Corn Growth Stage and Herbicide Application Postemergence

Key Points

- Herbicides are increasingly applied postemergence (POST) in corn for season-long control of weeds.
- Prior to POST herbicide applications, fields should be scouted to accurately determine corn and weed growth stages.
- Herbicide product labels should be followed according to the corn growth stage and other recommendations for POST applications.
- Environmental conditions should also be considered relating to how they may affect herbicide applications, effectiveness, and crop safety.

Importance of Identifying the Corn Growth Stage

When selecting a POST herbicide or tank mix combination, the weed species present, weed heights, and corn growth stage should be known. Taller corn is generally more sensitive to potential herbicide injury, particularly when nozzles apply directly into the whorl of the plant. Potential injury can be reduced and weed coverage is increased by using drop nozzles in taller corn (generally 24 inches or more).

Growth stages on herbicide product labels are usually indicated as a corn leaf stage or plant height, and sometimes both are listed. The growth stage that is most restrictive should be followed when both corn leaf stage and height are listed on the label. When using a tank mixture, follow the recommendations for the most restrictive label language of the products being used in the tank mix.

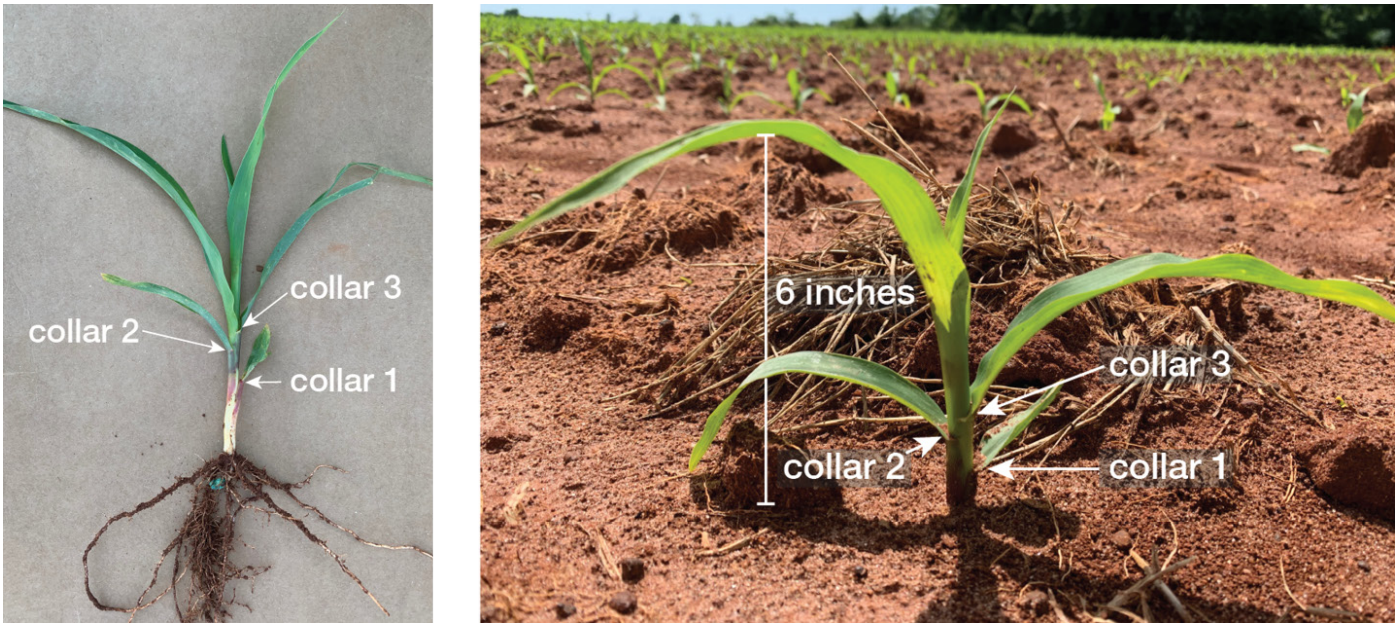

Figure 1. Corn plants in the V3 growth stage showing 3 visible leaf collars and a plant height of 6 inches measured from the soil surface.

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Corn leaf stage is determined by counting leaf collars after emerging from the whorl (Figure 1). Leaves that are just emerging from the whorl will not have a visible collar and are not counted. Leaf stages are designated using a "V" (vegetative) to represent each leaf during vegetative development. The first true leaf (coleoptile leaf) on corn is the short, rounded leaf near the soil surface, which is counted as V1. Each successive, visible leaf collar is counted as V2, V3, and all the way to V18, which emerges prior to tasseling. As corn plants grow, the lower leaves can die or tear away, making it difficult to accurately count the collars. Corn generally loses its coleoptile leaf by the time it reaches the V5 growth stage.
To stage older plants, dig up the plant and split the stalk down into the root ball. Find the triangular "woody" base of the stalk and locate the first internode above the base. The woody, horizontal node is the point of attachment for the fifth leaf or collar. For example, if you can count 5 visible leaf collars above this point, the corn plant is in the V10 growth stage.

Plant height is determined by measuring from the soil surface to the arch of the uppermost leaf that is more than 50% emerged (Figure 1). Plant height may not be an accurate determination of growth stage, because adverse environmental conditions can result in corn plants that are physiologically older than their height suggests.

Herbicide product labels provide directions for over-the-top broadcast and directed drop nozzle applications in corn. Labels provide a maximum corn growth stage for broadcast applications, and after which applications should not be made (Table 1). In corn with Roundup Ready® 2 Technology, a broadcast herbicide application of Roundup® brand glyphosate-only agricultural herbicides can be applied up to the V8 growth stage or 30-inch-tall corn, whichever comes first. Drop nozzles should be used for optimum spray coverage and weed control when corn is 24 to 30 inches tall. When corn is 30 to 48 inches tall, only use drop nozzles and avoid spraying into the whorls of the corn plants.

Some labels indicate the minimum corn growth stage before POST applications should be made. For example, Capreno® herbicide can be applied POST when corn reaches the V1 stage up through V7 or 20-inch-tall corn, whichever comes first. Broadcast applications of Capreno® herbicide in corn grown for seed are recommended from the V1 to V5 growth stages.

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Table 1. Application restrictions for selected herbicides applied postemergence in corn.	
Herbicide Product	**Maximum corn heights and/or growth stages***
Roundup® brand glyphosate-only agricultural herbicides (glyphosate-tolerant corn)	V8 or 30 inches over-the-top broadcast 30-48 inches with drop nozzles
Liberty® Herbicide (glufosinate-tolerant corn)	V7 or 24 inches over-the-top broadcast 24-36 inches with drop nozzles
Atrazine herbicide	12 inches
2,4-D herbicide	8 inches (use drop nozzles if over 8 inches)
Banvel®/Clarity® Herbicides (dicamba)	8 inches or 5-leaf using 16 oz/acre rate use 8 oz/acre rate at 8-36 inches
Harness® Herbicide, Harness® MAX Herbicide, Harness® Xtra Herbicide, Harness® Xtra 5.6L Herbicide, and Degree Xtra® Herbicide	11 inches
Warrant® Herbicide	30 inches
TripleFLEX® II Herbicide	11 inches
Balance® Flexx Herbicide	V2
Corvus® Herbicide	V2
Capreno® Herbicide	V1-V7 or 20 inches (V1-V5 in seed corn)
Laudis® Herbicide	Up to V8 in field or popcorn, up to V7 for sweet corn. Up to V9 in field or popcorn.
DiFlexx® Herbicide	V10 or 36 inches, whichever comes first
DiFlexx® DUO Herbicide	Directed application when corn is from V7-V10 stages up to 36-inches tall or up to 15 days prior to tassel. Direct sprays should be used if corn leaves prevent proper spray coverage, sensitive crops are grown nearby or when tank mixing with 2,4-D.
Accent® Herbicide	V6 or 20 inches, 20-36 inches using drop nozzles
Acuron® Herbicide	12 inches
Acuron® Flexi Herbicide	30 inches
Aim® Herbicide, Shark® Herbicide	V8, V8-V14 using drop nozzles
Basis® Herbicide	V2 (do not apply to >6 inches tall corn)
Buctril® Herbicide	12 inches
Callisto® Herbicide	V8 or 30 inches
Distinct® Herbicide	4-10 inches using 6 oz/acre rate 10-24 inches using 4 oz/acre rate 24-36 inches using 4 oz/acre rate and drop nozzles
Hornet® Herbicide	V6 or 20 inches, 20-36 inches using drop nozzles
IMPACT® Herbicide	Up to 45 days of corn/silage harvest
Marksman® Herbicide	8 inches
Option® Herbicide	V1-V6, V6-V8 using drop nozzles
Permit® Herbicide and Yukon® Herbicide	36 inches
Python® Herbicide	V6 or 20 inches
Resicore® Herbicide	11 inches
Resource® Herbicide	V2-V10
Resolve® Herbicide	V6 or 12 inches
Revulin® Q Herbicide	V6 or 20 inches
Status® Herbicide	V2 or 4 inches – V10 or 36 inches
Stinger® Herbicide	24 inches
*Where both height and leaf or growth stage are provided, use the most restrictive classification. ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR THE HERBICIDE PRODUCT.	

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POST Application Considerations

- ALWAYS READ AND FOLLOW LABEL DIRECTIONS. The type and amount of corn injury from a POST application beyond the labeled window for the herbicide(s) can be dependent on the herbicide(s), the exact timing of application, and environmental stress.
- Environmental conditions influence the absorption herbicides and potential crop tolerance. Corn under stress may not metabolize some herbicides quickly enough to avoid crop injury. Cool temperatures and wet soils can slow the growth of corn and alter its development. Warm and humid conditions promote rapid absorption, while cool and dry conditions may slow the crop's development. Corn can become more responsive to herbicides during favorable growing conditions due to changes in the leaf cuticle that may allow greater absorption.
- Spray additives can increase the rate of herbicide uptake by the crop. Injury symptoms resulting from spray additives include chlorotic mottling or necrosis of leaves and may only be temporary as the crop recovers. Herbicide product labels should be followed regarding spray additives that are recommended.
- Herbicide residues from previous applications may remain in the spray tank causing contamination. This contamination could cause an unwanted interaction with the herbicides applied to corn.
- POST-applied herbicide injury symptoms can include leaf chlorosis or necrosis, onion leafing, internode stacking, rat tailing, ear pinching, ear bottlenecking, brace root malformation, and green snap. Corn ear development can be affected if POST-applied herbicides are applied late in the growing season. Therefore, it is important to always read and follow the corn growth stage restrictions on the herbicide product labels.

Sources

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Legal Statements

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