Leading Edge
The Journal of No-Till Agriculture
September 2002 • Volume 1 • Number 3
No-till On The Plains

One Step Ahead

by Keith Thompson

Stepping into one of Craig Stehly's long-term no-till corn fields near Mitchell, South Dakota, what quickly strikes you is how weed-free his fields are, and how little herbicide he used. No, things don't always work out this perfectly for him (especially with this year's drought), but by keeping a wary eye out for vulnerabilities in his farming system, Stehly always seems to stay a little ahead of the pack.

Photo by Matt Hagny.

During a summer bus tour, Craig Stehly discusses the value of keeping wheat in his rotation (his area is predominantly in a corn >>soybean rotation) as well as his methods of managing wheat stubble for corn planting.

Although Stehly got started no-tilling back in 1986, he has changed his thoughts on the best way to no-till many times, and has altered his practices almost as much. Why, you ask, does he change things all the time? Simply because the perfect system doesn't exist, and never will; we will always be tweaking it. We will learn more, and technology and markets will rearrange things even further, making yesterday's 'perfect' system obsolete (kinda like that manual typewriter you have lying around somewhere, or that old IBM 286 or Apple II computer collecting dust). Stehly certainly doesn't drift aimlessly in his practices—he always takes a good look around before making a move.

One of Stehly's biggest changes was that early switch to no-till, which began with Craig's first encounter with "ecofallow" in 1984 during a farm tour in Nebraska. While the fallow portion of the system didn't fit his area at all, the concept that intrigued him in ecofallow was the preservation of the small grain stubble to be no-till planted to corn the following year. If done correctly, it was economical and the extra water stored by the small grain stubble really paid off in corn yield. Plus, wind & water erosion were reduced. Enthused, Craig went home and tried keeping some barley stubble and no-till planted his corn into it—this worked out very well for him.

Then, in 1988, "the light came on" for Craig. It was a severe drought year, and he was headed up to the SDSU Experiment Farm at Redfield. Along the way, all the conventional-till crops were brown

Contents

and dying, and then he pulls into Dwayne Beck's long-term no-till and everything was green and healthy—"it looked like an oasis"—and Craig remembers thinking to himself, " 'Ya know, this *might* work.' "

"We made it through a 2-year rotation of wheat >>soybean about three times, before it totally just fell apart."

Lessons Learned

So Stehly bought a Deere 750 drill in '89 and started working with drilling soybeans and small grains. One of the first hurdles was figuring out the rotations, which Beck was busy working on as well (rotational data & observations from his days at Redfield are available at dakotalakes.com). In the mid-'80s, the Stehlys were about 50% corn and 50% small grains (barley, oats, wheat), with a few sunflowers thrown in (soybeans were very new to their area back then, and weren't significant in their county until about 1990). They soon learned that oats and barley worked okay following corn, but wheat did not. One of the rotations that worked initially was soybean >>spring wheat, although Craig says, "We made it through that rotation about three times, before it totally just fell apart" from weed and disease pressure.

Today, Stehly's thinking is much different: "Back then, we weren't thinking about the long breaks to clean up these problems. . . . Ten years ago, our thinking was that you never did the same crop twice. Now, I've completely lost my fear of planting the same crop a second year—I just plan on going away from that crop for 3 or 4 years afterwards." Stehly doesn't have a set rotation that he follows on all his acres, noting that often the weather screws it up anyway. For instance, all his winter wheat died from winterkill in '01 (as did nearly all the w. wheat in SD that year), and in '95 he had thousands of acres that never got planted due to the exceptionally wet spring. "I just try to keep it diverse. I have 3 main crops, which isn't enough — I'd really like to have 4 or 5."

Craig's most common rotation is a "simple" one of wheat >>corn >>soybean, although he has 'stacked' all those crops and is doing more stacking all the time (stacking is planting the same crop twice back-to-back, following a long break). His current ideas for good rotations are spring wheat >>winter wheat >>corn >>soybean >>soybean, or doing s. wht >>w. wht >>corn >>soy >>corn >>soy. While he's quite comfortable with stacked wheat, as well as stacked beans, he doesn't have gobs of experience with stacked corn, although he's done enough to know that planting the second-year corn causes some residue-flow problems with 22-inch rows.

In Stehlys' area, almost no one grows small grains anymore—everything is in

Photo by Matt Hagny.

Stehly's second-year soybeans—the abundant corn stalks are from 2 years ago. For Stehly, diverse rotations with long breaks is the key to successful no-till. He should know—he's been 100% no-till for 13 years, and seems successful by most anyone's estimation.

Leading Edge
No-till On The Plains

Editors:
Bud Davis
Matt Hagny
Roger Long
Randy Schwartz
Keith Thompson

E-mail: editor.leading.edge@notill.org

Subscriptions & Advertising:

Phone: 888.330.5142

$25 per year (U.S.) subscription rate

No-Till on the Plains Inc. publishes ***Leading Edge*** four times per year.

No-Till on the Plains Inc.
P.O. Box 2334
Salina, KS 67402-2334
888.330.5142
Website: www.notill.org

Partial funding for this publication is provided from the USDA-EQIP. The United States Department of Agriculture prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, sexual orientation, and marital or familial status (not all prohibited bases apply to all programs). Persons with disabilities who require alternative means of communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint, write the USDA, Director of Civil Rights, Room 3226W Whitten Building, 14th and Independence Ave., SW, Washington, D.C. 20250-9410 or call (202) 720-5964 (voice or TDD). USDA is an equal opportunity provider and employer.

No-Till on the Plains Inc's Mission: To assist agricultural producers in implementing economically, agronomically, and environmentally sound crop production systems.

Objective: To increase the adoption of cropping systems that will enhance economic potential, soil and water quality, and quality of life while reducing crop production risks.

Photo by Craig Stehly.

Built for speed: Stehlys' tender truck.

a corn >>soybean rotation. Craig is the exception, with 25% of his acres in wheat. Stehly says that during the wet years of 90s, wheat didn't look so good. "Now that we've had a few drier years and the price is improving, people are saying, 'Gee, maybe that wheat isn't so bad.' " Stehly had the diversity all along, and will get rewarded for it this year: "Winter wheat will be by far our best crop this year." Stehly doesn't make radical changes to his rotations from one year to the next. "People just keep chasing their tails. It doesn't make sense. You read in farm magazines about somebody's justification for planting 80% of their acres to soybeans one year, then it's all corn the next."

"Back then, we weren't thinking about the long breaks to clean up these problems. Ten years ago, our thinking was that you never did the same crop twice. Now, I've completely lost my fear of planting the same crop a second year—I just plan on going away from that crop for 3 or 4 years afterwards."

Craig does have some fields in a corn >>soybean rotation, mostly due to landlords, and "it ain't working as good—there's more weed and disease pressure." Stehly further notes that soybeans are new enough to his area that the diseases are just getting there—he knows it will get worse. Recalling his earlier problems with only 2 crops in the rotation, Stehly asks, "So how long is the corn >>bean rotation gonna go? Technology keeps saving us—we've got trouble, just not bad enough to be forced to quit. If you don't have anything to compare it with, you'd never know how bad it is."

Managing Moisture

Getting back to the timeline of Stehlys' no-till adoption, they (Craig farms with his brother & dad) were 100% by 1990 and have been ever since. During the dry years of '86 to '92, everything worked great and Craig remembers thinking, " 'Why weren't we doing this sooner?' " Since 1993, they've been more concerned about being too wet in the spring, and working with wet soil can be a curse or a boon, depending upon how one thinks. "I sometimes fight getting the crop planted, and the stubble holding all that moisture at planting can cause problems—but wait till July or August; we are always glad to have moisture then."

Never one to sit still, Craig started looking for solutions to his problems: "After those wet years, we thought, 'we gotta get this equipment ready for wet conditions.' " In addition to some aftermarket attachments for the planter, one of the items Stehlys purchased was a Phoenix harrow (a.k.a. rolling harrow, or 'prickle-chain' in Aussie).

Photo by Matt Hagny.

Even in a drought year like '02, Craig's corn looks okay when it's in wheat stubble under long-term no-till. Craig almost always wears his good-natured grin, but the Cabela's cap is new.

The Phoenix harrow fluffs the residue and the top half-inch of soil wherever the teeth engage it, which helps air circulate to dry it out. He has seen times where 80 to 90% of the field is dry, but the low spots just are not drying out—he runs the harrow in those areas and two days later the whole field is planted. He dislikes having to use it, noting that it plants weed seeds and packs the soil where each tooth engages—but at least he can plant the whole field in one shot.

Maybe the answer is cover crops, which Stehly feels holds promise. Finding the right cover crop isn't easy—he wants something cheap that grows fast and is easy to kill.

Photo by Craig Stehly.

Stehlys planting corn. The planter has residue managers, Keetons, and spoked closing wheels; a Rawson hydraulic drive turns the seed meters.

That's a tall order, especially in his environment, but he has some interesting ideas. He played around with both red clover and sweetclover for several years, but is much more impressed with hairy vetch. The last couple years, he has been experimenting with seeding the vetch with his planter using milo plates and gets his seeding rate down to 3 lbs/a. He seeds the vetch in wheat stubble in September (he has gone earlier, but currently thinks later is better), which overwinters just fine. The next spring, Stehly plants the corn right into the vetch, then kills the vetch with herbicide. He notes that in a dry spring,

"So how long is the corn >>bean rotation gonna go? Technology keeps saving us —we've got trouble, just not bad enough to be forced to quit. If you don't have anything to compare it with, you'd never know how bad it is."

when you get the corn in on time, the vetch is only 2 or 3 inches tall —that's fine, since you didn't need it anyway. In the wet year, when you are struggling along and planting is getting late, the vetch has really kicked in—he says that the vetch goes from 2 inches to a big bushy plant in just a couple weeks —exactly what you need on that wet year.

Using up extra water with cover crops may seem weird in his semi-arid area, but it's just another approach to a problem that everyone else seems hell-bent on addressing with machinery, whether it is strip-till or whatever. Using a cover crop for pulling moisture out of wet spots, plus recycling nutrients and suppressing weeds—soon it all starts to make sense, maybe even to some of the 'I-wonder-what-the-heck-Craig-is-up-to-now?' crowd. *(Editors: the cover crop concept is solid, and a couple studies from the northeastern U.S. indicate vetch as one of the best species ahead of corn, and more profitable than not having a cover crop when N rates are optimized for each.)*

Looking Two Moves Ahead

Other ideas rolling around in Craig's mind include using GPS auto-steer, which would allow him to do things that now are next to impossible. One of the problems Stehly has with doing second-year corn is keeping a 22-inch planter centered on last year's row middles, which is tiring to have to do perfectly all day—but child's play for auto-steer. Another possibility would be using a low-disturbance applicator to put all of his crop's fertilizer down early in the spring and then be able to come back and use the auto-steer to stay almost exactly 2 inches to the side of the fertilizer band at planting time. Although Stehly currently broadcasts all or most of his fertilizer needs on the surface, he wonders if he could increase the fertilizer-use efficiency slightly by placing it in the soil, but doesn't want to slow up planting to place fertilizer.

For Craig, another one the pluses for no-till has been the increase in wildlife numbers in their fields. He has been able to use this fact to help 'sell' no-till to existing and potential landlords, who seem to appreciate the increasing bird and deer populations (Craig does too). He also uses CRP to his advantage to improve total farm efficiencies, by enrolling land around the potholes and squaring them up, so that he can turn around or just drive over these areas—he has found that even if the pothole is dry enough to plant in the spring, it often drowns out later. This also leaves more habitat for wildlife to flourish.

"I certainly would say there's economic advantages to no-till."—with 17 years of experience, Craig should know.

Photo by Craig Stehly.

Seedbed preparation, with a cover crop of hairy vetch in wheat stubble—by the next spring, it's ready for corn.

When he started no-tilling, Craig was the only one in his area doing any, which Craig feels helped out by allowing him to make the transition at his pace. He thinks that one of the reasons farmers sometimes have trouble making the change is they believe that they need to go 100% no-till right away: "Some people would be better off going slow, especially if they don't know what they're doing and haven't taken time to learn." Even his neighbors go about

Photo by Craig Stehly.

Stehlys seeding with their 1850 drill.

no-tilling differently than Craig does, but he realizes they have different problems and needs. He thinks a manager needs to feel somewhat comfortable with the change, by carefully studying the situation and not getting caught up in wishful thinking. He notes that it took him 5 years to become a 100% no-tiller, although "back then, there was a lot we didn't know"—referring not just to his operation but to the 'experts' as well.

Craig is satisfied with their choice: "I certainly would say there's economic advantages to no-till . . . and from the soil differences alone, I would never want to go back to doing tillage." But Stehly is always looking for ways to improve, mentally tugging at the weaknesses of his operation to see what might unravel, or delving into his assumptions to see what nasty surprises might be lurking in the foundation of his reasoning. Looking at 'the big picture' is a major part of Stehly's business approach, and keeps him on track. While he gathers lots of ideas from others, his attention to the interactions within his own farming system is what has kept him successful. Craig's unassuming 'average guy' personality is deceiving—this guy is a pro at gathering information, sorting out the possibilities, and acting *before* a crisis occurs. Stehly plays to win, and he does.

Photo by Matt Hagny.

The dark viny material on the ground is hairy vetch killed after the corn was planted; note that Craig doesn't try to move all that much residue out of the row area. Stehly doesn't spend much on corn herbicides anymore, helped by his long rotations and 22-inch rows.

Editors' Note: The Stehly farm was a featured stop on the 2002 South Dakota No-Till Tour, as well as several prior years; see www.notill.org for more on those tours.

Photo by Craig Stehly.

Redekop knives in the combine straw chopper—note the wings at the back of the knife to help throw the pieces of straw. Craig says that these, with a speed-up kit, plus deeper vanes on chopper, easily spread the straw "30 feet plus." Craig emphasizes the importance of uniform straw & chaff spreading with the combine, an essential part of preparing his seedbed for the next crop. For more info, visit www.redekopmfg.com.

No-Till on the Plains is yet again undergoing a change in staffing, as Tim Christian and Drue Durst depart us to pursue additional work with the Kansas Wetlands Alliance—we sincerely thank them for their efforts while under contract with No-Till on the Plains, Inc.

Note that our phone number will remain the same, and the website and *Leading Edge* will continue without interruption. However, the P.O. Box in McPherson will be discontinued—please use our new address, P.O. Box 2334, Salina, KS 67402-2334. We hope to be announcing a new Coordinator soon.

Winter Wheat: Go Deep

Winter wheat seeding that verges on too deep was rather common in tilled soils, but with no-till quite a bit now actually goes in too shallow, often resulting in plants not coming through the winter in good condition, or even dying. The shallow wheat problem seems most common in low-disturbance systems, partly due to the soil firming up and more abundant stubble on the surface, but also is inherent in the design of low-disturbance openers—they don't 'furrow down,' i.e., heave or throw soil out of the furrow and mound it between the rows. The tendency to have winter wheat ending up too shallow (1½ inches or less) varies considerably by soil type, moisture level, and previous management, as well as the drill opener's design, maintenance, and settings.

Photo by Matt Hagny.

Winterkilled streaks in wheat after soybeans, in central Kansas. Note that streaks run in at least a couple different directions, reflecting not only variations in opener performance during seeding, but also old traffic patterns and uneven residue distribution.

The wheat plant's vigor come spring will be determined (in part) by how well-insulated the crown was, and how well-anchored it was (preventing the crown from being heaved out of frozen soils). These are accomplished by: A) seeding to a certain depth, B) getting good seed/soil contact, and C) having enough soil over the top of the seed (a wheat seedling in an open 'v' isn't protected very well). Upright stubble remaining after seeding also helps.

Photo by Matt Hagny.

Winterkilled streaks in wheat after wheat, mostly where straw was 'windrowed' behind the combine—the 2d wheat did establish in those areas, but the crown was set in the pile of straw instead of soil, which provided inadequate protection.

In central Kansas, it seems that we grew complacent about wheat seeding depth during the mild winters of the late '90s, and got a 'wake-up call' in 2000/01 and again this last winter. Part of the problem this last year was the dry fall never allowed the wheat's nodal roots to get properly established, which made the plant much more vulnerable. While we can't do anything about the weather, we *can* make the best of it by watching seed placement.

This starts with good distribution of the preceding crop's residue, whether it is 'ropey' soybean stems, bunchy wheat straw, or whatever. Also, make sure the drill's openers are in good condition—dull opener blades hairpin more and have trouble just cutting into the soil (maintaining depth), and worn seed boots may not be getting the seed to the bottom of the furrow. Then run enough down-pressure and frame weight to keep the opener at a proper depth (it may take a lot in some soils). Using a pop-up fertilizer also helps build a healthy wheat plant.

While '02 wasn't much of a wheat year across much of the region, enormous yield variation often occurred between fields that were well-managed and those that weren't (sometimes it didn't make any difference—they were all zeros). Good yields don't happen by chance; the management was in place to maximize whatever potential the weather allowed. We often don't need to spend big money here, just a little more attention to detail.

Photo by Matt Hagny.

Heaving of frozen soils pushed these old milo crowns out, leaving them 'perched' several inches above the soil line. Overwintering wheat plants are subjected to the same pressures, which sometimes tears the wheat plant's crown away from some or all of its roots.

Fall Atrazine: Cool It!

When doing atrazine on wheat stubble, wait until later in the fall—this compound does degrade in sunlight if left on the surface for several weeks without rainfall. For Kansas, most researchers & agronomists agree that October through mid-December is generally best, although sometimes later applications do work okay. Tank-mixing 2,4-D and crop oil (or UAN) is advisable. Wheat or cheat more than a few weeks old may require glyphosate. Note that it's much easier to deal with the wheat, cheat, and other winter annuals before they overwinter; plus, fall atrazine (or simazine) is highly cost effective and cuts down on the spring workload.

What Do You Mean, Herbicide Resistance?

by Roger Long

SCIENCE

Roger Long is a Syngenta sales representative for south-central Kansas.

Herbicide resistance is a common problem in crop production throughout the High Plains, and just about everywhere herbicides are used, for that matter.

"How does resistance come about?"

"Are we creating super weeds?"

"One of these days we will create a weed that nothing will kill!"

These are but a few of the comments I hear every year from both inside and outside of agriculture. The aim of this article is to address these and numerous other questions surrounding weeds and herbicides.

According to the Herbicide Resistance Action Committee (HRAC; more at www.plantprotection.org/HRAC/), the definition of weed herbicide resistance is: "The naturally occurring inheritable ability of some weed biotypes within a given weed population to survive a herbicide treatment that would, under normal use conditions, effectively control that weed population."

It is the consensus among almost all weed scientists that we don't really 'develop' (create) resistant weeds. We do, however, select for resistant weed populations. We all know about the theory of evolution—a mutation occurs that gives an individual within a population an advantage over the rest of the population, making that individual more fit to 'conquer' its environment and more likely to pass on those advantageous genes, thereby building a more fit population, ie., a group better adapted to that environment. Right! But those successful mutations are few and far between, and in the grand scheme of things we haven't been using herbicides long enough for plants to have gene mutations that are herbicide 'haters' and destroyers. Although very difficult to prove with certainty, the weed science community generally agrees that resistant weeds have always existed and that we have, with the use of herbicides, put so much pressure on the susceptible individuals that we are left with nothing but resistant weeds in some of our fields. So we really should say "we developed a resistant weed population," but that takes too much time so we perpetuate slightly incorrect terminology and say "we developed weed resistance." If you go back to the definition of resistance, the HRAC says *"the naturally occurring inheritable ability…"* which means: we didn't create the snake, it was already lying in the grass!

What's a biotype? The publication "Herbicide Resistant Weeds" from the Minnesota Extension Service defines 'biotype' as "a group of plants within a species that has biological traits that are not common to the population as a whole. For example, atrazine-resistant common lambsquarters is a biotype of common lambsquarters. Therefore, in most instances, specific biotypes are not easily recognizable by casual observation." In the case of herbicide-resistant biotypes, the difference comes in how the plants function physiologically. A resistant biotype handles the herbicide internally differently than a susceptible biotype.

When a herbicide—or any control method—is used repeatedly and with great success it culls out the portion of the population that can't survive the particular method.

There are actually three different ways in which resistant biotypes fend off herbicides. The method that causes the most problems in the High Plains is called the "altered target site." All herbicides have what is called a site of action. This is the place inside the plant where the herbicide does what it is supposed to do. The analogy of a lock and key is many times used to explain the process.

Photo by Matt Hagny.

Herbicide choices of product, rate, and timing are critical to efficacy. After wheat harvest, get the sprayer going if weeds are threatening to set seed—don't accept the myth that you should wait a couple weeks after harvest for the weeds to recover.

In this case, the plant or weed would contain the lock and the herbicide molecule is the key. Susceptible biotypes have sites, or locks, that allow the herbicide molecule to bind, or fit into that site. When the herbicide, or key, binds to that site it either blocks the normal biochemical reaction that would have taken place, or initiates other destructive reactions, depending on the herbicide. In the case of the Group B herbicides (see chart—a kind of 'family tree' of the chemistries), the plant no longer produces some of its own proteins and eventually 'starves' itself to death. A resistant biotype builds those proteins through a slightly different process, the lock is different, the key (herbicide) no longer fits, and the plant keeps on producing the protein.

"Enhanced metabolism" is another way in which weeds survive herbicide treatments. Biotypes that have extremely rapid metabolism will 'chew up' (degrade) a herbicide before it gets a chance to bind at the site of action. The arrangement of the herbicide molecule is foreign to the plant, but its components are nothing new in nature so the plant merely breaks down the molecule into pieces of non-toxic molecules.

Photo by Doug Palen.

Timing is everything. Part of avoiding resistance is spraying the weeds at an appropriate size, as well as rotating modes of action, rotating crops, and maximizing biological control (more on this in future issues).

A third means of resistance is called "compartmentalism sequestration." A plant will utilize a vacuole or 'storage bank' within the plant cell that will hold the herbicide away from the site of action, rendering it harmless to the plant.

So, are we creating super weeds? No. For that matter we're not even selecting for a super weed population. According to Kassim Al-Khatib, herbicide physiologist with Kansas State University, few resistant biotypes show any fitness differences from their susceptible brethren. The only exception he noted was that biotypes of atrazine-resistant pigweeds had slightly slower photosynthesis rates, thus making them less environmentally fit than susceptible biotypes—if no triazine herbicide selection pressure is present.

What is meant by 'selection pressure'? When a herbicide —or any control method, for that matter—is used repeatedly and with great success it culls out the portion of the population that can't survive the particular method. Using a 'burndown' (non-selective) herbicide prior to planting may control all of the weeds present, but a biotype with a tendency for later germination may come up later and flourish because other weed competitors are now gone. This is a simple concept but one that we overlook far too often. Cropping rotations, even without the herbicide factor, play a huge role in which weed species will be successful. How competitive is the crop to the weed? Will the crop mature before the weed sets seed? Does the crop have some allelopathic effects on the weed? (Very little is known about this one.) Now throw in the herbicide factor and the variables it creates. Now, management is really fun!

Cropping rotations, even without the herbicide factor, play a huge role in which weed species will be successful.

The use of herbicides with different Modes of Action (MOA) is important when managing selection pressure from herbicides. The site of action may be only slightly different from one active ingredient to another *within* a MOA group, but the site of action is drastically different between an ACCase inhibitor (Group A) and a synthetic auxin (Group O). Thus, not relying too heavily on any particular MOA for control of a species will greatly reduce the selection pressure, and will preserve the usefulness of that MOA for years to come.

"But I used _____ herbicide for the first time this year and the chemical rep said my weeds are resistant. How can this be?"

"So what weeds do we know are resistant?"

"What are some things I can do to manage my resistant population and keep from developing new problems?"

"What do all those &!%@# Modes of Action mean, and why do I care?"

—These and other questions will be addressed in future issues as part of this Weed Management Series.

2001 Kansas No-Till Tour, Epilogue

by Matt Hagny

In August a year ago, No-Till on the Plains, Inc. launched the inaugural[1] run of its Kansas No-Till Bus Tour, which met with spectacular success by quickly filling all the seats on the 50-passenger bus, plus a caravan of 20 to 30+ people tagging along by car or pickup at various tour stops. It was a discerning crowd, asking challenging questions of our farm hosts and panel of 'experts' during our 2 days together.

We kicked off the event at Doug Palen's farm headquarters south of Glen Elder, with Palen describing his parents' exit of the crop production segment of the farm in 1994 to pursue other endeavors, in essence telling Doug to 'sink or swim' on his own. Just starting out, and not being able to afford hired help, plus having caught a glimpse of what no-till *could* do, Palen decided to tackle this new style of farming as his best choice to get into business with as little overhead and labor as possible. It worked. Palen has been 100% no-till since 1995 and no longer considers tillage an option (except when acquiring new farmland that needs to be leveled).

Photo by Tim Christian.

During the 2001 Kansas Tour, Doug Palen describes seeding these soybeans directly into warm-season CRP sod (including little bluestem), without tillage, matches, or other goofing around. Looks like he got it right.

From '95 through '01, Palen farmed solo, with only occasional part-time help (he added a full-time hand in '02), and yet was able to get across considerable acreage with only 30 feet of 750 drills and a 12-row JD 7200 planter. Plus, his fields are scattered across 25 miles. Palen is very meticulous in reconditioning his seeding equipment each winter, and has added a number of aftermarket parts to tweak the performance of his seeding tools. It must be paying off, because his agronomist has made many notes about his stands bordering on being too thick the last couple years (I know, because I'm Palen's agronomist). More importantly, he achieves consistently high rates of emergence across crops and in varying conditions, which tells me that his soils are improving and his attention to detail on seeding tools is paying off. One of the most impressive situations was a field of milo in '01 that was literally planted in the mud and didn't get a drop of rain for 3 weeks after seeding, yet emerged marvelously! (If your seeding equipment is set up right and you're planting into moisture, you really *don't* want a rain soon after planting.)

Photo by Doug Palen.

Later that year, harvesting those same soybeans—looks like just a regular field, unless you look closely for clumps of dead grass.

The group viewed the pull-type 90-foot Flexi-coil sprayer with wheel-booms that Palen had been leasing for several years (he now runs a used Fast pull-type sprayer instead). Palen mentioned that he is much more satisfied with air-induction (AI) nozzles for reducing drift than with skirted or shielded booms. He also runs a GPS light bar for guidance, and notes significant reductions in overlap.

We looked at several of Palen's fields, including some RR soybeans planted into warm-season grass CRP sod that was killed with only two herbicide applications in '01 (Roundup + 2,4-D pre-plant, then Roundup + Select post-emerge), and none the prior year. The kill was phenomenal—some management, some luck. We also spent some time discussing soybean inoculants, noting their critical importance on land never having grown soybeans previously.

We stopped in several other fields of Palen's, noting that they all had a

[1] KCRMA had a tour while hosting Carlos Crovetto in '97, which traveled to a number of no-till farms in Kansas over a couple days—but this was our first bus tour.

nice surface mulch with identifiable stalks from 4 or 5 prior years of crops, which had accumulated under his ultra-low-disturbance methods. Palen's rotation has been primarily wheat >>milo >>milo >>soybeans in the recent past, with some corn and alfalfa mixed in. Palen has done some 'stacked' wheat in the past, and is now making that a standard practice in his operation. He's now working on stacked soybeans, so that his rotation is becoming wht >>wht >>milo >>milo >>soy >>soy, sometimes with two years of corn substituted for the two milo years. In the mid-90s, Palen typically grew sunflowers in the same place in the rotation as the soybeans, but has quit them saying that they cannot compete economically with soybeans. Palen is also experimenting with some cover crops and double-crops after his 2d-year wheat to make use of all available moisture.

Kent Stones reports: No-till has been undeniably more profitable and less risky than tillage-based methods.

Photo by Tim Christian.

Looking over Stones' FSO openers.

We then headed up the road to Kent Stones' headquarters near Lebanon (Kansas, that is), who was *Leading Edge's* cover story for the premiere issue (Dec. '01.) *(Editors: for many of the details of Stones' operation, refer back to that issue —also available at www.notill.org.)* Stones described for us a bit of their farm history, and how he & his wife Cindy got into no-till, saying that for their operation, no-till has been undeniably more profitable and less risky than tillage-based systems. They have been 100% no-till since '97, and have completely eliminated summerfallow by going no-till.

We poked around Stones' machinery, which covers a very large number of acres each year—making his overhead per acre quite healthily low, despite much of the equipment being late-model. When quizzed about his seeding equipment, Stones remarked, "Seed placement is absolutely *the* most critical aspect of no-till." Consequently, he and his hired man, Terry, spend lots of time making observations and adjustments during seeding, as well as major off-season time rebuilding openers.

Stones farms mostly silty clay loam soils formed in loess. The soil texture and semi-arid climate allow him to broadcast the majority of his N fertilizer as urea during the winter, with good results. He has experimented with other methods, including applying everything during seeding, but currently favors winter b'cast due to the economics. They truck the urea in themselves, then apply it with a boom that fits onto their Flexi-coil air cart.

We also looked at Stones' comparisons of stripper-harvested wheat vs. sicklebar, noting the remarkable differences in weed growth (fewer, smaller weeds in the stripped wheat). Stones thought the stripped stubble was also storing moisture better than the cut stubble, and was equally plantable in the spring (he has since revised his opinion, noting some rather serious bunching, bridging, and other residue-flow problems with stripped wheat stubble, especially when it rots off at the soil surface and begins accumulating in drifts even before spring seeding begins). Stones also described considerable efforts and adjustments needed to get grain yields with the stripper head to equal the sicklebar.

Photo by Tim Christian.

Discussion of one of Palen's corn fields, including the value of residue (part of the stubble had caught fire the previous year).

(As you can see, Stones is ever the researcher and strategist, and is relentless in studying all aspects of his operation.)

Next was Harold Krause's farm near Hays, where we toured a few of his fields including some of his dryland no-till corn, which was holding up admirably well in the hot dry season of '01. Krause's dryland rotation is typically wheat followed by corn or milo, then to sunflowers, and then summerfallowed (Krause has some irrigation in addition to his dryland).

We observed a detailed spraying demonstration put together by Bob Wolf (a K-State spray technology specialist) and Greg Simpson of Simpson Enterprises. On a Spra-Coupe, Wolf demonstrated quite an array of nozzle types at various pressures—the pattern differences were visibly striking. Wolf said that in his research, the venturi (a.k.a. air-induction, or AI) nozzles have

performed equally with flat fan or Turbo TeeJets for herbicide efficacy, but with markedly less drift. Wolf described some other types of tip/boom arrangements, including air-assist, electrostatic, and double nozzle (where the small droplet pattern is directed into a high-volume pattern), and their uses, generally noting these as being better suited to desiccants, fungicides, and insecticides, rather than herbicides—we were relieved that we didn't need to spend big $$ on these devices for our herbicide work.

Following our supper in Hays, our panel of Bob Wolf, Ray Ward (soil scientist & founder of Ward Labs), Paul Jasa (U.Neb.-Lincoln seeding equipment specialist), and myself recapped a few thoughts for the day, and answered some questions. Then some of us adjourned to the bar, where the really important discussions took place (although they didn't *all* involve agriculture).

Bright and early the next day we set out for Randy Schwartz's farm north of Great Bend, who was another Feature Farmer for issue #1 of *Leading Edge*.

Ray Ward contends that ripping is way oversold: "If roots are penetrating the 'plow layer,' then leave it alone."

All dryland, Schwartz has been 100% no-till for over a decade now, with very good results (except for the habitual hailstorms hitting his area in 3 of the last 4 years, plus the recent drought).

For farming 2,500 acres, Schwartz's overhead is astonishingly low—and he does virtually all field operations himself, including haying, with only part-time hired help. Just before our arrival, Schwartz was harvesting sunflowers using a corn head *with no*

Photo by Tim Christian.

Ray Ward describes changes in soil structure.

modifications—we found a little grain shattering, but generally thought it was a quite reasonable job of harvesting without the time and expense of adding sunflower pans to a straight head, or buying an all-crop head, or installing Corn-Sol plates in the corn head (Schwartz notes that the unmodified corn head only works if the flowers aren't too dry). This bit of management typifies Schwartz's style—keep it simple, but effective. Don't waste precious $ on fancy new equipment or gadgets for which the return on investment is rather speculative, or an illusion. And always evaluate your return *per hour*—chasing that last little bit of yield often isn't worth it; sometimes your time is better spent on something else.

Up until this point of the tour, we had been looking at farms in regions with reasonably decent soils and climate. We got a reality check at Gene Albers' near Cunningham. I made an attempt to explain some of the differences en-route, especially making a point about nighttime temperatures: the higher elevations at Great Bend, Hays, Lebanon, and Glen Elder make for much cooler nighttime temps. A corn or milo plant can produce only so much photosynthate (sugar) during the day, which must sustain it during the night when it can't do photosynthesis, plus have some left over for growth and/or grain-fill. Cooler nights allow the plant to slow down its metabolism, consuming less sugar. A few degrees warmer causes much higher sugar consumption just to stay alive, plus the plant is attempting to grow more rapidly because of the warmth—throw in some conditions where daytime sugar production isn't maximal (drought, excess heat, cloudiness) and things go to hell in a hurry. This is why corn and milo production is so much more difficult in south-central Kansas (we sometimes joke about the "Wichita trade winds" cooking us), and even cotton is adversely affected. Further complicating matters are the typically shallower soils and lower OM occurring in that region.

Albers had been experiencing all of this (in spades) in 2001, which we saw firsthand in some of his milo fields that couldn't exsert a head due to drought. He had thick stands of double-crop milo and forage sorghum in his wheat stubble, which also needed rain soon if they were going to make much (his cattle provide the backup plan). His soybeans were also likely to be harvested by

Photo by Tim Christian.

Paul Jasa discusses crop rooting characteristics with tour participants.

cattle if he didn't get rain soon. Albers has been 100% no-till since 1997, and does all his seeding with a 15-foot 750 drill.

Ray Ward did some digging with his trusty spade in one of Albers' milo fields to see how the root development was proceeding. It was a bit shallow, which Ward explained was normal in a soil of this type (Farnum) with a crop like milo. Someone asked about ripping or subsoiling, which Ward explained was mostly just equipment companies trying to sell you stuff you don't

need. He said that in certain situations deep ripping might have value in redistributing a compacted layer (note that it *doesn't* make the compaction disappear), but often those implements were used incorrectly or in circumstances where they weren't needed. Ward recommended always checking root development with a spade before deciding if subsoiling is necessary: "If roots are penetrating the 'plow layer,' then leave it alone." Ward explained that roots tended to follow old root channels or earthworm burrows, unless these pores are disrupted by tillage.

Off we went again, to Joe & Sue Swanson's farm near Windom, where they have experimented with no-till for decades, and have been 100% no-till since 1997. *(Editors: see issue #2 for more details on their operation.)* Swansons' area also suffers from warm nights much like Albers' area, although the soils are somewhat better—mostly loess deposits (Crete and Smolan series) on upland, plus a few bottomland fields along the Little Ark. River.

Paul Jasa and I went over some planter tips while we looked at Swanson's equipment, consisting of an 8-row JD 1750 planter and a 15-foot 750 drill. Jasa noted that

Photo by Tim Christian.

Jasa on planter attachments. Jasa also provided insights on row spacings, plus some of the history and patents of various planter gizmos.

Photo by Tim Christian.

Matt Hagny and Joe Swanson discuss Keeton performance and longevity, although Hagny looks like he's ready for a cocktail.

coulters didn't help planter performance any, and that properly adjusted residue managers are all you need in front, if anything. He also emphasized the importance of having enough frame weight when attempting to run high down-pressure on the openers. Jasa also brought up some interesting facts on the history, patents, and licensing of some opener and attachment designs—which actually explains quite a bit about who brings what to market. I described the reasons for poor performance of 'notched' (indented) CIH gauge tires on JD/White/Kinze planter units (essentially allowing the blade to lift the sidewall before the seed is placed, which sometimes allows seeds to bounce or roll under a chunk of sidewall), and talked a bit about differences in spoked closing systems and the conditions where they excel over traditional smooth closing wheels. I commented on how absolutely critical the Keeton's performance actually is, especially if spoked closing wheels are used that provide no additional firming. Jasa mentioned the Rebounder and J.S. Ag's notched covering discs as worthwhile add-ons for CIH row units.

We then went to a cover crop/double-crop plot put in by Swanson and myself after the '01 wheat was harvested, where we are looking for good alternatives to double-crop flowers in his rotation. Although double-crop flowers have been profitable for Swanson in recent years, he dislikes the high input costs—he's looking for less risk. Swanson recognizes the need to grow *something* right after the wheat in his area, whether a revenue-generating double-crop or a true cover crop. In the plots, the pearl millet, canola, and vetch all looked a bit stressed by the hot weather—not surprising for the vetch and canola, which have cool-season growth habits. I expected the pearl millet to look better, as it originates from the desert borders of Africa, although it did eventually perk up later in the season (as did the canola). The sunn hemp (*Crotalaria juncea*) and cowpeas were the most impressive for handling the hot dry weather, and were also the best at suppressing weeds (the sunflowers were also quite good). The pearl millet and soybeans were intermediate for weed suppression; the canola and especially the vetch and check strips were rather weedy by late summer (the weeds were chopped by hand, so Swanson & I really noticed the differences!) The plot was seeded to corn in '02 with different N rates to measure legume contribution of N, although it looks like corn yields will be extremely low this year and we may not learn much—however, the various strips did produce some emergence and early growth differences in the corn, as well as affecting how drought stressed it was later in the season (no, the check strips were *not* the ones with the least drought-stressed corn). We'll see what the yield data shows.

Lastly, we took a quick look at a corn field near Swanson's home, where he & his dad commonly threw out their leftover night-

crawler fishing bait years ago. The nightcrawlers had built up quite a population over the years, and it was very easy to find their middens. Unlike our common transient-burrowing earthworms (gray worms or field worms), nightcrawlers live in permanent vertical tunnels that often penetrate 4 feet or more, resulting in rainfall infiltration rates unlike anything you've ever seen before (despite the fact that they eat much of the surface residues). In this particular field, the nightcrawler population had moved partway up the hillside (they aren't native to Kansas), and Swanson reports a measurable yield advantage to the area with the nightcrawlers —prompting the question of whether we should be undertaking a serious effort to introduce them to other fields.

And so it goes—while we continue to refine an already profitable system, we discover even more questions to ask, and new possibilities to consider. The journey continues to unfold . . . .

Fully Invested

by Matt Hagny

Les Sims certainly defies tradition in his farming operation just south of Wichita, KS, and that discerning management style is exactly what has kept him profitable and expanding over the years. In an area typified by burning, plowing, and continuous wheat, Sims' no-till techniques and high percentage of summer crops stand in stark contrast.

The history of Sims Farms isn't what you'd expect either. Les grew up on a successful livestock and grain farm in northwest Missouri, but chose an engineering & management career instead (Les has an electrical engineering degree from Univ. Missouri and an MBA from Wichita State), including 30 years in the aerospace industry, mostly with Boeing. Les eventually returned to farming, albeit in an entirely new location. Since then, Les has been joined by his son, Fred, who studied computer science at K-State and did stints in the Army and in hotel management in California. They both work full-time on the farm these days.

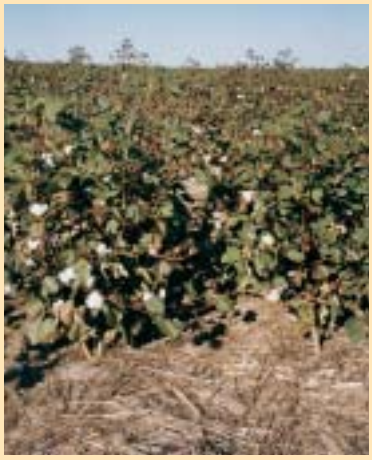

Photo by Matt Hagny.

Sims' cotton in heavy residue.

At first, Les approached farming using the standard practices for the area: lots of plowing and continuous wheat. Always looking for a better way, he initially considered going 'organic' over a wide acreage, prompted by his son Eric's interest in 'organic' gardening (Eric & wife Shelly had 20 acres of Certified Organic —some of the first in the area at the time), although the lack of a market caused Les to rethink that plan. Still, Les knew there had to be a way to meet his profitability goals, and that traditional farming wasn't it. A self-described "avid environmentalist," Les also questioned whether traditional farming was anything close to sustainable—in his own words, he has a strong desire to pass the land on to future generations in better condition than when he received it. While confessing to be a "numbers freak," Les also notes that "most of our agricultural research is focused on maximizing crop yield per acre per year —however, *I* am much more interested in *profits per decade* per acre, and even more interested in profitability per century per acre." Les further notes that the accounting for tillage-based systems needs to include costs for soil erosion as well as "mining" the soil's OM —both of which not only rob the soil of productivity, but also produce side effects that are generally considered damaging to the environment—but that these hidden costs of tillage are often blissfully ignored.

An 'organic' gardener and self-described "avid environmentalist," Sims questions whether traditional tillage-based farming is anything even close to sustainable.

With those goals in mind, Les had been looking into no-till, and started experimenting with it in 1995. When his conventional-till wheat crop blew out in the winter of '95/96 (along with much of Kansas' wheat crop that year), "We made the decision to go 100% no-till and haven't looked back." They made that choice based on

no-till being the best system to meet both their profitability and sustainability goals, plus the fact that more effective herbicides and no-till seeding equipment were becoming available, and changes in the U.S. Farm Program "allowed meaningful crop rotations." The Simses were 100% no-till in 1996, and have been ever since, except for new land acquired that needs smoothing before going into permanent no-till. Les says that since they've been no-tilling, they have maintained profitability per acre, reduced risk, and virtually eliminated erosion. By eliminating tillage and diversifying the cropping, they've been able to keep expanding their operation without major additional labor or equipment, and still have the capacity for doing considerable custom work. As for the abruptness of his changing over to no-till (after lengthy study), Les says, "You can't afford to maintain two lines of equipment."

Dollars In, Dollars Out

One of the keys to their success has been extremely low overhead: with the exception of a 15-foot JD 750 drill, all of their equipment is at least 15 years old, although it is well-maintained. With the drill and a 6-row JD 7000 planter, they seed their own 1,100 acres (scattered out from near Conway Springs to Peck, KS) as well as another 1,000 acres or so of custom no-till seeding every year. They do almost all their own spraying, with a tractor-mounted 45-foot spray bar they built, and all of their own harvesting with an IH 1460 combine and an AC 860 cotton stripper with a broadcast head. They also do some custom harvesting of soybeans and cotton. In other words, Les & Fred are always looking for ways to generate more income per machinery dollar.

Their management mantra also makes them very cost conscious on their other inputs. Les is very willing to tolerate some weeds in their fields, explaining that profits are maximized somewhere short of killing every last weed: "We try to rotate crops in a fashion that reduces weed pressure and herbicide needs, but we usually have to use more herbicides on newly acquired land." They tend to favor preplant herbicides to post-emerge, although they have quit doing soil-applieds on cotton, saying that Roundup Ready is the only way to go on that crop. They do admit that one of the biggest challenges for converting to no-till is choosing the proper herbicides and timing to avoid excess expense. As for insecticides, Les hardly ever uses any, explaining that all too often the beneficial insects will solve your problem for you, if you give them the chance.

Forget dabbling in no-till: "You can't afford to maintain two lines of equipment."

Sims' approach on fertilizers is a little more aggressive, although always guided by returns per dollar spent and by extensive soil testing (they have their own lab), which has paid off by revealing large variations in residual N in different rotations. They apply all of their fertilizer as a liquid at planting—their drill is equipped with Yetter coulter/ knife fert. openers every 15 inches, and the planter has double-disc JD fert. openers in front (they claim not to have trouble with the fert. openers pulling up mud). Even though the drill is equipped for applying dry fertilizer as a pop-up in the seed furrow, they have quit it—"It takes too much time; it's a hassle to handle that extra product"—choosing instead to put liquid phos. with the UAN applied with the fertilizer openers. They have seen the benefit of pushing the fertilizer harder on the wheat, as Les explains, "We used to fertilize for 35-bushel wheat, and didn't get much more. Then we started fertilizing for 50 bu., and started getting 50 to 60—so we upped the fertilizer to have enough for 65 bu. wheat, and lo and behold sometimes we'd get 70!" Les and Fred both see their wheat yields consistently trending higher, and aren't sure whether it's entirely attributable to the fertilizer, or to no-till and improved rotations (likely some of each).

Photo by Fred Sims.

Sims stripping cotton.

The Portfolio of Crops

Les constantly works at improving his rotations, although the underlying pattern is basically 2 years in wheat and 2 years in summer crops, in addition to double-cropping a summer crop after the second wheat. Les explains that "wheat [following a summer crop] is still our most profitable crop, although cotton is a close rival — but we only have four years of experience with cotton, and the returns vary considerably." The accompanying chart presents his data, although Les points out that there's more than meets the eye. For instance, he is well aware that the reason for his highly profitable wheat is the rotation (higher yields & less cost), so that he cannot simply drop some of the less profitable summer crops. Also, eliminating diversity would cause a workload crunch, perhaps necessitating more equipment.

Sims' 2d-year wheat brings in slightly less return than does his first-year wheat, which is primarily due to the $10 to $15 of herbicide needed to keep it clean during that 4-month fallow period between the harvesting of the first wheat and the planting of the 2d wheat. They are experimenting with seeding sunn hemp in this niche, which could help reduce weed control costs, fix some N for future crops, and create a better environment for the 2d wheat crop.

	Return per acre^
W. Wheat (following a summer crop)	$63*
Spring Wheat (following cotton)	38**
W. Wheat (2d-year, ie., wheat following 1st-year wheat)	48
Double-crop milo	(1)
Double-crop soybeans	(4)
Full-season (first crop) milo	23
Full-season soybeans	28
Full-season cotton	58

^These numbers reflect actual revenue and cash outlays, plus paying themselves a custom rate for all field operations. The numbers also include any gov. or insurance revenue, but do not include land costs, and so can be thought of as returns to land and management. These are averages of all his acres in that crop over multiple years (generally 6 or 7, except as otherwise noted). Even so, Les quips: "Past performance is no guarantee of future results."

*To break this number down further, the wheat following soybean has returned $3/a more on average than wheat after milo, when all the years are weighted equally (to prevent skewing by acreage fluctuation from year-to-year). Most studies indicate that wheat following milo suffers yield lag in comparison to wheat following soybeans, which can only be partially overcome by additional N fertilizer—the yield drag is thought to be due to an allelopathic effect of milo residues on seedling wheat, and varietal differences have been noted. Standard practice for Sims includes putting ~ 20% more fertilizer N on the wheat after milo than what their soil testing indicates is required.

**Only one year of data.

As for the small losses reported on the double-cropping following the 2d-yr wheat, Les much prefers this to the guaranteed $7 to $15/a loss if he just fallowed that stubble until the next cropping year. He is interested in trying double-crop cowpeas for hay, although he notes the fickle nature of that market. "We're still looking for a good broadleaf for double-cropping . . . to set it up for milo the following year." Les notes that he could just as well be doing a cover crop, since his double-crop soybeans are essentially that—they rarely make enough grain to justify harvesting. For double-crops, he is now trying cotton. It looks promising, although it'll be a little surprising if it matures in time to have consistently good fiber quality.

"We really start seeing the benefits of no-till by the 4th and 5th year. We add acres every year, so we get to compare."

The sequences most commonly used by Sims are: A) wht >>wht/dc milo >>milo >>cotton, or B) wht >>wht/dc milo >>cotton >>milo, or C) wht >>wht/dc soy >>milo >>cotton. Soybeans are often substituted for cotton, although Les continues to expand his cotton acreage and was quite impressed with its resilience in the drought of 2001. Sims is also experimenting with sunflowers to fill this niche, and although flowers didn't do so good in '01, Les remarks, "I never base any conclusions off of just one year." They have done some alfalfa in the past, too.

Photo by Fred Sims.

Sims' 750 drill, seeding wheat.

In '01 they tried *spring* wheat after cotton, prompted by the reality that cotton harvest often gets too late to properly establish winter wheat (despite applying defoliants to the cotton)—with somewhat promising results. As for milo after cotton, Les hasn't seen a huge problem with droughtiness compared with milo after wht/dc milo or wht/dc soy, but he also makes the point about not having enough data to definitively make statements about many of the rotational effects (Sims jokingly refers to Dwayne Beck's observation on testing & sorting out all the possible nuances & multi-year implications of crop sequencing: "By the time you die, you might know something"). Les does note that neglecting to seed wheat (or some other winter crop) into the b-lf stubble does make it highly susceptible to erosion the next spring.

Their pattern for spring seeding typically progresses from sunflowers to soybeans to milo to cotton, aiming to have the cotton in by the second week in May, and then a brief rest until going on double-crop in June and July. The drill does most of the work, using the planter only for about 2/3 of the cotton and 1/3 of the milo, plus any sunflowers. They try to do as much as possible with the drill, due to higher possible ground speeds, less fill-time, and much less maintenance. "These planters just aren't designed to be rugged enough for no-till in this part of the world—it does fine in the spring, but tends to start shedding pieces when the soils get drier." They do get better cotton stands with the planter typically, which they attribute to more rapid soil warming in the strip cleared by the Dawn residue managers, as well as the more precise seed placement of the planter. Sims' planter also has aftermarket Keeton seed firmers and spoked closing wheels; the 750 drill is mostly stock,

except for the fertilizer bar. All soybeans are drilled on 7.5-inch spacing, milo and cotton on 15-inch whenever those go in with the drill. Les thinks no-till seeding is one area where we definitely need improvement: "We've spent the last several thousand years figuring out how to till soils, but only 15 years honking around trying to do no-till seeding."

While the growing conditions have been plenty rugged the last couple years, Les is unwavering, reiterating that he is much more interested in long-term profitability than in any one year's results—he compares returns on his time and equity invested in the farm to non-farm investments, noting that stock market returns have been negative the last couple years, too. And Les thinks they are well-positioned to take advantage of better weather and prices in coming years, having already established their no-till, diverse rotations, and good management practices.

Photo by Matt Hagny.

Les & Fred Sims with their '01 cotton crop. Les' no-till production methods and diverse rotations result directly from his environmental goals and investment philosophy of looking at the long-term (and when Les says "long-term" he really means it—no Enron or WorldCom accounting schemes here).

Les is intrigued by the continuing integration of 'organic' techniques into the no-till system, and the rapid evolution of no-till methods. He observes the changes in his fields, confirming his choices: "We really start seeing the benefits of no-till by the 4th and 5th year. We add acres every year, so we get to compare first- and second-year with 6- and 7-year no-till." For those just beginning, he remarks, "We can make the transition overly complex by trying to do everything perfectly"—implying that our ideas on the best no-till methods continue to change, and that tillage-based systems had plenty of persistent flaws despite centuries of refining those techniques. Les summarizes a great deal when he notes that "not everything that works in one area will work in another, but in general you can successfully convert to no-till without the need for ripping, pre-liming, or buying lots of fancy equipment—you can if you want to, but you don't have to. If you want to go no-till, go."

Photo by Fred Sims.

Wheat remains an integral part of Sims' rotational plan, including wheat after wheat.

"We would like to thank No-Till on the Plains and the South Dakota No-Till Tours for providing much useful information as we developed our farming system."

Les Sims, Mulvane, KS

No-till On The Plains

P.O. Box 2334
Salina, KS 67402-2334

Non Profit Org.
U.S. Postage
PAID
Permit No. 96
Salina, KS