Growers Urged to Evaluate Lodging Before Harvest
Ken Ostlie, Extension Entomologist

Producers may want to take advantage of down time before corn harvest to check their fields, evaluate lodging, and plan their harvesting strategies. Goose-necked or falling stalks from a variety of causes can complicate harvest and lengthen harvesting times. With rainy and snowy weather already delaying harvest, growers can ill afford the surprise of unexpected lodging in their fields. Now is the time to assess how well fields are standing, adjust harvesting priorities and investigate the causes behind unexpectedly lodged corn, said Ken Ostlie, University of Minnesota entomologist.

Corn rootworms, European corn borer, and stalk rots can all contribute to lodging and harvesting problems. Each pest produces distinctly different lodging patterns.

**Stalk rots** will weaken the stalk internally and plants can simply fall over with the weight of the ear or with assistance of winds associated with storms or cold fronts. Stress, fertility issues, and injury from corn rootworm and European corn borer will all increase the risk of stalk rots. The internode area weakened by the stalk rot varies so plants will tip over at different heights. Problems from stalk rots typically worsen when harvest is delayed by rainy weather and stalk quality deteriorates.

**European corn borer** tunnels weaken the stalk and plants bend over above ground. The height reflects the timing of attack with earlier attack concentrated below the ear and near the tassel and later attack after tasseling near the ear or near the base of the stalk. Lodging from corn borer simply slows harvest speed and, if ear shanks are tunneled, the ears may fly off the stalks when they’re pulled into the header.

**Corn rootworm** feeding on roots reduces standability and plants lodge at the roots. If lodging occurs while corn is still growing, the stalk usually bends upward, a symptom called “goosenecking.” If lodging occurs well after tasseling, the stalk may remain straight but simply tip over at the base of the plant. Lodging may be sporadic, occurring in streaks, in pockets, or on side hills. More rarely lodging is fairly uniform throughout the field. Poor root systems and lodging can spell trouble for combining by delaying harvest (corn is wetter), prolonging harvest times, and excessive wear in the combine from soil on roots pulled out of the ground or rocks pulled in when the header is close to the soil surface. Wet weather will increase susceptibility of
plants to high winds and increase likelihood that roots will be pulled into combine.

“Weather conditions have complicated grower awareness of corn rootworm activity in their fields,” said Ostlie. "In a drought year, lodging provides an imperfect window into the extent of corn rootworm. We had few thunderstorms with strong winds to lodge corn during the summer." Now Mother Nature seems to be making up for lost time. Recent rain, snow and wind are contributing to increasing harvest problems.

If producers observe lodging, Ostlie encourages them diagnose the culprit. Dig up some roots before harvest, wash them off and check for rootworm damage. Look for signs of corn borer activity. Check for hidden stalk rots using a push test, simply push the plants over 20-30 degrees and see if the stalks fall over. "Conditions were very good for both corn rootworm and corn borer this year, and the environmental stress on plant was high, so we'll see more stalk rot this fall," said Ostlie.

**Harvest Tips for Lodged Corn**

Harvesting lodged corn can try anyone’s patience, Ostlie admitted. Each situation is unique but several tips to keep in mind.

1. Use information on lodging and its causes to prioritize your fields. Taking the worst fields out early may incur extra drying costs but reduce harvest losses. There’s not much advantage in postponing the aggravation unless you need to make rapid progress on your harvest and are willing to suffer increased harvesting loss in the lodged field(s).
2. Plastic snouts generally work better than metal snouts. Some growers have even waxed snouts to help stalk gathering.
3. Improve pickup by combining against the direction of lodging. You may need to combine only in one direction. In severe situations, some growers have even combined at angles across the row to improve pickup, but combine rocking may be excessive.
4. Assume higher moisture levels and extra drying costs will be typical for these fields. Ears don’t dry easily near the ground and sprouting may even occur in extreme situations.
5. Be prepared for higher repair costs after this year’s harvest. Running the header close to the ground will increase risks from rocks. A poor root system will increase likelihood that headers may plug from plants pulled out of the ground. Be careful and keep safety in mind before trying to clear obstructions. Dirt on roots pulled into the combine will also increase wear on internal parts.

**Unexpected Corn Rootworm Injury in Transgenic Corn**

Transgenic corn expressing one of the three proteins active against corn rootworm usually performs significantly better than soil insecticides. “Phone calls this fall, however, from several areas of Minnesota report unprecedented levels of corn rootworm injury to rootworm-resistant corn,” Ostlie said. Before labeling injury as”unexpected,” planting records have been checked and the corn tested to see if its expressing protein. Preliminary evidence suggests hybrids are expressing the protein …but the root injury was equivalent or even worse than in insecticide-protected refuge corn. In these fields, Ostlie says that northern and western corn rootworms were unusually abundant in September when lodging was reported.
In the aerial view of one field (see photo), refuge corn protected by a soil insecticide are the narrow strips and a rootworm-resistant hybrid is planted in the wider strips. Root injury averaged about 0.6 nodes gone in the 4-row refuge strips where only 0.5% of the plants were lodged. In contrast in the rootworm-resistant corn, nearly 2.0 nodes were gone and 35% of the corn was lodged.

Why is root injury worse than expected? It’s too early to know the reason(s) behind unexpected root injury. Possibilities range from unusually severe corn rootworm pressure to resistance by corn rootworms to reduced protein production in drought-stressed corn. Dry weather conditions early in the summer certainly favored corn rootworm survival while mid-season drought certainly stressed corn plants. Extended diapause pressure from 2007 has also been unusually heavy. Biological changes in corn rootworm populations, such as resistance, cannot be ruled out yet.

**Help needed to identify extent of problem**

Observations from growers and their agricultural advisors will be critical to defining what corn growers are facing. “Help is needed to define the geographical area where unexpected injury is occurring and characterize the history, injury, and hybrids involved,” says Ostlie. If you have unexpected lodging, take a few minutes to examine your planting records, contemplate the pattern of lodging in the fields, and wash some roots from both the rootworm-resistant and refuge corn. If corn rootworm damage exceeds 0.5 node pruned, please fill out and return the attached report form. A pdf version of this form can be downloaded from the website:


Please let me know whether or not unexpected rootworm feeding and lodging is occurring in rootworm-resistant corn in your area. Thank you!
At the end, add a line to separate document content from authors' titles and other credentials, and other logos or credits if needed for partners, funders, etc.

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