

Immediate Release

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### Emerging Seed and Soil Issues

The 2020 planting season has been mostly cold and dry, allowing most farmers to get crops planted, with rain and warmer temperatures now expected. With slow crop germination and emergence, several issues have occurred. What are soil conditions and how healthy are seedlings trying to emerge? Dr. Bob Nielsen, Purdue University says corn can take 4 days up to 4 weeks to emerge (needing 100-120 growing degree days) depending on soil temperatures, but fast growth and fast emergence due to warm soil temperatures is preferred for best yields. Corn has the genetic capability of yielding 1100 bushel per acre under optimal conditions, unfortunately environmental conditions limit yields, and the first 10-14 days of crop emergence are critical for top yields.

Most cold injury occurs in the first 24-36 hours after planting when the seed takes in (imbides) water to germinate. With several really cold morning temperatures below 28° F, cold injury may have stressed germinating seeds. Check your corn seed to see if the radicle (first root) is healthy. Roots are generally white with healthy roots having a layer of soil wrapped around the root called a “rhizosheath”. The rhizosheath is the area of soil surrounding a root that is altered by root growth, nutrients and respiration. Corn seedlings that emerge 3 days late tend to be like weeds. If the radicle or seminal roots (secondary roots) are discolored, damaged, swollen or mushy; the corn plant may have reduced or delayed emergence which can affect the final corn population and yield.

In some cases, seedlings appear to be growing down before starting to grow upward. Due to the cold nights and mornings, the deeper soil was warmer than the air, so plants grew in the wrong direction. Planting corn deeper (2-3 inches deep) can reduce large temperature swings that shallow planted corn experience. No till planting deep into a cover crop reduces cold stress if there is adequate drainage. The cover crop holds warm air closer to the soil surface with frost forming on the cover crop leaves above the soil surface. Also, crop residue acts like a blanket to moderate soil temperatures. Nielsen says the corn mesocotyl (first corn internode below ground) can elongate 6 inches and should be white, elongating into the coleoptile or the first corn leaves. Planting corn deep (2-3 inches), should not be a problem with good structure.

Some corn leaves may be emerging underground. This can be due to sunlight exposure below the soil due to 1) cloddy dry soils, 2) crusting or compacted soils, 3) cold injury, or 4) to herbicide injury. All four problems create similar conditions where the corn leaves unfurl beneath the soil surface. This year, the first three (1-3) seem to be common problems.

Another observed planting issue was blowing corn residue and blowing soil due to high winds. The dry soil allowed both soil and crop residue to blow with the wind, creating a “snow” storm of crop residue being deposited in lawns, road ditches, and streams. In some places in Northwest Ohio, soil drifts have been observed, especially with dry tilled detached soil, which could be a lot of nutrients moving off a field.

Poor soil structure is where the problem starts. Tillage creates microaggregate which with rain and warmer temperatures, causes soil sealing, crusting, and poor crop emergence. The clay microaggregates have a negative charge and the positive soil ions (magnesium, calcium, etc.) cause the soil to set up like a brick wall (soil sealing). Having active live roots (active carbon) from cover crops and soil organic matter to create macroaggregates reduces this problem. Recent rains show standing water on newly planted conventional fields. This is a recipe for pathogens (*Phytophthora*, *Pythium*, *Fusarium*, *Rhizoctonia*) to thrive under saturated soil conditions in the top 1-2 inches.

It may be too late to solve many of these problems this year. Some problems may go away due to better growing conditions but some replanting will be needed. Looking to the future, fields planted to cover crops do not have as much standing water. Blowing crop residue and keeping soil in place is less of a problem. Growing cover crops to keep the soil warmer along with a blanket of undisturbed crop residue reduces cold injury, germination, and emergence issues if the crop is planted deep into good soil structure and there is adequate drainage. We'll see the results by harvest.