CLEANER FIELDS, HIGHER YIELDS

DuPont™ Sortan™ IS
herbicide
Pre-emergence or post-emergence

Introducing NEW Sortan™ IS

NEW Sortan™ IS is a powerful tool that can be applied pre-emergent or spike to the V3 stage, helping growers keep their corn free of weeds during the Critical Weed Free Period (CWFP).

Keeping your corn weed free is key to maximizing yield and profits in corn.

Carman, MB, 2015

Application Timing:
Pre-emergence – Before emergence of crop or weeds or Post-emergence - VE (spike) to V3 stage
Packaging:
Convenient packaging: all-in-one dry additive in a 1.2kg bottle.

NEW Sortan™ IS: 3 Key Benefits

Removes Early-Season Weed Competition	Designed to remove **early season weed competition** including volunteer Roundup Ready® canola and wild buckwheat
Resistance Management	Provides an additional mode of action to glyphosate, making it a great tool for effective resistance management
Extended Control	Extended control of tough broadleaf and grassy weeds throughout the critical weed free period

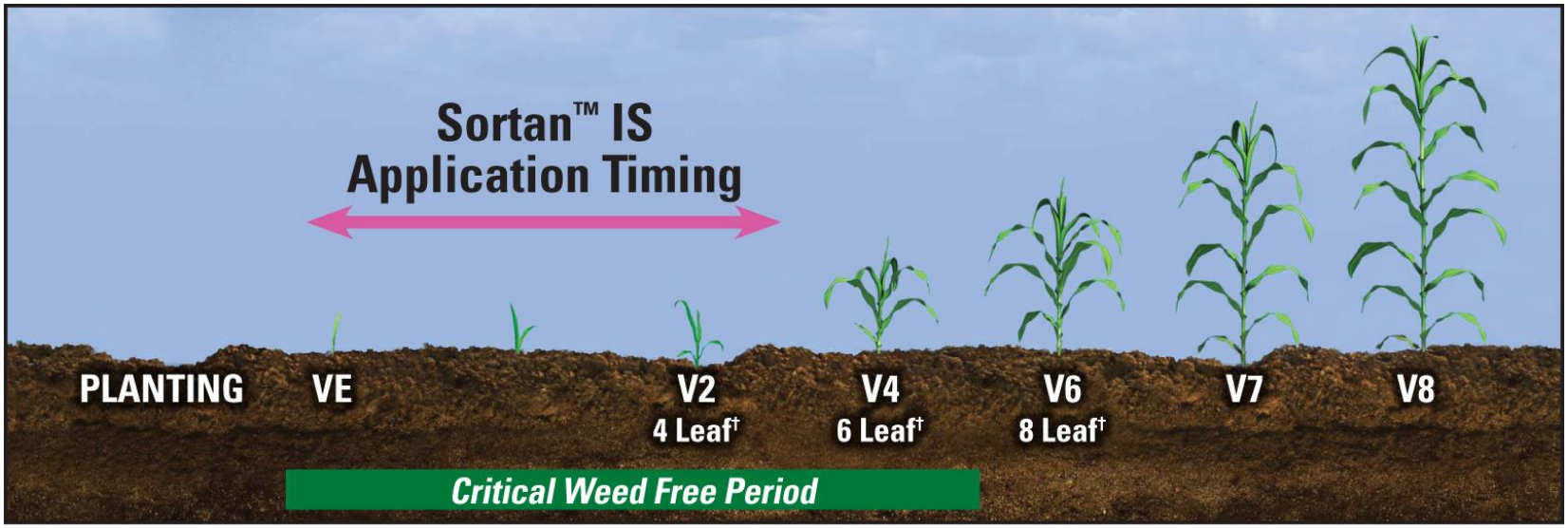
NEW Sortan™ IS: Weeds Controlled

Carman, MB, 2015

Weeds Controlled
Volunteer Canola*
Wild Buckwheat
Redroot Pigweed (including triazine resistant)
Lamb's Quarters
Barnyard Grass
Green Foxtail
Yellow Foxtail[1]
Quackgrass
Large (Hairy) Crabgrass[1]
Fall Panicum
Old Witchgrass
[1]Suppression only. *Tank-mix with glyphosate required for volunteer Clearfield® canola control.
Refer to product label for complete details prior to use.

New Sortan™ IS: Application Timing

Pre-Emergent application – before emergence of crop or weeds
Post-Emergent application – VE (spike) to V3 (5 leaf stage†)



†Corn leaf stages can vary depending on both growing conditions and corn seed product.

New Sortan™ IS: Application Information

Application Information	
Pre-Emergent Rate	30 g/acre, 40 acres/bottle
Post-Emergent Rate	15 g/acre – 30 g/acre, 40 – 80 acres/bottle (Refer to product label for more details on the post-emergent application).
Packaging	1.2 kg bottle
Tank-Mix	Tank-mix with a glyphosate herbicide at 365 g ai/acre (900 g ai/ha) for control of additional weeds (glyphosate-tolerant corn only).
Water Volume	Minimum 40 L/acre (9 imp. gal/acre)

Crop Rotation:
The following crops may be seeded 10 months after application: Spring wheat (including durum), oats, barley, canola, soybeans, dry beans, chickpeas, potatoes, sunflowers, field corn, and field peas

Geography:
No geographic restrictions for Western Canada

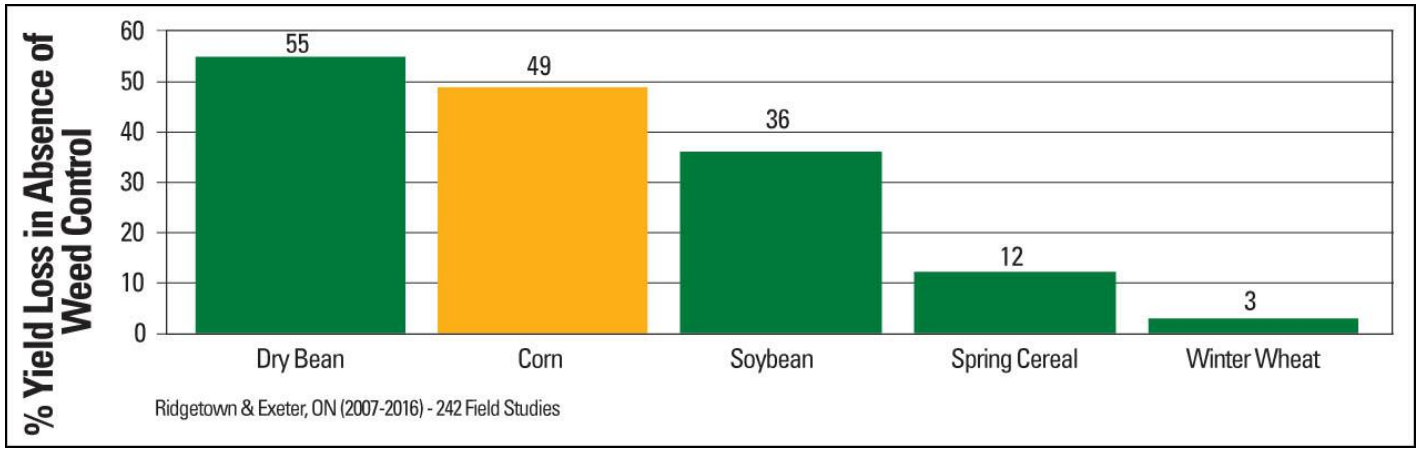
Importance of Weed Control in Corn

Source: Dr. Clarence Swanton, University of Guelph

- When weeds are present, corn plants play defense.
- Plants will allocate less to the roots and more to the shoots.
- When this occurs, plants are taller – as the corn plant tries to grow above the surrounding weeds – but this results in a weaker root system.
- The corn plant might look fine above the ground, but a compromised root system means lower yield potential.

Importance of Weed Control in Corn

- With some crops, a few weeds have little effect. Corn yields, on the other hand, can be severely impacted.
- This long-term study done by Dr. Peter Sikkema, University of Guelph, found an average yield loss of 49% in the absence of weed control in corn.
- <u>For growers, the implications are clear</u>
- **For maximizing crop yield and grower profits, the goal is ZERO** weeds in your corn.

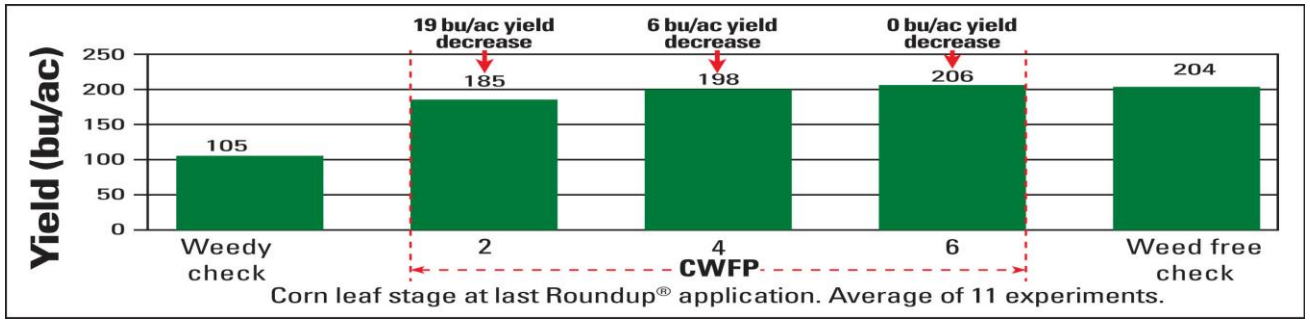


Source: Dr. Clarence Swanton, University of Guelph

Critical Weed-Free Period

- Timing is everything when it comes to weed control in corn, as shown by this 3 year study (2009-2011) conducted by Dr. Peter H. Sikkema, Professor of Weed Management, Field Crops, at the University of Guelph.
- Corn yield is greatly affected from weed pressure from emergence until V4 (6 leaf stage) but it is mainly unaffected after that point. This research shows the importance of early weed control, keeping corn weed-free from emergence to V4.
- Not keeping the corn weed-free between the 2 leaf and 6 leaf stage resulted in a significant yield loss of 19 bu/acre. The untreated check resulted in 99 bu/acre (49%) yield loss.
- Key is to keep your corn weed free early – emergence to V4 (6 leaf stage). This is known as the Critical Weed-Free Period (CWFP) in corn.

Keeping your crop weed free until 6 leaf stage can result in no yield loss due to weeds



Source: Dr. Clarence Swanton, University of Guelph

Critical Weed-Free Period

Because corn growth and yield are most affected by weeds during the Critical Weed-Free Period (CWFP), controlling weeds during this period will help you maximize your final yield.

The CWFP in corn is from emergence to the V4 (6 leaf stage†).

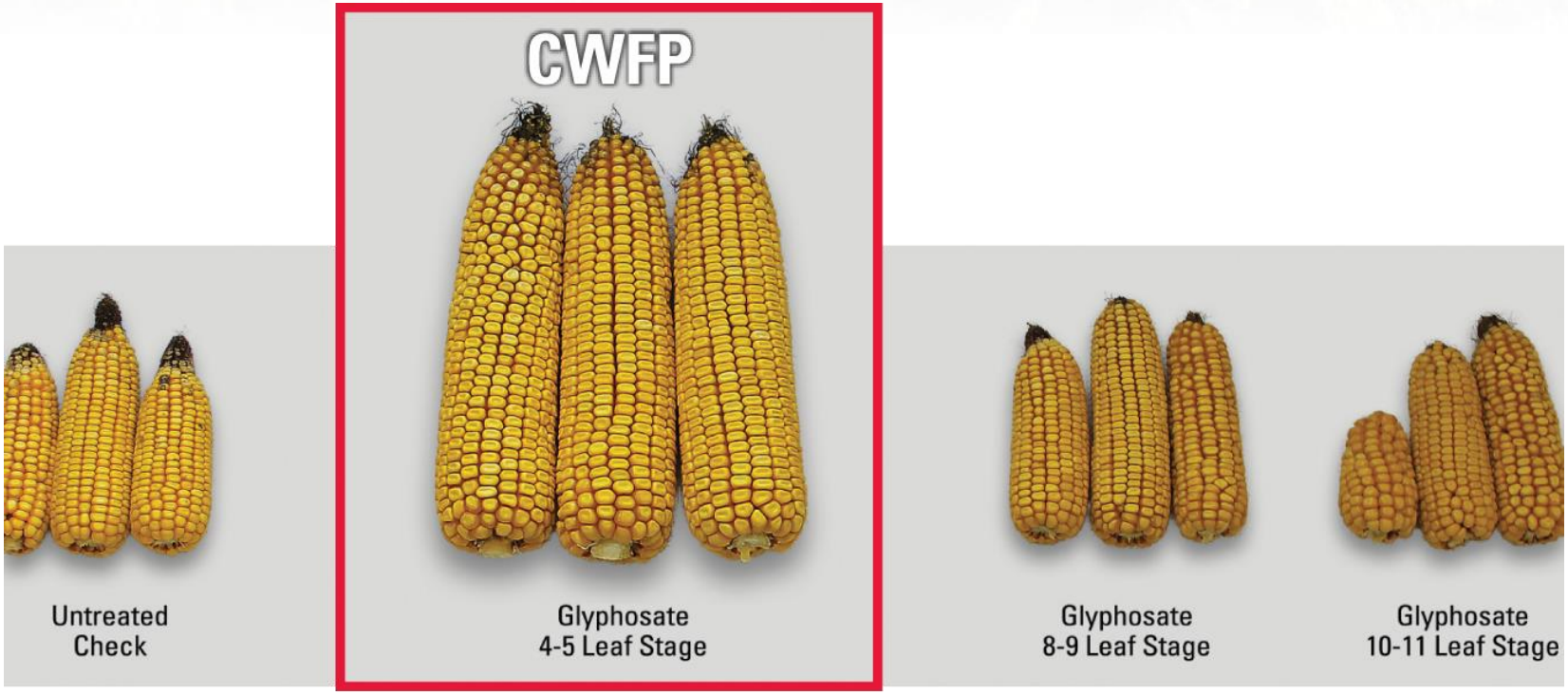
†Corn leaf stages can vary depending on both growing conditions and corn seed product.

Critical Weed-Free Period

Source: M Cowbrough, Ontario Ministry of Agriculture, Food and Rural affairs

- Remember how corn plants can grow taller when weeds are present, but have less root development?
- The photos show the result. The corn crop on the bottom looks more attractive as it has fewer weeds. However, it was sprayed after the CWFP and yielded 8 bushels/acre less than the crop on the top.
- **Weeds significantly reduce yields in corn. Weed control is necessary, but properly timed weed control is critical.**

Critical Weed-Free Period



This photo shows the negative effects on both yield and plant growth of delayed weed control outside the CWFP.

The 4 R's – Resistance Defense Framework

Weed resistance is a global phenomenon, but the specific challenge vary *at the local level* and so should the weed management tactics.

- **Right product**
- **Right rate**
- **Right time**
- **Right agronomy**

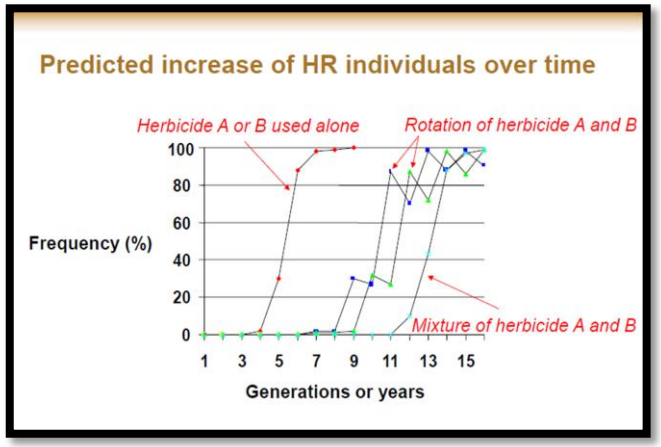
The 4 R's – Resistance Defense Framework

Right Product

- **Know your weed spectrum**
- **Choose the herbicide system that can provide the best management of the weed spectrum to avoid the return of weed seed to the seed bank**
- **Use multiple modes of action**
- **Use products with overlapping broad spectrum activity**
- **Use different herbicide combinations**
  - Use combinations of different groups in each pass within the same year
  - Otherwise, rotate herbicide modes-of-action

Herbicide-Resistant Weeds: Management Tactics and Practices[1]

HUGH J. BECKIE[2]



Source: Weed Technology. 2006. Volume 20:793-814

More recent research indicates tank mixing is a more effective strategy to mitigate resistance

The 4 R's – Resistance Defense Framework

Right Rate

- **Consider increased seeding rates/ seed more competitive varieties**
- **Follow the label**

Right Time

- **Earlier is generally better…but time it for the weeds**
  - Apply herbicides at recommended crop and weed stage
  - Control weeds to maximize yield & harvest management
  - Apply products at <u>different timings</u> throughout the season. Incorporate pre-seed, in-crop, pre-harvest or post-harvest applications in the same year to layer different modes of action.

Right agronomy

- **Diverse cultural practices take the pressure off herbicides, such as a strong crop rotation & using clean, certified seed**

Sortan™ IS vs Glyphosate alone

Sortan™ IS + Glyphosate Post-Emerge:

Green Foxtail

Buckwheat

Glyphosate Alone Post-Emerge:

Buckwheat

Sortan™ IS provides stronger control of tough weeds that glyphosate cannot control alone.

Plum Coolee, MB: July 7, 2016: 41 DAA

New Sortan™ IS: Wild Buckwheat Control

Armezon®+ Glyphosate Post-Emerge | **Sortan™ IS + Glyphosate Post-Emerge**

Armezon®+ Glyphosate Post-Emerge | **Sortan™ IS + Glyphosate Post-Emerge**

Wild Buckwheat Extended Control

Morris, MB: August 9, 2016, 63 DAA

New Sortan™ IS: Extended Control Pays Off

Sortan™ IS + Glyphosate
Post-Emerge

Armezon®+ Glyphosate
Post-Emerge

Morris, MB: July 6, 2016, 45 DAA

New Sortan™ IS: Volunteer Canola Control

Sortan™ IS + Glyphosate Pre-Emerge, Glyphosate Post-Emerge (20 days later)

Glyphosate Pre-Emerge, Glyphosate Post-Emerge (20 days later)

Sortan™ IS provides excellent, extended control of volunteer canola

New Bothwell, MB: July 6, 2016: 60 DAA

New Sortan™ IS: Volunteer Canola Control

Sortan™ IS + Glyphosate Post-Emerge

Amezon® IS + Glyphosate Post-Emerge

Pardner® IS + Glyphosate Post-Emerge

Sortan™ IS provides excellent, extended control of volunteer canola

Ardrossen, AB: July 27, 2016: 27 DAA

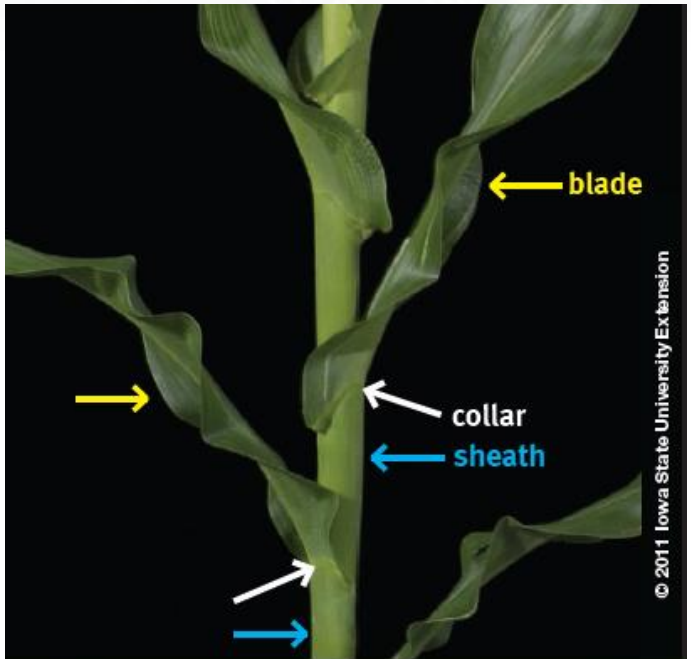
Corn Staging Guide: Leaf Collar System

- The leaf collar system separates corn development into vegetative (V) and reproductive (R) stages
- Use of this system marks defined physiological stages in plant development
- This makes it easier to distinguish between stages, rather than using plant height or exposed leaves
- The number of leaves exposed or plant height systems are not as accurate as the leaf collar system
- Plants will respond to different environments/stresses and may be older than they appear if looking only at plant height. The leaf number system does not require collar formation to count, so it is open to interpretation, and may lead to less consistent staging

Vegetative Stages		Reproductive Stages	
VE	Emergence	R1	Silking
V1	First leaf	R1	Blister
V2	Second leaf	R1	Milk
V3	Third leaf	R1	Dough
V(n)	nth leaf	R1	Dent
VT	Tasseling	R1	Mature

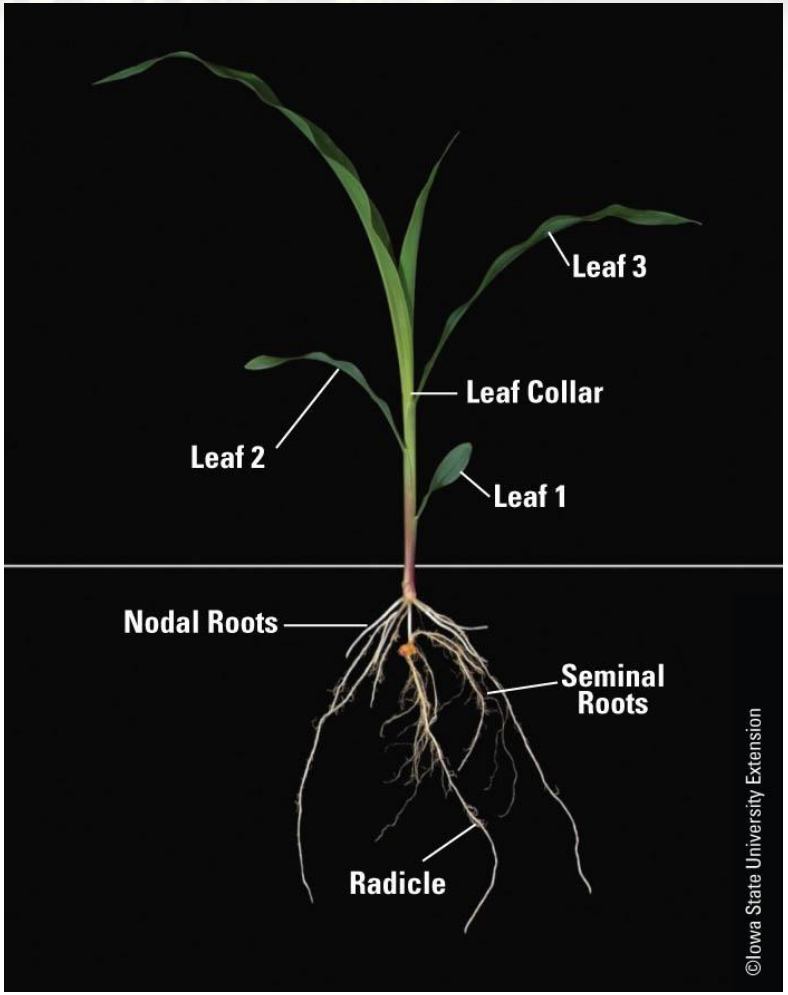
Corn Staging Guide: Vegetative Stages

- The vegetative stages (V) are characterized by the presence of a leaf collar on emerged leaves
- The corn leaf has three main parts: the blade, sheath, and collar
- The blade is the flat portion of the leaf that intercepts the sunlight, the sheath is the portion that wraps around the stalk, and the collar is the line of demarcation between the blade and sheath, usually with a distinct bend
- As the corn plant grows, each succeeding leaf is pushed into view by the elongating stalk and by leaf expansion in sequence from the seed up to the tassel. The leaf tip is the first part visible, followed by the leaf blade, and finally by the leaf collar and sheath



- When a collar is visible, the leaf is considered fully emerged and is counted in the staging scheme. The vegetative stages of development begin with emergence (VE), and continue numerically with each successive leaf until the tassel emerges (VT)

Corn Staging Guide: V3



- Leaf collars present on the 3 lowest leaves
- Nodal Roots elongate rapidly
- Number of leaves and ear shoots determined
- Stalk strength comes from strength of layered leaf sheaths (to support system up to V6)
- Growing point is approaching the soil surface*

**NOTE: On some of the new early maturity Pioneer® brand corn seed products we have found that the growing point can be above the soil surface at V3*

What growers are saying

"I applied Sortan™ IS both pre- and post-emergence to control volunteer canola and other tough weeds. For the pre-emergence application, the weeds were down and out until the corn was emerged. Without Sortan™ IS, the corn was smaller and thinner with more canola growth in the field. I would definitely use this product again- you'd be crazy not to. I have recommended it to a few people and have told them what good results I got on my fields with Sortan™ IS."

Danny Wurz, Perdue, SK

"We were very pleased with the results we got with Sortan™ IS. Sortan™ IS was longer-acting on my field and caught some later emerging weeds that Armezon® didn't control. We had heavy weed pressure on that field, with a lot of volunteer canola, millet, red root pigweed, green foxtail, wild buckwheat, wild oats and many other weeds present. Using Sortan™ IS resulted in a cleaner field. I would use it again and recommend it to others."

Ed Peters, Randolph, MB