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Late Emerging Wheat

Recent rains have been just what the Doctor ordered for our drought stressed wheat crop. If good moisture conditions continue, the wheat crop may certainly make a come back. One question I am getting is 'what kind of yield can I now expect'? The answer to this question is largely dependent on the condition of the wheat prior to receiving the recent moisture and what the rest of March and April has in store for us. There are three components that contribute to yield. Those are: number of heads, number of seed per head, and weight of each seed.

Number of heads are determined by seeding rate and tillering. A healthy wheat plant will usually have 3 to 5 tillers that contribute greatly to yield (or more under good irrigated conditions). The two or three most productive tillers usually develop in the fall. Secondary tillers that develop in late winter and early spring can and do contribute to yield. How much they contribute to yield will be very much tied to March and April weather.

Number of seed per head is largely affected by conditions that are present the two weeks prior to jointing, and the conditions that are present during and immediately after flowering. The potential number of seed is determined when the plant switches from a vegetative to a reproductive stage of development. This will likely occur over the next two to three weeks (March 4 - 24). The rains we have recently received should give us conditions for a high number of seed per head. How many of those potential seed actually develop will be determined later.

Seed weight will be based on conditions present during grain fill, with wet, moderate temperatures promoting high seed weight.

So lets discuss different scenarios and how these three components may interact to effect final yield:

- *Fields that emerged well, and got off to a reasonably good start.* Hopefully these fields still have excellent potential, although their leaves may have been burned back due to cold weather in early January. It is possible some of the primary tillers that developed in the fall may have been aborted due to our fall and winter drought. This likely occurred in some fields. Late winter and spring tillers can make up for some of this loss. Conditions that will favor the development of these spring tillers are a cool, wet March. Our current wet conditions should promote the potential for a high number of seed per head. Overall, these fields should have a reasonable chance to make a good yield.
- *Fields with wheat that emerged in the fall but are thin and/or spotty.* These are the fields that looked like they were just about dead four weeks ago. In these fields a wet, cool March, will be essential for

promoting tillering. If adequate tillering does not occur, seed number per head and seed weight can potentially at least, partially offset this lack of productive tillers. However, they are unlikely to fully compensate for the lack of tillering. Expect some decline in yield.

- *Fields with wheat that have just recently emerged.* Even under the best of situations, these fields are unlikely to produce a 'normal' yield. However, these fields can still produce significant yield. One concern is that wheat that has just now emerged may not have 'vernalized'. Vernalization is essentially a chilling affect that must take place in winter wheat before it will switch from the vegetative to reproductive stage and produce a head. This is a protective mechanism in winter wheat that keeps the growing point below the ground, thus insulating it from potentially being frozen during the winter. Once the plant has been sufficiently 'chilled' and temperatures begin to warm up (day length may also play a role), the plant will start its reproductive stage and jointing will soon occur. This vernalization process starts as soon as the seed imbibes water. Wheat does not need to be emerged for vernalization to begin. The effective vernalizing temperature range appears to be from 33° and 50° F. The amount of chilling necessary is variety dependent. Some varieties may require as little as a few days to vernalize, while others may require as much as six weeks. Varieties known to have a short vernalization requirement are TAM 101 and TAM 202. Jagger is also suspected of having a short vernalization requirement. My best guess, is that any variety planted before January 1st has had plenty of opportunity to vernalize, even if it has just recently emerged. Clearly the yield potential of recently emerged wheat has been significantly reduced, as even under the best of spring conditions seed number per head and seed weight cannot make up for the lack of sufficient tillering.

Estimating Wheat Yield Potential

Two publications have been written on how to estimate wheat yield. Both publications require you to make certain assumptions (guesses) on seed number and seed weight. Basically, to get an estimate of yield potential, number of plants are counted, or better yet tillers, per square foot. By estimating seed number and seed weight a potential yield can be derived. Clearly the closer to actual harvest the more accurate the yield estimate will be. These two publications, one from Texas and one from Oklahoma, can be printed from the internet at:

- <http://soilcrop.tamu.edu/publications/pubs/scs1999-21.pdf>
- <http://www.agr.okstate.edu/plantsoilsci/extension/publications/wheat/pt-01-10/pt2001-10.htm>

Research out of Kansas and elsewhere suggests that wheat yield can be reduced as much as 20% for every month planting is delayed past it's optimum planting date. On average, wheat yield was reduced 50% when it emerged in March compared to in the fall. However, as indicated in the previous discussion, actual yield loss will largely be dependent on weather conditions from now through grain fill. At least the recent moisture has given the crop a fighting chance. If fields have a decent yield potential at this time, keep in mind that weed control and possibly nitrogen topdressing may be required. If wheat is to be topdressed with nitrogen this needs to occur before jointing to do much good.