

Have you ever wondered if wheat varieties differ in their tillering ability and how tillering is associated with the different yield components?

One study was established at the South Central Experiment Field near Hutchinson on a Clark clay loam soil and a second study was established at the Agronomy Farm near Manhattan on a Muir silt loam soil to provide answers to those questions. Seven wheat varieties, Agseco 7853, Custer, Ike, Jagger, Karl 92, 2137, and 2163, were planted in early October at 60 pounds per acre in nine inch rows. Tiller numbers were determined at three growth stages, late boot stage (Feekes stage 9-10), early grain milk stage (Feekes 10.5.4), and late grain dough stage (Feekes stage 11.2).

At Hutchinson, at the late boot stage, all varieties had the greatest number of tillers and the average number of tillers was 893 tillers per square yard ( $\text{yd}^2$ ). However, at early milk stage the average number of tillers was 636 tillers per  $\text{yd}^2$ , a decline of 29 % from the late boot stage. From the milk stage to the late dough stage, tiller numbers decreased by another 13 % (519 tillers per  $\text{yd}^2$ ) for a total decrease in tillers numbers of 42 % (58 % tiller survival). There were no significant differences in number of tillers among the varieties at each of the three growth stages.

At Manhattan, at the late boot stage, there were no tiller number differences among varieties but the average number of tillers (1308 tillers per  $\text{yd}^2$ ) was higher than at Hutchinson. There was a decline of 33 % in tiller numbers from boot stage to the early milk stage (871 tillers per  $\text{yd}^2$ ) and another 13 % decrease to the late dough stage (700 tillers per  $\text{yd}^2$ ). There was a total decrease of 46 % in tiller numbers from boot stage to late dough stage.

At Hutchinson, there was no significant yield differences among varieties and the average yield was 61 bushels per acre. At Manhattan, yields ranged from 72 bushels per acre for Karl 92 to 87 bushels per acre for 2137 with an average yield of 77 bushels per acre. At Hutchinson, the varieties generally had more kernels per head than at Manhattan (20.6 kernels per head compared to 17.5 kernels per head) but the kernel weight was lighter (32.5 mg vs 36.2 mg).

At both locations, number of tillers at the dough stage was not correlated with grain yield, but was negatively correlated with the number of kernels per head. At Manhattan, the number of kernels per  $\text{yd}^2$  had a positive affect on grain yield. At Hutchinson, the number of kernels per head was negatively correlated to kernel weight, but there was not a significant correlation at Manhattan.

What's the bottom line?

Although, we hear and talk about wheat varieties tillering more than others, these data indicate that all our adapted varieties have the potential to develop an adequate number of tillers. We normally think that tillers are lost during the winter and early spring, but interestingly, there is a large percentage of tillers that senesce between late boot stage and dough stage and are not productive. Wheat tillers are important yield components, but so are kernel numbers per head, kernels per  $\text{yd}^2$ , and kernel weight and if you can affect one yield component, another has the potential to compensate. Kernel weight is the last yield component to be determined. It should be noted in these studies, the number of tillers did not directly affect grain yield, but rather the other yield components. (Of course, you have to have tillers before you have grain.) Generally, as productive tiller numbers increase the number of kernels per head decreases, and kernel weight may or may not be affected. That's why we see small heads with few kernels per head at high seeding rates and, depending on growing conditions the kernels may be heavy or light.

For details about this research see:

Relationship between tillering and grain yield of Kansas wheat varieties. 2002. Keeping Up With Research SRL134, K-State Research & Extension.

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