

BETWEEN THE ROWS

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EFFECTS OF COMPACTION ON CORN SEEDLINGS

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The establishment and early growth of nodal roots is a very important step in corn plant development. Restrictions can lead to stunted corn seedlings and have a lasting impact on yield potential. Sidewall compaction and soil compaction can restrict root growth and lead to lost yield.

Soil Compaction

Soil compaction occurs when soil particles are pressed together, reducing pore space between them. Compaction is most likely to occur when heavy equipment is operated on soils that are too wet. The risk of compaction is present even after the soil is noticeably saturated. A good rule of thumb is to take soil and run it between your thumb and index finger. If you are able to form a ribbon of any significant length you are at risk of causing compaction. Fit soil will crumble and not form a ribbon.

Course, sandy soils, and those with high levels of organic matter are less prone to compaction. Soils that are high in clay content with a much finer texture are more susceptible because they have greater water holding capacity and are slower to dry. The severity of the compaction is determined by the weight of the equipment and the amount of moisture present at the time.

Sidewall Compaction

Sidewall compaction is caused by furrow openers and press wheels at planting. Furrow openers can smear the sidewall of the furrow and effectively seal it, making it a barrier to seedling growth. Press wheels set with too much down pressure to close the seed slot can over-pack the soil. If this packing occurs below the seed, because of shallow seed placement relative to the press wheel positioning, root restriction can occur. Proper closure of the seed slot should cause fracturing of the sidewalls around the seed to ensure good seed-to-soil contact.



Seed furrow split open with evidence of sidewall compaction.

Diagnosis

Usually the first symptoms you see from a corn plant affected by compaction is stunted or delayed development. Nutrient deficiency symptoms may also show up, even in cases where there is an adequate nutrient level available in the soil profile. Because the compaction restricts root growth the plant cannot take up the nutrients available in the soil. This will most likely start to show up after the V3 growth stage when kernel reserves are depleted and the plant is relying on its root system for nutrients to develop. Floppy corn syndrome, where corn plant roots cannot support the plants growth, can also be a result of sidewall compaction.



Corn seedlings with restricted root growth due to sidewall compaction.

To check for compaction when scouting, use a spade and carefully remove a plant with the soil around it. As you break away the soil from the roots look for restrictive layers either on the sidewall or in a compaction layer below the seed. After you remove the soil, examine the roots to see if they are following the seed slot or show evidence of restricted growth in any direction.

Summary

There are not a lot of mechanical options for alleviating compaction once it has formed. If you receive some rainfall, it can loosen up the sidewall or compaction layer enough for the roots to push through and break it up. Being able to recognize and diagnose compaction will keep you from spending money unnecessarily. Many times what may look to be nutrient deficiency or irregular development could, in fact, be the result of compaction.