Post-emergent herbicide timing key in corn production

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Leaf Collar

Identifying the leaf collar and first true leaf are critical to accurately stage corn, according to Dr. Jourdan Bell. Credit: Texas A&M AgriLife photos by Kay Ledbetter

Weed control in corn is important to profitability, but producers need to be aware of herbicide application timing, said Dr. Jourdan Bell, Texas A&M AgriLife Extension Service agronomist in Amarillo.

"We know post-emergent herbicide applications are necessary for season-long weed control," Bell said. "However, it is important to follow post-emergent corn herbicide labels, which define the latest growth stage for which herbicide applications can be made without causing crop injury."

She said herbicide applications past the recommended growth stages can result in significant crop injury, so it is important producers understand and recognize each of the stages.

"Some herbicide labels also provide a recommended height for the last herbicide application as plant height often corresponds with a particular vegetative stage."

However, Bell said, in high-input environments with abundant irrigation and/or precipitation and fertility, internode distances can expand at a greater rate than new leaves.

"Consequently, plant height does not always correspond to the correct vegetative stage," she said. "So, it is important to accurately stage the corn crop before making post-emergent herbicide applications."

Bell also warned stressful production environments with limited water or cool temperatures can slow corn growth, which can result in magnified crop injury because the plant does not metabolize the herbicide quickly enough to avoid injury.

The first round-tipped leaf. Credit: Texas A&M AgriLife photo by Kay Ledbetter

For labels that provide both plant height and growth stage, the applicator should follow the more conservative recommendation, she said.

The vegetative stages are described using the leaf collar method. Leaves are counted from the lowermost first rounded-tip leaf to the uppermost leaf with a leaf collar, which is the connection between the leaf blade and the leaf sheath, she explained.

"The key features to identify are the leaf collar and the first round tipped leaf," Bell said. "While the individual stages are important, it is key to be able to identify the leaf collar and first true leaf to accurately stage corn."

The leaves in the whorl that are not fully expanded are not counted, she said.

Leaf stages are labeled as "V" stages. Some of the more important V stages include:

- Coleoptile leaf or first leaf is visible, V1. This leaf will be shorter than later emerging leaves and has a rounded tip. It is also referred to as a spike. The growing point of the plant should be 1-1.75 inches below the soil surface. Seminal roots begin growing from the seed and the permanent nodal root system will begin developing at this point. If the seed is planted too shallow, the root system will have a difficult time becoming established.

- 4-Leaf, V4. Collar of fourth leaf is visible. The growing point is below the soil surface. Roots are elongating and the root system is primarily nodal roots. Weed competition will begin to significantly reduce yield potential.
- 5-Leaf, V5. Collar of fifth leaf visible. May have lost the coleoptile leaf by this time. Leaf number and ear shoot formation is now complete. The plant is about 8 inches tall. The growing point is just below the ground surface. A hail or light freeze will cause little long-term damage to the plant. However, flooding while the growing point is below ground can kill the plant, especially if temperatures are high. The first internode to elongate is about one-half inch long and is located just below the node to which leaf five is connected. This is an important reference for crop growth staging. Tassel formation has been initiated.
- 6-Leaf, V6. Collar of sixth leaf is visible. This occurs approximately about three weeks after emergence. The growing point and tassel is above the soil surface, making the plant more vulnerable to a hail or freeze. The permanent root system rather than the seminal roots is now the primary root system supporting the plant. The root system extends about 18 inches.
- 13-17 Leaves, V13-V17. V17 occurs about eight weeks after emergence. Leaf stages 13 to 17 will develop very rapidly. At some point the tip of the tassel will be visible. Early maturing hybrids progress from the 13-leaf stage through the 17-leaf stage faster than later-maturing hybrids and have smaller ears. Brace roots are developing from the sixth node.

Another consideration, Bell said, are non-labeled spray adjuvants. Spray adjuvants are to enhance herbicide performance, but under certain conditions, non-labeled spray adjuvants can increase herbicide injury from a poorly timed post-emergent application. Consequently, it is always recommended to check the label for appropriate adjuvants.

"In addition to the crop stage and condition, knowledge of the weed species and weed size are also important for effective post-emergent herbicide applications," Bell said.

More information: A complete list of post-emergent corn herbicides evaluated in the AgriLife corn herbicide trials at Bushland is available at tinyurl.com/cornherbicidepub

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