigid-frame John Deere standard rotary hoe. Rex recommends getting in a quick second pass after breaking up a crust—later the same day or the next day—to prevent any germinating seeds from surviving in small chunks of the crust. “This will do you more good than waiting a week,” he says.

When they needed a rotary hoe, they purchased a rebuilt unit because it had been fully outfitted with Ho-Bit replacement spoons. These hardened metal points are welded onto the ends of rotary hoe wheel arms to rejuvenate worn tips. “They’re properly aggressive and well worth the money,” says Glenn. In their loosest soils, they raise the three-point hitch a bit to keep the hoe from running more than about 2 inches deep.

After soybeans are well rooted—at about the two-leaf stage—he advises farmers not to worry about damage from the spinning fingers. “Truth is, you couldn’t thin established soybeans with a rotary hoe if you wanted to,” he says.

• **Shielded cultivators.** Front-mount, four-row straight-shank IH conventional low-residue cultivators work well on their sloping land where the rows are often contoured—but so would a newer six-row unit if its addition wouldn’t require so many other equipment changes. They mount three or four 8-inch sweeps in front, followed by spring teeth on a rear toolbar to cover wheel tracks. The first cultivation is critical to a crop’s success in relation to weeds, Rex explains. “If you don’t get weeds on this round, you won’t get them the next time, either.” Running shallow—right through the root zone—when weeds are young increases chances for success, he says. The brothers keep inside sweeps 3 to 4 inches from the row for all passes. Cultivating speed on first pass is a slow 2 to 3 mph to protect young plants but 6 to 7 mph on second pass to move soil into the crop row.

**Round rolling shields** and custom-built metal tent shields protect young crops and allow faster operating speeds. Adjusting the shields upwards allows loose soil to “flow like water” around the base of the plants while residue and soil lumps slide over the top.

The Sprays waited in ’95 for warm soil for the same reasons as does Carmen Fernholz. (See page 41.) After planting corn in mid-May, they encountered the situation that skeptics of mechanical weed control cite most often—rain and cool temperatures. They first entered fields two weeks after planting to cultivate, when corn was 4 to 5 inches tall.

“Things cleaned up better than we expected,” Glenn says. “Foxtail was a minor problem, but something in the weather must have suppressed the broadleaf weeds. The fields looked at least as good as usual.”

Reports from the Knox Soil and Water Conservation District Corn and Soybean contest for three seasons show the Sprays’ no-herbicide, no-fertilizer fields have out-performed many well-managed no-till fields.

While their yields of up to 175 bu/A usually rank in the middle third of the participating farms, the Sprays observe their profit per acre has been far greater than the other contestants. They cite two reasons: lower production costs and premium prices from customers who value top-quality, certified-organic commodities.

The four-year rotation of alternate grass and legume crops is their foundation for productivity, soil health, insect control and weed management. “This organic farming is mostly just common sense. Keeping ahead of weeds is really our biggest challenge.”

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**Agronomic Row Crops**

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