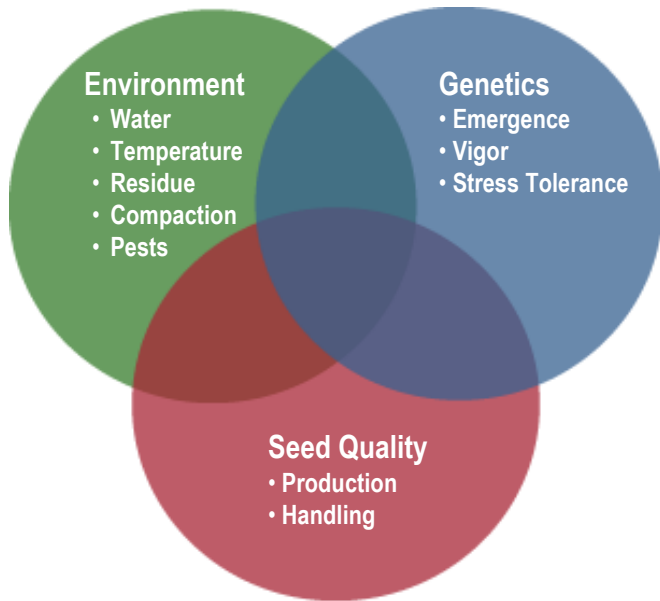




Corn Stress Emergence

What controls emergence?



Why is corn sensitive to early season stress?

- Corn is a warm-season crop – optimal temperature for emergence is 85°-90° F – so it is almost always under some degree of cold stress
- Prolonged exposure to soil temperatures below 50° F promotes seed deterioration and seedling disease



Modes of Damage in Cold, Wet Soils

- Cold imbibition causes physical damage
- Extended cold delays emergence and further damages seeds
- Damaged seeds are likely to be attacked by insects and disease
- Surviving seedlings are likely to produce runts

Imbibitional Chilling Injury

- Cell membranes are brittle in the cold
- Force of hydration causes membrane rupture
- Leaked cell contents invite pathogens

Water temperature during initial contact is critical

Most damage occurs during imbibition at < 50° F



← Imbibitional chilling and cold injury. Note club and corkscrew shapes, and underground emergence.

Frost Damage

- Frost damage can lead to runts and uneven stands
- Multiple events are more damaging than a single frost
- A healthy growing point does not guarantee a healthy stand
- Growth may be blocked by dead tissue
- Growing point needs a healthy coleoptile to push through soil



Flooding Damage



Flooding damage – note necrotic area of each root above root tip.

Pioneer Stress Emergence Scores

- Genetic potential of hybrids to emerge under stressful environmental conditions (cold, wet soils or short periods of severe low temperatures)



Management Tips

- Avoid planting ahead of a cold event
- Plant into moisture
- Plant well-drained, low residue fields first
- Use a residue manager
- Use the right seed treatment
- Choose the right hybrids
 - Stress Emergence
 - High Residue Suitability