

## Timing of Crop Stress is Critical!

R.L. (Bob) Nielsen

[Agronomy Dept.](#), [Purdue Univ.](#)

West Lafayette, IN 47907-1150

Email address: <mailto:rnielsen@purdue.edu>

Last month, I wrote an article about the importance of the timing of stress and the existence of other stress factors in determining whether or not stand establishment problems developed on some of the few acres of early-planted corn (**Some Corn Afflicted With TMDS Syndrome**, *P&C Newsletter*, 6/14/02). Recently, colleagues in Entomology here at Purdue reported that corn rootworm (CRW) larvae were feeding on the roots of late-planted corn in some first-year corn after soybean fields and that dramatic stunting subsequently developed (**Rootworm Damage Being Reported on Late-Planted Corn**, *P&C Newsletter*, 6/28/02 and **Stunting and Lodging of Late-Planted Corn**, *P&C Newsletter*, 7/5/02).

The incidence of CRW larval injury to late-planted corn seedlings serves as another morbid example of the importance of the timing of stress relative to crop growth stage plus the existence of other complicating stresses in determining whether or not subsequent crop stunting occurs. I've walked some of these fields and want to share my thoughts with you on these teachable examples.

Root injury to first-year corn by CRW larvae is not unusual in many parts of Indiana and Illinois due to the development of the variant of CRW that no longer preferentially lays eggs in corn fields. What was unusual this year was the preponderance of corn acres planted in late May throughout Indiana due to excessive and frequent rains earlier in the season. The late corn planting also coincided with CRW egg hatch and larval feeding activity.

Consequently, CRW larvae were "waiting at the table" in some fields at the time of corn emergence and initial seedling development whereas normally, with earlier corn planting, corn is much further developed (close to V6 leaf stage) before CRW egg hatch occurs and CRW larvae begin their feeding activities. In fields that I walked in late June, there was evidence of CRW larval feeding on the seminal (seed) roots and often the first set of nodal roots originating from the crown of the plants. In some cases, the mesocotyl of the young seedlings also showed evidence of CRW larval feeding injury.

In and of itself, the CRW injury to seminal and nodal roots is not unusual. What is important to understand, though, is the timing of this injury relative to crop growth stage. This injury occurred to very young corn seedlings that were just beginning to form

permanent (nodal) root systems rather than injury to well-established corn plants closer to V6 in growth stage.

Such stress to the initial nodal root system of very corn plants will stunt further crop development by itself, but the proverbial “straw that broke the camel’s back” was the concurrent hot and dry weather conditions that were rapidly drying the upper two or more inches of surface soil in some of these fields. Remember that the crown of a corn plant is positioned at about three-fourths inch (2 cm) below the soil surface. The excessively dry and hot soil imposed further stress on the nodal root development, leading to wilting of seedlings and eventual death for some.

In the fields I walked, there were also interesting patterns of stunted and nearly normal plants within the field. What was unusual was that the nearly normal plants seemed to coincide with the trafficked areas of the field (tractor and planter tires) where soil compaction was the greatest.

These nearly normal plants often exhibited similar levels of root injury due to CRW feeding, but several nodal roots of each plant had successfully elongated into the moist soil profile below the upper dry two inches. Plants that were stunted but not wilted usually had at least one nodal root that had managed to elongate down to moist soil. In contrast, almost every severely wilted plant could be characterized by not having any nodal roots below the excessively dry upper two inches of soil.

I could only surmise that the trafficked areas of the field had not dried out as rapidly as the non-trafficked areas after earlier rains and that the young corn plants had a bit longer opportunity to successfully establish one or more nodal roots before the excessive heat settled in by mid-June.

Injured corn plants in those fields that received rainfall from the spotty thunderstorms the last week of June survived the CRW damage, but now comprise the less favorable component of the tall corn/short corn phenomenon that characterizes those fields today. Injured and severely wilted corn plants in those fields that did not receive rainfall from the spotty thunderstorms have likely moved on to that “Great Corn Field in the Sky”.

**Bottom Line:** As with good comedy, timing is everything, especially when it comes to the effects of severe early season stress on corn. Do not discount the potential effects of a seemingly minor stress when the timing of its occurrence relative to crop growth stage or other complicating stress factors is “perfect” for crop injury.

#### **Related References:**

Nielsen, Bob. 2001. Corn Root Development [Online]. Purdue Univ. Coop. Extension Service. [http://www.kingcorn.org/news/articles.01/Corn\\_Root\\_Dev-0509.html](http://www.kingcorn.org/news/articles.01/Corn_Root_Dev-0509.html) (Verified 7/5/02).

Nielsen, Bob. 2002. Some Corn Afflicted With TMDS Syndrome [Online]. Purdue Univ. Coop. Extension Service. <http://www.kingcorn.org/news/articles.02/TMDS-0609.html> (Verified 7/5/02).

Nielsen, Bob. 2002. Too Much Dang Stress – Recap [Online]. Purdue Univ. Coop. Extension Service. <http://www.kingcorn.org/news/articles.02/TMDS2-0625.html> (Verified 7/5/02).

Obermeyer, John, Rich Edwards, and Larry Bledsoe. 2002. Rootworm Damage Being Reported on Late-Planted Corn [Online]. Pest & Crop Newsletter, No. 15, June 28. Purdue Univ. Coop. Extension Service.

[http://www.entm.purdue.edu/entomology/ext/targets/p&c/P&C2002/P&C15\\_2002.pdf](http://www.entm.purdue.edu/entomology/ext/targets/p&c/P&C2002/P&C15_2002.pdf) (Verified 7/5/02).

Obermeyer, John, Rich Edwards, and Larry Bledsoe. 2002. Stunting and Lodging of Late-Planted Corn [Online]. Pest & Crop Newsletter, No. 16, July 5. Purdue Univ. Coop. Extension Service.

[http://www.entm.purdue.edu/entomology/ext/targets/p&c/P&C2002/P&C16\\_2002.pdf](http://www.entm.purdue.edu/entomology/ext/targets/p&c/P&C2002/P&C16_2002.pdf) (Verified 7/5/02).

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