Wheat Growth and Development

**Feekes Scale of Wheat Development**

- **Feekes 1**: Emergence. Developing from below ground. For each peak, there are three leaves visible, a tiller will be at the base of the first leaf. Tillers can contribute to grain yield when spring-tillering occurs.
- **Feekes 2**: Tiller development. Tillers are initially leafless and nutritionally independent from the main stem. Tillers with three or more leaves are visible, a tiller will be at the base of the first leaf. Tillers can contribute to grain yield when spring-tillering occurs.
- **Feekes 3**: Continued tillering. Primary tillers develop in the axil of the first four or more true leaves of this main stem. Secondary tillers may develop from below the flag leaf. Tiller development is prioritized based on this sequential formation. The development of the crown root system increases with tiller intensity. From 1 to 15 per cent of the total dry matter is accumulated by this stage, depending on growing conditions, sowing date, soil fertility, tiller number, moisture availability, and other factors.
- **Feekes 4**: Completion of tillering. Once requirements are met, the growing point differentiates and the embryonic head reaches the double ridge stage. Depending on the season and planting date, tillering will occur in the spring. Genetic potential and environmental conditions determine the number of tillers on a plant. Tillers with three or more leaves are nutritionally independent from the main stem. Tillers that develop more than 50% per square foot are present, an early indication that increased grain production can increase yield potential and help compensate for poor growing conditions.
- **Feekes 5**: Header development. The pseudo-stem becomes strong and leaf sheaths are pushed against the spikelet. The terminal spikelet reaches the terminal stage and is pushed up into the pseudo-stem. The potential number of spikelets per head is determined at Feekes 5. The first floret stage is marked by the development of the stamen and ovary, and the development of the spikelet is complete. Approximately 25% of the total dry matter is accumulated at this stage.
- **Feekes 6**: Second stage of terminal tillering. As the second node of the stem becomes visible, the last to next last leaf is visible. Demand for water and nutrients increases. Temperatures lower than 24 degrees Fahrenheit can damage the developing head.
- **Feekes 7**: Management. Plant growth regulators may be applied at this growth stage. Scout for insects, weeds, and diseases.
- **Feekes 8**: Leaf and leaf scald. The flag leaf starts to emerge from the sheath above the third or fourth node. Temperatures below 28 degrees Fahrenheit can damage the developing head.
- **Feekes 9**: Management. Scout for insects and diseases. Consider a fungicide application to protect the flag leaf. Early to late blight diseases are present on the lower canopy. Fungicide applications can increase grain protein levels.
- **Feekes 10**: Terminal spikelet. At this stage, the spikelet begins to develop and is visible. Temperatures below 24 degrees Fahrenheit can damage the developing head.
- **Feekes 11**: Management. Consider a fungicide application for wheat head armyworm. Severe heat and marketing plans if present. Scout the crop for head scab and adjust yield predictions. Monitor the crop for leaf scab and adjust yield predictions. Scout for wheat head armyworm. Severe heat and marketing plans if present. Scout the crop for head scab and adjust yield predictions.
- **Feekes 12**: Hard dough. The grain is fully developed, and the kernels are nutritionally mature. Temperatures below 28 degrees Fahrenheit can damage the developing head.
- **Feekes 13**: Management. Scout for insects and diseases. Consider a fungicide application to protect the flag leaf. Early to late blight diseases are present on the lower canopy. Fungicide applications can increase grain protein levels.

**Milk stage** (anthesis). Flowering begins shortly after the flag leaf emerges, typically 10 to 15 days after flowering. A minimum of 20% of flowers are visible when flowering is complete. If fewer than 70 tillers are present, tillering should be increased from dual-purpose wheat before first hollower stage.

**Grain filling**

- **Kernel hard**: Nursery or field plots with hard-dough kernels. Avoid planting plots with hard-dough kernels. Kernels are hard and difficult to dehusk.
- **Kernel dry**: Field plots with hard-dough kernels. Avoid planting plots with hard-dough kernels. Kernels are hard and difficult to dehusk.

**Harvest**

- **Kernel moist**: Field plots with hard-dough kernels. Avoid planting plots with hard-dough kernels. Kernels are hard and difficult to dehusk.
- **Kernel wet**: Field plots with hard-dough kernels. Avoid planting plots with hard-dough kernels. Kernels are hard and difficult to dehusk.

**Ripening**

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