

Critical Period of Weed Control in Corn

Why Control Weeds Early?

- Early season weed control helps protect crop yield potential, as corn is not a very competitive crop.
- Weeds and corn compete for the same resources: water, sunlight, and nutrients.
- Small weeds are easier to control and can absorb and translocate herbicide better.
- Herbicides can be less effective during times of heat and drought stress, which often occur with later applications.
- A sequential weed control program consisting of both pre-plant/emerge (PRE) followed by post-emergence (POST) herbicides generally provides the most consistent results.



Figure 1. Field infestation of wild buckwheat and lambsquarters. June 27, 2018. Southern Alberta.

Critical Period of Weed Control

- Defined as the growth stages or time during which weeds must be controlled to maintain maximum yield potential (assumes field is clean at time of planting).
- In Western Canada, weeds can reduce corn yield starting at emergence so controlling weeds from even prior to the VE (emergence) stage of corn to V6 (6 leaf stage) is recommended.
- After this stage, the corn is generally too tall and/or susceptible to glyphosate herbicide injury.
- Controlling weeds is important for minimizing competitive effects and subsequent yield reduction, but also for preventing weed seed production.

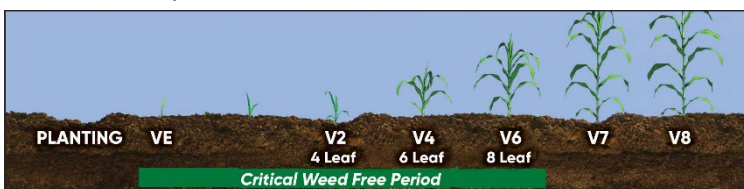


Figure 2: Critical Period of Weed Control in Corn (VE-V6)

Take Time to Apply Preplant/PRE Herbicides

- Weeds that germinate, emerge, and grow with the crop cause the most yield loss.
- Preplant/PRE herbicides provide critical early season weed control when crops are most sensitive to competition.
- Preplant/PRE herbicides can widen the window of application for post-emergence herbicide sprays.
- Weed control programs that rely totally on POST applications carry more risk because weather conditions may prevent timely application and weeds may be too large to achieve sufficient efficacy.
- The key is to control weeds before they start to compete.

Post-Emergence Applications

- Scout fields to determine what weeds are present and what products can be safely used in crop.
- If a preplant/PRE application was not applied, apply postemergence herbicides as soon as possible.
- Always follow labels and guidelines of registered herbicides for maximum efficacy.



Figure 3. Post emergent sprayer miss. Coaldale, AB. June 14, 2021. Sprayer miss on right hand side of picture.



Figure 4. Same field as shown in figure 3. Sprayer miss was sprayed 7 days after the first application. (Illustrates effect of delaying application and weed/crop competition). July 7, 2021. Coaldale, AB.

Crop Staging

- Staging a corn crop appropriately to match label recommendations is key to crop safety and herbicide efficacy.
- The leaf collar method is the preferred method of Pioneer agronomists as it leaves no discrepancy in staging.
- This method is utilized to stage corn plants from emergence (VE) to tassel (VT).
- Start with the lowermost short rounded-tip true leaf and end with the uppermost leaf with a visible leaf collar.
- **Leaf collar:** Is a light collared “band” located at the base of an exposed leaf blade where the leaf contacts the stem of the plant (Abendroth et al., 2011).
- With this method, leaves that are still in the whorl with no visible leaf collar are NOT included in staging. Ex.: V3 = 3 leaves with visible leaf collars.
- Check herbicide labels to determine what staging method is utilized. Contact your local Pioneer representative or agronomist for staging assistance.

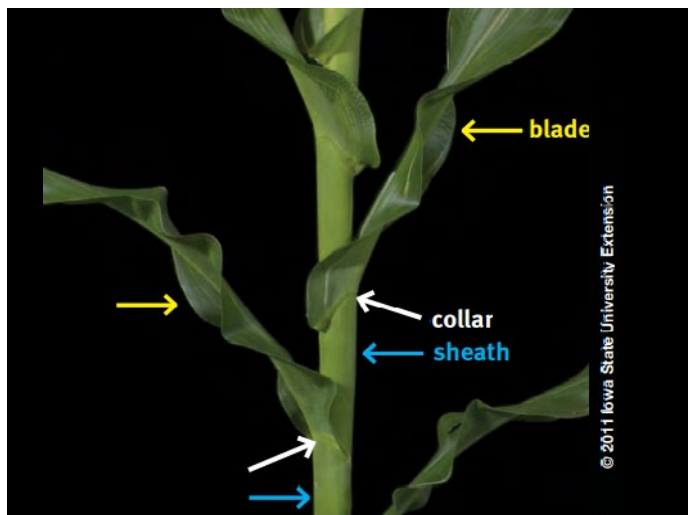


Figure 5. Corn plant showing fully emerged leaves with visible leaf collars. Photo courtesy of Iowa State University Extension.

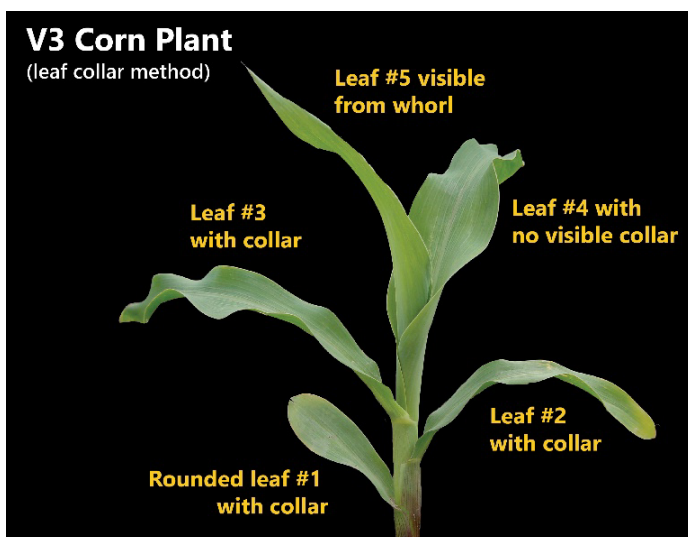


Figure 6. Corn plant staged as V3 according to the leaf collar method.

Herbicide Injury

- Although many herbicide products are registered on corn, some pose a risk of crop injury under certain environmental conditions, particularly with early maturity corn hybrids.
- Pioneer has developed a Corn Hybrid-Herbicide Management Guide to assist producers in selecting and managing their herbicide programs (Gaspar, 2019). Growers are encouraged to contact their Pioneer sales professional for more information. The current Corn Hybrid-Herbicide Management Guide is available at www.pioneer.com/us/stewardship
- **Auxin Herbicides (Group 4)**
 - Ex.: 2,4-D, MCPA, dicamba
 - Synthetic auxin herbicides cause tissues to “outgrow” the cells’ capacity to maintain function.
 - Affected plant tissues can exhibit epinasty – stalks twist, lean and fall over. Leaf rolling and trouble unfurling can also occur.



Figure 7. Group 4 herbicide injury in corn.

• Photosystem II Inhibitors (Group 6)

- Ex.: Bromoxynil
- These products can “burn” the cells on the leaves stopping photosynthesis.
- Injury is typically confined to the leaf tissue that has been contacted by the herbicide.



Figure 8. Group 6 herbicide injury in corn.

References

- Abendroth, L.J., R.W Elmore, M.J. Boyer, and S.K. Marlay. 2011. Corn Growth and Development. Iowa State Univ. Extension Publication PMR-1009. <https://store.extension.iastate.edu/Product/Corn-Growth-and-Development>.
- Gaspar, P. 2019. Corn Hybrid Herbicide Management Guide. Crop Insights Vol. 29 No. 9. Pioneer. Johnston, IA. <https://www.pioneer.com/us/agronomy/corn-herb-guide.html>