Wheat often produces excessive tillers which reduce grain yield.

By Larry Reichenberger

Tie nitrogen to tillering

Photographs: Larry Reichenberger

Intensive wheat management expert Phil Needham says learning to manage wheat by the number of tillers present in the spring will improve efficiency and increase crop yields.

If wheat growers hope to count on more bushels at harvest this summer, then they need to be counting the number of tillers developing in their crop this spring. By learning to manage tiller development, and then to tailor topdress nitrogen rates accordingly, growers can count on both higher yields and greater profits.

Phil Needham, a global crop consultant with Needham Ag Technologies, Calhoun, Kentucky, says one of the most important steps in producing high yielding wheat is managing the tillers. "The number of tillers impacts the number of heads per square yard and that is a critical component of the yield. Wheat growers in Europe, and many in southeastern and northern plains states in the U.S., understand tiller management but most in the central plains do not," says Needham.

TOO MANY TILLERS

Needham, who worked as manager of Opti-Crop Consulting until starting his own business last year, says with adequate moisture, maximum wheat yields are produced with 600 heads per square yard. Assuming some loss will occur, these will come from a population of about 250 plants per acre—each with two to three tillers.

"Most wheat growers in the central plains are producing a crop with five to seven tillers per plant. That translates to a tiller count of 1,000 to 2,000 per square yard. This results in a dense crop canopy with poor utilization of soil moisture and nutrients and increased pressure from foliar disease," says Needham.

Needham says the excessive number of tillers result from not paying attention to the impact seed size has on planting rate, planting too early and using too much fall-applied nitrogen. "Growers know and understand the concept of population management with corn and soybeans, but wheat is just something they plant at 1 1/2 bushels per acre, apply one shot of nitrogen and see what happens. With this approach, they'll likely be disappointed in the grain yield that results," he says.

'Our approach to high-yield wheat production is to only have 30 pounds of nitrogen per acre in the seedbed at planting. This helps to reduce the number of tillers and allows the production of grain rather than straw. The balance of the nitrogen (2.5 lbs/bushel) is applied according to the number of tillers per square yard found in the field," explains Needham.

If there are less than 300 tillers per square yard, this approach calls for an application of 60 pounds of nitrogen at greenup to spur tiller development. The balance of the ▸▸

Tie to tillering

nitrogen is then applied at Feekes growth stage 6.

As shown at right, if the tiller count is in a range of 450 to 550 per square yard, less nitrogen is applied at greenup. If the count is closer to 700 per square yard, only 30 pounds is applied at greenup.

"In the latter case, delaying the application of nitrogen will reduce excessive tillers and increase the grain yield," says Needham.

HOW OTHERS MANAGE TILLERS

Agronomists from Virginia Tech University advocate a similar approach to nitrogen management. "We really stress counting tillers as the way to determine spring nitrogen needs because we don't want to encourage excessive winter growth by applying too much N in the fall," says extension grains specialist Wade Thomason.

The Virginia approach is based on tillers per square foot. When wheat has more than 100 tillers per square foot in February, it doesn't need additional nitrogen until at least March. With 50-100 tillers per square foot, 30-40 pounds of nitrogen should be applied earlier. And, if wheat has less than 50 tillers, 40-50 pounds of nitrogen should be applied as soon as possible in February.

Thomason says county agents, crop consultants and farmers have been trained to count tillers. "We count the equivalent of a square foot—19 inches of row length in 7-inch rows—at five places in the field," he explains. ■

At proper seeding rates, two to three tillers per plant is the optimum number for maximum wheat yields. Wheat with more tillers tends to be less efficient in using nutrients and moisture, unless used for haying or grazing.

TIMING TOPDRESS NITROGEN APPLICATION

Tiller number	N timing
Split application	
<300	Apply 60 lb. N at greenup, followed by the balance at GS 6
450-550	Apply 45 lb. N at greenup followed by the balance at GS 6
700 +	Apply 30 lb. N at greenup followed by the balance at GS 6
Single application	
<300	Apply all nitrogen at greenup
700 +	Apply all nitrogen at GS 5-6

Needham suggests varying topdress nitrogen application according to the number of tillers per square yard, as shown above. To count tillers, he counts the plants in a yard of row then pulls up representative plants to determine the number of tillers per plant—count only tillers with at least two unfolded leaves. Multiply plants per yard by tillers per plant and convert to tillers per square yard using a factor for row width. For 6-inch rows the factor is 6 (the number of rows per yard). The factor for 7 1/2-inch row spacing is 4.8.

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