

2 Stage I: Scouting from Emergence to Knee-High

Determine the extent and severity of any problem identified. Is the problem throughout the field or spotty and localized? Has emergence been completed or are there seeds sprouted, ready to emerge? Take accurate stand counts and determine percent of stand achieved.

If replanting is necessary, take steps to prevent recurrence of the cause for poor emergence. Verify that the planter is operating properly and that fertilizer or pesticide issues have been corrected.

$$\% \text{ stand achieved} = \frac{\text{number of plants established}}{\text{number of seeds planted}} \times 100$$

If the stand is uneven or if there are skips down the row, dig to find the planted seed and its distribution.

GENERAL SYMPTOM	POSSIBLE CAUSE	REMARKS
1. No seed	<ul style="list-style-type: none"> Planter Rodents or birds 	<p>Improper adjustment; row unit drive not engaged; worn parts; clogged spout; empty box or tank; wrong plates, disks, or drum; excess or wrong seed treatment.</p> <p>Digging and partly-eaten kernels.</p>
2. Normal seed appearance; not swelled	<ul style="list-style-type: none"> Unfavorable soil conditions Poor seed-soil contact 	<p>Cold, dry soil.</p> <p>Inadequate press wheel pressure; improper closing wheel adjustments; inadequate residue management; dry or cloddy soil.</p>
3. Normal seed appearance; swelled but not sprouted	<ul style="list-style-type: none"> Unfavorable soil conditions Fertilizer or pesticide injury 	<p>Cold, wet soil.</p> <p>Phytotoxic pesticides or too much fertilizer too close to the seed.</p>
4. Seed dead, rotted	<ul style="list-style-type: none"> Seed rots or seedling blights 	<p>These are accentuated when soil conditions are unfavorable for germination and seedling growth. Many species of fungi and/or bacteria may be involved. Fungicide seed treatment protects the seed, not the seedling.</p>



GENERAL SYMPTOM	POSSIBLE CAUSE	REMARKS
4. Seed dead, rotted (cont.)	<ul style="list-style-type: none"><li data-bbox="509 394 743 426">• Fertilizer injury<li data-bbox="509 821 773 852">• Insecticide injury<li data-bbox="509 968 805 999">• Dead seed planted<li data-bbox="509 1010 911 1041">• Unfavorable soil conditions	<p data-bbox="963 394 1515 804">Fertilizer salts, nitrogen, and potassium draw moisture and may leave seed in soil too dry to support growth. In-furrow applications are more likely to cause fertilizer injury than starter fertilizers placed at least 2 inches from the seed. Ammonia toxicity is caused when planting follows anhydrous or aqua ammonia application too closely or where application was too shallow. This can kill or stunt seedlings. Roots appear sheared off. Boron and some other micronutrients impair germination if they are too close to the seed.</p> <p data-bbox="963 821 1515 951">Some soil-applied organophosphate insecticides can impair germination if placed in furrow with the seed. Check the label and apply only as directed.</p> <p data-bbox="963 1010 1336 1041">Cold, dry, wet, or crusted soil.</p>
5. Seed hollowed out	<ul style="list-style-type: none"><li data-bbox="509 1077 651 1108">• Insects	<p data-bbox="963 1077 1515 1140">Seed corn beetle, seed corn maggot, or wireworm (see pp. 36-38).</p>
6. Sprout twisted or leaves expanded below ground	<ul style="list-style-type: none"><li data-bbox="509 1171 911 1203">• Unfavorable soil conditions<li data-bbox="509 1318 846 1350">• Seed planted too deep<li data-bbox="509 1360 911 1434">• Mechanical injury to seed in handling or planting<li data-bbox="509 1444 748 1476">• Chemical injury	<p data-bbox="963 1171 1515 1308">Crusted, cold, or cloddy soil. A cloddy surface can allow light to reach the sprout and trigger leafing too soon. In the case of crusting, rotary hoeing may be beneficial.</p> <p data-bbox="963 1444 1515 1539">Fertilizer (see p. 5); insecticides (see p. 5); or some herbicides such as acetanilides and dinitroanilines (see pp. 41-42).</p>
7. Slow, uneven emergence	<ul style="list-style-type: none"><li data-bbox="509 1570 651 1602">• Planter<li data-bbox="509 1644 911 1675">• Unfavorable soil conditions<li data-bbox="509 1791 846 1822">• Seed planted too deep	<p data-bbox="963 1570 1515 1633">Seed injury due to improper operation or adjustment, including planting depth.</p> <p data-bbox="963 1644 1515 1780">Cold, dry, wet, or crusted soil. In the case of crusting, rotary hoeing may be beneficial. Properly banded fertilizer at planting may help seedlings overcome unfavorable soil conditions.</p>

**If plants are abnormal in appearance,
try to identify one of the following specific symptoms.**

GENERAL SYMPTOM	POSSIBLE CAUSE	REMARKS
1. Seedlings pulled or dug up, seed eaten	<ul style="list-style-type: none"> • Bird or rodent damage 	Chemical repellents may help.
2. Slow, uneven plant growth	<ul style="list-style-type: none"> • Unfavorable growing conditions • Low fertility • Insects attacking roots • Nematodes attacking roots • Chemical injury • Non-uniform planting depth • Failure of secondary roots to develop (rootless corn syndrome) 	<p>Cold, dry, wet, or compacted soil. Properly banded fertilizer at planting may help minimize the effects of some unfavorable growing conditions.</p> <p>If a nutrient deficiency due to inadequate amounts in the soil, is confirmed, consider sidedressing or foliar application, depending on the nutrients involved (see pp. 52-53).</p> <p>Corn root aphid, corn rootworm, grape colaspis, webworm, white grub, or wireworm (see pp. 31-38).</p> <p>Requires microscopic analysis.</p> <p>Fertilizer (see p. 5); insecticides (see p. 5); herbicides such as Balance®; Command® or Scepter® carryover (see pp. 41-42); or liquid manure.</p> <p>Dry, loose soil is not conducive to normal root development. This condition is accentuated by shallow planting and whipping by wind. Cultivation may help by throwing soil around the base of plants.</p>
3. Discolored leaves	<ul style="list-style-type: none"> • Nutrient deficiency • Unfavorable soil conditions 	<p>Magnesium, nitrogen, phosphorus, or sulfur (see pp. 52-53). Nitrogen deficiency results in a yellow discoloration of leaves. Phosphorus deficiency results in a purpling of leaves due to the accumulation of anthocyanins. If nutrient deficiency is confirmed, consider sidedressing or foliar application, depending on the nutrients involved.</p> <p>Waterlogged, cold, or compacted soil. These conditions can also affect nutrient uptake and translocation.</p>



GENERAL SYMPTOM	POSSIBLE CAUSE	REMARKS
3. Discolored leaves <i>(cont.)</i>	<ul style="list-style-type: none"><li data-bbox="509 384 846 415">• Insects attacking roots<li data-bbox="509 533 899 564">• Nematodes attacking roots<li data-bbox="509 579 748 611">• Chemical injury<li data-bbox="509 728 737 760">• Wind damage<li data-bbox="509 810 740 842">• Frost or freeze<li data-bbox="509 926 797 999">• Cold (not freezing) temperature stress<li data-bbox="509 1213 761 1245">• Anhydrous burn<li data-bbox="509 1260 776 1291">• Mechanical injury<li data-bbox="509 1306 786 1337">• Hybrid differences	<p data-bbox="961 384 1523 520">Most observed leaf discoloration is due to nutrient deficiency induced by damaged or inadequate roots (see nutrient deficiency, above).</p> <p data-bbox="961 533 1349 564">Requires microscopic analysis.</p> <p data-bbox="961 579 1523 716">Fertilizer (see p. 5); insecticides (see p. 5); herbicides such as Balance®; Command® or Scepter® carryover (see pp. 41-42); liquid manure.</p> <p data-bbox="961 728 1523 802">Abrasion by sand or soil particles. Difficulty establishing secondary roots.</p> <p data-bbox="961 814 1523 909">Check growing point for damage. Seedlings often recover. Most pronounced in low-lying areas.</p> <p data-bbox="961 921 1523 1199">Cool nights and warm days promote above-ground plant growth at the expense of root development. This leads to increased demand by the above ground tissues for more nutrients than the roots can deliver. The result can be short-term deficiency symptoms until the root system becomes more developed.</p>



Uneven Corn Plant Growth



GENERAL SYMPTOM	POSSIBLE CAUSE	REMARKS
4. Leaves rolled or puckered, may be wilted	<ul style="list-style-type: none"> • Drought • Insects attacking roots or stalks • Nematodes attacking roots • Mechanical root pruning 	<p>See Section 6, Insect Injury Symptoms (p. 31-38), plus chinch bug, cutworm, Japanese beetle, stink bug, or webworm.</p> <p>Requires microscopic analysis.</p>
5. Leaves rolled or twisted together (“onion leaf” or “buggy whip”)	<ul style="list-style-type: none"> • Herbicide injury • Temperature variation • Nutrient imbalance • Hail damage 	<p>Acetanilides, dinitroanilines, or phenoxy (see pp. 41-42).</p> <p>Alternating hot and cold weather, inducing very rapid growth spurts followed by little or no growth.</p> <p>Boron toxicity or calcium deficiency (see p. 52).</p> <p>Injury to the growing point at this growth stage can result in short-term wrapping of leaves.</p>
6. Shredded leaves or eaten plants	<ul style="list-style-type: none"> • Wind damage • Hail damage • Insects • Livestock or wild animal grazing 	<p>Armyworm, common stalk borer, corn earworm, cutworm, European corn borer, grasshopper, slug, or webworm (see pp. 32-37).</p> <p>Look for tracks.</p>
7. Leaves spotted, striped or dead	<ul style="list-style-type: none"> • Wind damage • Low soil pH • Nutrient deficiency • Insects • Disease • Fertilizer or herbicide injury 	<p>Abrasion by sand or soil particles.</p> <p>Beaded streaking of leaves, which turn reddish-purple and may die.</p> <p>Boron, copper, magnesium, potassium, sulfur, or zinc (see pp. 52-53).</p> <p>Flea beetle, leaf miner, or thrips (see pp. 35-37).</p> <p>Anthracnose, bacterial wilt, eyespot, Goss’s wilt, holcus spot, seedling blights (favored by cool, wet soil), virus or virus-like diseases (see pp. 24-27).</p> <p>Anhydrous burn; spray drift; foliar-applied herbicides such as Buctril®, Basagran®, Gramoxone®, or Blazer®; Classic®, Scepter®, or Reflex® carryover; premix acetanilides post-applied (see pp. 40-42).</p>



GENERAL SYMPTOM	POSSIBLE CAUSE	REMARKS
7. Leaves spotted, striped or dead (cont.)	<ul style="list-style-type: none">• Sunscald or cold• Hybrid differences	Cold nights followed by clear, bright, fast-warming days.
8. Rows of holes across leaves	<ul style="list-style-type: none">• Insects	Billbug, common stalk borer, corn borer, cutworm, or stink bug (see pp. 32-37).
9. Plants wilt and die suddenly	<ul style="list-style-type: none">• Insects• Wind damage• Disease• Herbicide injury• Frost or freeze• Lightning• Anhydrous burn• Flooded, water-logged soil	<p>Billbug, chinch bug, cutworm, stink bug, white grub, or wireworm (see pp. 32-38).</p> <p>Seedling blights, bacterial wilt, or Goss's wilt (see p. 26).</p> <p>Triazines or misapplications of glyphosate herbicides (see pp. 41-42).</p> <p>Check growing point for damage. Seedlings often recover.</p> <p>Kills everything, usually in circular area.</p>



“Buggy whip”



Corn plant two days after frost



GENERAL SYMPTOM	POSSIBLE CAUSE	REMARKS
10. Plants twisted or broken off	<ul style="list-style-type: none">• Herbicide injury• Insects	<p>Especially 2,4-D followed by wind (see pp. 41-42).</p> <p>Billbug, cutworm, lesser cornstalk borer, or stinkbug (see pp. 32, 36-37).</p>
11. Inhibited root development or malformed roots	<ul style="list-style-type: none">• Nematode injury• Insects• Fertilizer injury• Herbicide injury• Soil conditions	<p>Requires microscopic analysis.</p> <p>Corn rootworm, grape colaspis, white grub, or wireworm (see pp. 34-38).</p> <p>Phenoxys, Banvel[®], carryover dinitroanilines, and Scepter[®] or Classic[®] carryover (see pp. 41-42).</p> <p>Planting when soils are too wet can cause sidewall compaction that can arrest or severely restrict corn root development. Look for flat-sided or abruptly arrested root systems.</p>



Wind Damage in Corn Field



Hail Damage in Corn Field