

Root Lodging Concerns in Corn

R.L. (Bob) Nielsen
[Agronomy Dept., Purdue Univ.](#)
West Lafayette, IN 47907-1150
Email address: <mailto:rnielsen@purdue.edu>

The welcome rainfall in recent days was accompanied by strong winds that resulted in dramatic root lodging for corn in some fields around the state. Some folks are asking why the root lodging was so severe in some fields and what the consequences will be for the downed corn plants. I offer my two-cents' worth on the subject.

Strong wind by itself does not always cause root lodging. The pattern of root lodging I observed in several fields this week strongly suggested that some of the thunderstorms packed powerful downdrafts that lodged corn plants in every direction of the compass. It is difficult for corn of any age or level of health to withstand such powerful wind forces.

Other contributing factors also played a role in "setting up" the plants for a fall. The list of factors to choose from in 2002 is long and includes:

- Reduced root systems due to severe corn rootworm (CRW) injury, especially in later-planted corn fields,
- Shallow root systems due to compaction from tilling wet soils this spring,
- Reduced root systems due to excessively wet and cold soils during initial nodal root formation for early-planted corn,
- Reduced root systems due to excessively dry or cloddy soils during initial nodal root formation for later-planted corn,
- Reduced root systems due to nematode injury on sandier soils back in May,
- Reduced root systems due to nitrogen deficiency in areas of fields where significant nitrogen loss had occurred earlier,
- Reduced root systems due to inhibition by low soil pH in areas of fields,
- Soaked surface soils due to heavy rainfall at the time of the wind damage that made it easier for the roots to be "pulled" by the force of the wind.

Growth Stage Influence. The consequences of root lodging depend heavily on the growth stage of the plants at the time of the damage. The younger the corn (and therefore shorter), the more apt it is to "straighten up" following severe root lodging without

noticeable “goose-necking” of the plant. This is particularly true with root-lodged corn that is knee-high or shorter.

Older and taller corn becomes increasingly less likely to “straighten up”, but will instead “goose-neck” as the upper stalk internodes continue their elongation. The “goose-necking” or curvature of the upper stalk results from a hormonally driven (auxin) geotropic response to the horizontal or nearly horizontal position of the downed plant. Large areas of “goose-necked” corn can create headaches during harvest and increase mechanical harvest loss of grain if stalks or ears break off before being captured by the combine header.

As corn nears pollination, it also nears its full height. Recovery or “straightening up” from root lodging in corn at this point in time is not very likely because stalk elongation is nearly complete. Severe root lodging at or during pollen shed can greatly reduce the pollination success of the downed plants because the silking ears are often covered by leaves of other fallen plants and thus prevented to varying degrees from capturing pollen and, thus, fertilizing ovules on the ear. The photosynthetic stress imposed on the downed plants by lodging-induced root injury and lessened light interception due to the downed plants shading each other likely also limits survivability of any fertilized ovules on the ears as well.

Influence of Root System Health. Recovery from severe root lodging is hindered for those plants whose root systems are already limited (e.g., by soil compaction or soggy soils) or injured (e.g., by CRW larvae feeding). If additional root injury occurs from the root lodging itself, the plants may struggle greatly as they attempt to recover.

Don't forget, this and other timely information about corn can be viewed at the Chat 'n Chew Café on the World Wide Web at <http://www.kingcorn.org/cafe> . For other information about corn, take a look at the Corn Growers' Guidebook on the World Wide Web at <http://www.kingcorn.org/>

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