

THE LEADING EDGE

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A PUBLICATION DEDICATED TO MAXIMIZING YIELD POTENTIAL

Check Your Crop and Yield This Year, Then Plan Ahead

When yields are low, producers investigate the reasons and plan ahead. But even when yields are above average, it's good to check and plan.

For example, Missouri posted near-record yields of corn in 2009, but University of Missouri Extension Agronomist and Professor of Plant Sciences, Peter Scharf says the yield could have been 25 percent larger if the crop hadn't run out of nitrogen. Two of the wettest years in the state's history boosted yields, but water saturation also caused nitrogen leaching and deficiency.¹

Here are factors to examine this year to help you plan for improving next year's yield.

Unsatisfactory Stand Counts and Uneven Stands

Poor weather, planter problems, or insect damage cause growers to obtain final stands that are less than optimal.

If cool weather following planting reduced germination rates, strip-till may provide a solution. With strip-tillage, soil is warmer and drier at planting.

Some no-till farmers who experienced poor stands in cold, wet springs have improved germination by switching to strip-till. Also benefiting from a switch to strips have been farmers who had field-cultivated bean stubble before

planting corn.

"The effect on soil temperature from strip-till is dramatic," says University of Illinois plant pathologist Wayne Pedersen. "We've created a planting zone that is 5° to 9° warmer than regular no-till."²

Moisture and temperature are related. Jim Kinsella has used strip-till for 20 years on his Lexington, Illinois, farm. He says, "A lot of people think the residue is keeping the ground cold. But it is really the water that is keeping it cold. I don't care how much sun you've got, as long as the pores are full of water, the ground is not going to warm up."³

Uneven height and maturation times also reduce yields. John McGillicuddy, an independent agronomist at Iowa City, Iowa, says, "A corn plant knows what its neighboring plants are doing —research has proven this. The closer together plants are, particularly when the spacing drops below 7 inches, the more sensitive they become."⁴

Both stand count and uniformity can be improved with consistent planting depth and the right tools. Spike closing wheels have proven to be invaluable in challenging planting conditions such as wet soil, helping to create good seed-to-soil contact in less-than-ideal conditions.



Cast spike closing wheel

Good row cleaners, or residue managers, clear residue, rootballs, and dirt clods from the row and create a level planting surface. On a level surface, planters' gauge wheels achieve better seed placement. Also, when the residue is cleared, the exposed soil warms the seed zone more quickly. Warm soil early in the season leads to earlier planting dates and even emergence.

Wet spots can also contribute to root

Adding starter fertilizer is also a potential solution. Cool, wet springs slow the ability of the seed to

damage and to nitrogen/nutrient loss. Consider adding drainage tile to poorly drained areas in fields to eliminate this effect.

develop an extensive root system and are a problem for both conventional and minimum-till operations. In these conditions, only a few roots are responsible for gathering enough nutrients to sustain the seedling during crucial early-growth stages. Even in fertile soils, this can be difficult. Starter fertilizers placed in the optimal location give young roots access to needed nutrients. Roots hit the fertilizer shortly after developing and get the boost needed for a growth spurt.

Tools that achieve precision placement for starter fertilizer are key. Look for attachments that can be integrated into your current planting setup, resulting in more efficient pass through the field. Models that allow for depth and down-pressure adjustment can be attuned to work in varying field conditions; these adjustments are key to achieving precision placement.

Plant Yellowing

Yellow plants can indicate that corn ran out of nitrogen during a wet growing season.

McGillicuddy observes, "In most years, we are losing more bushels by not feeding plants that came up than bushels we lose from plants that don't come up because it was too cold."⁵

Scharf states, "Up to a week after silking you should definitely apply nitrogen if your crop is showing deficiency, although I would rather see it done by the time it's shoulder high. If you've done that, you won't have lost much potential yield from nitrogen stress."⁶

Applying nitrogen later in the growing season is departure from long-held farming traditions. However, it is now a viable option due to the availability of precision placement, high-clearance, and side-dressing equipment that protects young plants.

Lack of time may be another reason some producers are reluctant to side-dress nitrogen into their fields. But whether you apply liquid or anhydrous fertilizer, today's products get producers through fields faster.

Self-propelled sprayers equipped with coulters to apply liquid can travel up to 18 mph, a remarkable improvement over spraying operations in the past. Tractors with mounted toolbars equipped with liquid coulters can commonly travel 12 to 15 mph. And now, tractors applying anhydrous with single disc openers have been running up to 12 mph.

These new operations create very little soil disturbance and have much lower horsepower requirements than traditional machines. Traveling faster, using less horsepower, and placing fertilizer better all boost efficiency, which in turn boosts profits.

For more information about nitrogen deficiency, see Nitrogen Watch 2010.

Erosion



Rear Mount Fertilizer applying starter fertilizer.

Hard spring rains are especially damaging to fields without a protective layer of residue. Substantial soil erosion can occur when soils are vulnerable because of degraded crop residue cover, soil preparation by tillage, and no crop canopy, according to authors Mahdi Al Kasi and Matt Helmers in a 2008 article published in the Iowa State Extension Integrated Crop Management newsletter.

The article further reports that raindrops from a normal rainfall range in size from 1 to 7 millimeters in diameter and hit the ground going as fast as 20 miles per hour. Millions of drops hitting the bare soil surface can dislodge soil particles and splash them 3 to 5 feet away. During a heavy rainstorm, as many as 90 tons of soil per acre may be splashed!

While the majority of the soil splashed is not immediately lost from the field, it does clog surface pores, which in turn reduces water infiltration, increases water runoff, and increases soil erosion. Erosion in fields reduces topsoil and lowers soil productivity and can negatively impact yields.

Switching from conventional or min-till to no-till, strip-till, or vertical tillage can reduce erosion. A certain amount of residue on the soil surface prevents erosion, conserves moisture, improves tilth, and reduces crusting tendencies.

Darrell Dunahee of Melvin, Illinois, used to field-cultivate bean stubble before planting corn. "But I saw soil erosion where I ran the field cultivator," he says. "Ever since I was a little boy it's upset me to see soil washing away. I thought there had to be a better solution."⁷

For Dunahee, the solution was fall strip-till, which he adopted nine years ago." It's not without problems, but basically it works well," he says. "It looks like it is yielding right with conventional tillage. And the thing most people around here like is it plants nicely. The soil is loose and mellow. Generally, you don't end up with clods or smeary soil."

A switch to reduced tillage results in a decrease in labor and input costs that, managed effectively, will increase the profitability of the farming operation.

But managing residue as a part of a reduced-tillage system is a long-term commitment, so growers need to use a systematic approach beginning at harvest and continuing on through the planting season. Properly managed residue means implementing the right equipment and techniques throughout



Residue cleared during Spring planting with residue managers.

the year.

One challenge is obtaining the desired percentage of residue removal without disturbing the soil. This is possible if the right residue management tool is chosen. A wide variety of residue managers with many different attachments are readily available. A properly set residue manager moves the residue without moving the soil, and planter gauge wheels will run on level ground for optimum seed placement.

For more ideas for your-round residue management, read Issue 53 of the Leading Edge.

Above All, Make a Plan

While time is something many producers find to be in short supply, especially during harvest, a commitment to evaluating the crop and potential yield-robbing issues will pay off. Armed with the knowledge gained, producers can make equipment and fertilizer choices that will have a quick return on investment.

According to McGillicuddy, "Decisions shouldn't be based on emotion — establish a production plan and stick to it. And if something goes wrong, determine where it happened and take steps to correct it before the next crop."

1 <http://www.midwestagnet.com/Global/story.asp?S=11918694>

2 http://www.agriculture.com/products-classifieds/product-reviews/machinery-and-equipment/implements/strip-till-vs-plter-attachments_423-re7103

3 http://www.agriculture.com/products-classifieds/product-reviews/machinery-and-equipment/implements/strip-till-vs-plter-attachments_423-re7103

4 <http://www.msagconsultants.com/?p=510>

5 <http://www.msagconsultants.com/?p=510>

- 6 <http://www.midwestagnet.com/Global/story.asp?S=11918694>
- 7 http://www.agriculture.com/products-classifieds/product-reviews/machinery-and-equipment/implements/strip-till-vs-plter-attachments_423-re7103

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