

AGRONOMY PROFILE

Early Season Cold Stress

OVERVIEW. In areas of the Corn Belt, frost and variable soil temperatures can place corn under significant stress after planting. Cold-temperature stress affects the growth of young seedlings. Corn seedlings have little growth at soil temperatures below 60°F or ambient temperatures 25-30°F.

WHAT YOU SHOULD KNOW.

- Soil temperature is important, because emergence is directly related to soil temperature. The optimum soil temperature for constant corn growth is 86°F.
- Plants need ample depth for vigorous root development. Planting at a depth of 1½-2½ inches ensures seedlings are at appropriate soil temperatures for optimum emergence.
- Corn seedlings exposed to early stress, wet conditions, restricted root development and lack of phosphorus can develop a purple hue due to the buildup of sugars caused by restricted root growth. Cool or compacted soils and shallow planting can also promote purpling in the leaves. Corn seedlings will usually recover after a few days of warm weather and yield potential may not be affected.

ACTION STEPS.

- 1. Understand how cold temperatures impact seedlings.** Extended periods of soil temperatures 50°F or colder, as well as major fluctuations of 25-30°F, may injure emerging seedlings. Symptoms include rotted, split or deformed mesocotyls. Check for rot by opening seedlings and looking for dark, water-soaked tissue. Healthy seedlings will have firm, cream-colored growing points.
- 2. Watch for cold temperatures right after planting.** For 24-72 hours after planting, germinating seeds may suffer from imbibitional chilling, where seeds imbibe water and cell tissues get too cold, causing them to rupture, leading to potential germination failure.

NOTES:



Cold temperature stress affects the growth of young seedlings.

30 SECOND SUMMARY

- Think about current and future weather conditions to avoid freezing young seedlings.
- To maximize yield potential and avoid replanting, wait until soil temperature is above 60°F.
- Plant seeds 1½-2½ inches deep to promote vigorous root development.
- Monitor for injury or rotting seeds if temperatures drop below freezing.