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Seed treatments and soil insecticides in real world situations for corn rootworm

Statewide monitoring of corn and soybean fields has documented a slow western corn rootworm population rebound in some areas.

Jan 30, 2019

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Producers across east-central Illinois have enjoyed low western corn rootworm pressure for several years, due to a combination of saturating rains during rootworm egg hatch and widespread use of Bt corn hybrids. Following a low point in the rootworm population in 2015, statewide monitoring of corn and soybean fields has documented a slow western corn rootworm population rebound in some areas.

Recent low corn pest abundance (combined with lower commodity prices) provides an opportunity to become reacquainted with rootworm monitoring and non-Bt options for their management. While relying on soil insecticide or a seed treatment to protect corn roots may not fit into every growers' operation every year, rotating among different rootworm management tactics should be considered a part of the best management practices for corn rootworms in the transgenic era.

Rotating between different rootworm management tactics and Bt modes-of-action is necessary because western corn rootworm populations are evolving resistance to the Bt proteins expressed in Bt corn hybrids. In addition, monitoring adult populations in fields that will be planted to corn the following year will help to assess the need for control (whether a Bt trait or an insecticide).

In 2018, we conducted a series of field trials to evaluate control options for corn rootworm. These trials were planted following a 2017 "trap crop" of late planted corn and pumpkins to artificially increase rootworm populations in the field. Root masses (5 per plot) were removed during the early reproductive stages (R1-R3), cleaned using pressure washers, and rated for corn rootworm damage using the 0-3 Node-Injury Scale developed by researchers at Iowa State (Oleson et al. 2005).

The rootworm population at this location consisted almost entirely of western corn rootworm, and previous bioassay data indicated a high level of resistance to the "Cry3" Bt traits within the population. Note that additional information and data for these trials (as well as additional insect and disease management trials) are available in the recently published "Applied Research Results on Field Crop Pest and Disease Control," available at the following link: <http://cropdisease.cropsciences.illinois.edu/wp-content/uploads/2018/12/Pestpathogenappliedresearchbook2018.pdf>. In addition, readers are encouraged to consult "on Target" for summaries of applied research trials conducted by University of Illinois personnel from 2004-2014: <http://ipm.illinois.edu/ontarget/>.



For many years, some corn hybrids have been marketed with seed treatments at what has been described as the ‘rootworm rate’. These data indicate that at modest larval pressure (*ca.* 1.9 on the 0-3 Node Injury Score scale), these seed treatments provide some root protection; however, based on previous studies these treatments should not be relied upon alone for control under heavy rootworm pressure. Note that all hybrids used in this trial expressed Cry3Bb1 for root protection. The relatively high root pruning observed in the untreated plots illustrates that resistance to the “Cry3” proteins is an issue at this site.

Soil-Applied Insecticides

We tested soil-applied insecticides with a non-Bt hybrid for rootworm control, and all insecticide materials tested in 2018 reduced injury from corn rootworm larval feeding compared with the untreated control. This trial was conducted under relatively low larval pressure (1.07 on the 0-3 node-injury scale in the untreated plots), and no distinctions among the different insecticides could be made.

Before commercialization of Bt corn hybrids, a soil-applied insecticide was one of the only options available to growers anticipating economic rootworm injury in continuous or rotated corn. Over the years, soil-applied insecticides were regularly evaluated in University of Illinois Insect Management Trials (see previously linked “on Target” reports). They typically provided significant reductions in corn rootworm larval damage to corn roots compared to untreated controls.

Oftentimes, soil-applied insecticides provided root protection equivalent to, or approaching that provided by single trait Bt corn hybrids with similar yield results (see 2013 “on Target” report). Ultimately, Bt corn’s season-long root protection that was as good as or better than a soil-applied insecticide, reduced pesticide exposure, and simplified planting operations were powerful motivations that drove adoption of Bt corn. However, use of a granular or liquid soil-applied insecticide on a non-rootworm Bt corn hybrid remains a viable tactic to protect corn roots without the use of a Bt corn hybrid.

If you are interested in using one of these products and have not done so in a while, now is a good time to verify that your application equipment is in good shape. Rotating corn hybrids that incorporate Bt traits with non-Bt corn treated with a soil-applied insecticide should be considered as a strategy to slow resistance evolution, especially in areas that are currently experiencing only



Rootworms (Coleoptera: Curculionidae). Journal of Economic Entomology 90: 1-6.

Table 1. Mean (\pm standard error) node-injury ratings of corn rootworm larval feeding injury on corn hybrids expressing the Bt trait Cry3Bb1 treated with Poncho Votivo, Poncho Votivo 2.0, or Untreated at Urbana, IL in 2018.

| Treatment | Node-injury ratings 10 July (R1) |
|-------------------|-------------------------------------|
| Untreated | 1.83 \pm 0.18 a ^a |
| Poncho Votivo | 0.57 \pm 0.06 b |
| Poncho Votivo 2.0 | 0.55 \pm 0.10 b |

^a Means followed by the same letter within a column are not different based on the Fisher method of least significant difference ($\alpha = 0.05$)

Table 2. Mean (\pm standard error) node-injury ratings of corn rootworm larval feeding injury on non-Bt corn treated with granular and liquid insecticides at planting at Urbana, IL in 2018.

| Treatment | Node-injury ratings 10 July (R1) |
|----------------------------|-------------------------------------|
| Untreated | 1.07 \pm 0.12 a ^a |
| Capture 3RIVE 3D (16 oz/a) | 0.37 \pm 0.07 b |
| Force CS (9.9 oz/a) | 0.22 \pm 0.05 b |
| Aztec 4.67G (52.3 oz/a) | 0.25 \pm 0.06 b |

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| | |
|--------------------------------|---------------|
| Ampex EZ ^b (8 oz/a) | 0.13 ± 0.01 b |
|--------------------------------|---------------|

^a Means followed by the same letter within a column are not different based on the Fisher method of least significant difference ($\alpha = 0.05$) ^b Note that Ampex EZ is not labeled for use in corn at the time of this publication

Source: University of Illinois Extension, which is solely responsible for the information provided and is wholly owned by the source. Informa Business Media and all its subsidiaries are not responsible for any of the content contained in this information asset.

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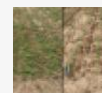
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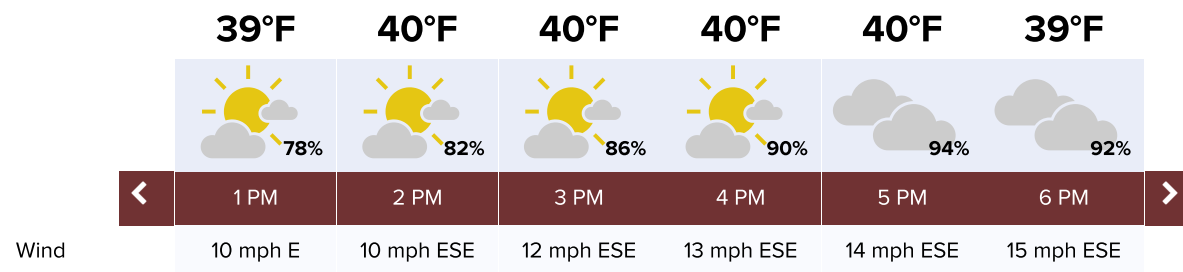
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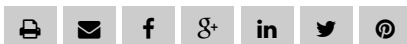
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Farm Progress America, Feb 6, 2019

Max Armstrong looks at a key issue for U.S. agriculture - trade

Feb 06, 2019





Max Armstrong wants to know what farmers are saying about trade and politics as he visits conventions and meetings this week. He notes that most organizations are working to avoid the politics, but make sure the message is clear that trade is crucial. During the Cattle Industry convention, Max talked with the head of CattleFax, who noted the value of global trade for beef, and potential disruptions that could occur.

Farm Progress America is a daily look at key issues in agriculture. It is produced and presented by Max Armstrong, veteran farm broadcaster and host of [This Week in Agribusiness](#).

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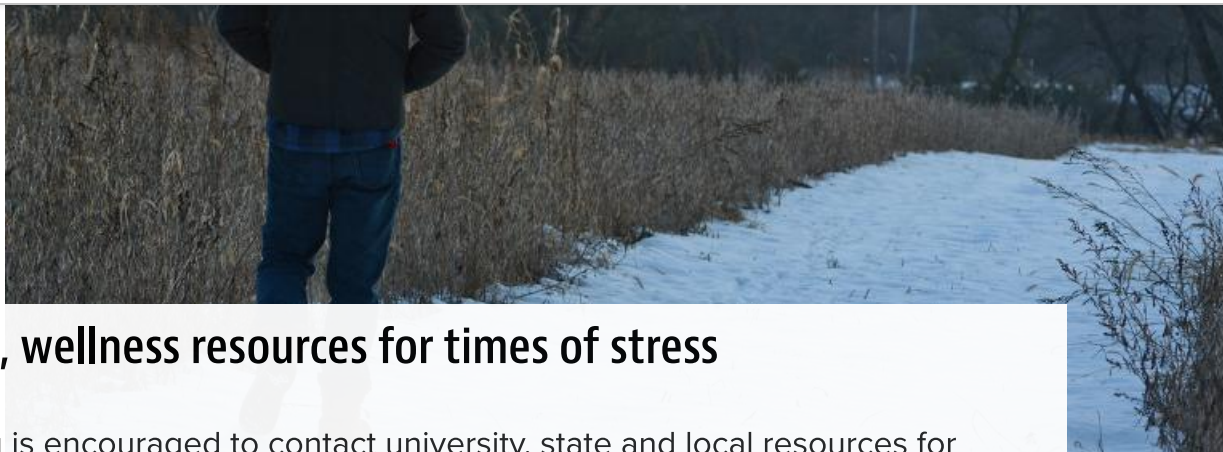
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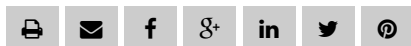


Mental health, wellness resources for times of stress

Anyone struggling is encouraged to contact university, state and local resources for help.

Paula Mohr | Feb 06, 2019

NOT ALONE: Farmers and their families under stressful situations need not face tough times alone. Professionals and programs across Minnesota are available to provide assistance.



A variety of resources and projects to address the challenges of stress and mental health are available to Minnesota farm families and rural residents.

The following is a compilation of current information from several sources:

- The National Alliance on Mental Illness and the Upper Midwest Agricultural Safety and Health Center are partnering on two efforts. One is a project that will work on changing public perception of mental illness in agricultural communities and equipping the community to identify and help people who may be having thoughts of suicide. The project also seeks to create personal stories of farmers or farm families who want to share their story of living with mental illness or being a suicide loss survivor.

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Go online to [learn more about NAMI](#).

- “Cultivating Resiliency for Women in Agriculture” is an online six-session education series of American Agri-Women, University of Minnesota Extension, Upper Midwest Agricultural Safety and Health Center, and District 11 of Minnesota Agri-Women.

The online classes are designed to help women in agriculture cultivate resiliency by focusing on what they can control in challenging times and connecting them with resources and information to help them weather stress. The 90-minute classes began in December and will continue through April. Each session focuses on a topic for discussion and includes an interactive Q&A period. The free sessions, all on Fridays, start at noon central time. Previous sessions were recorded and archived for later viewing.

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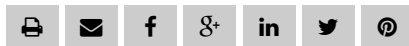


Big rigs with no emissions

Paccar shares new-tech trucks with electric motors and fuel-cell designs at CES 2019.

Willie Vogt | Feb 06, 2019

FAST REFUELING: The zero-emission Kenworth T680 has been developed in partnership with Toyota. It features a hydrogen fuel cell that provides electricity to an electric motor.



A trip to a high-tech convention and trade show can be full of surprises, including the two truck rigs from Paccar sitting in the parking lot. Paccar, known for its Kenworth and Peterbilt brands, shared two prototype rigs that feature a common theme — zero

where more goods move by truck, these machines do offer an interesting option.

Fuel cell features

Having a fuel cell as the energy source for an electric truck offers a key option that a fully electric system can't provide — quick refueling.

The Kenworth T680 Fuel Cell Electric Vehicle offers some interesting specs for the prospective future buyer. It is a prototype.

First, the rig has 560 hp in its traction power motor. The company notes the truck can maintain 30 mph on a 6% grade. That's significant if it can make that speed under those conditions, and it shows the torque this electric motor has.

In fact, the machine boasts enough torque to start out on a 20% grade.

The truck has a 300-mile range before refueling; and while that's a lot less than a standard diesel, this Class 8 tractor does offer the quick refill time for its fuel cell energy source. That fuel cell provides the needed "battery power" for the electric motor.

This is a hydrogen fuel cell that Paccar is developing in cooperation with Toyota. In fact, it carries the Toyota name along with the Kenworth brand — at least in this prototype on display.

With a fuel cell, hydrogen and air work through a system with an anode and cathode, along with an electrolyte, to create electricity. The only emission from this system is water.

The system has been engineered to fit into a standard cab.

Given the quick refill ability — just pump in the hydrogen and go — this approach may be more acceptable for tractors working in and around major cities. Over the road, the 300-mile range may be a limit for some; that remains to be seen. At [kenworth.com](https://www.kenworth.com), you can see more information about this truck.



CHARGE THIS: Electric vehicles are showing up in the most interesting places these days. The Peterbilt 579EV joins other models in the brand's electric vehicle development program.

Going all electric

The fuel cell electric version of the Paccar rig uses a quick-fill energy source, but there was also a Peterbilt on hand that was all electric.

The Peterbilt 579EV is an all-electric Class 8 vehicle that will join the company's 220EV and 520EV to create a lineup of electric rigs. All are in development with the 579EV, the latest on display.

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The 5/9EV has about 429 hp and 308 kilowatt-hours of storage capacity. That gives the rig about 130 miles of operating range — which might work for a rig hauling grain to town (though time will tell).

Battery recharge time for the rig is about four hours.

To maximize energy use, the rig features an automated manual transmission and a high-power onboard inverter-charger set.

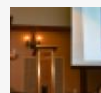
For now, the truck is best suited for moving material in a port application, which can rely on starts and stops for regenerative braking (a feature popular on hybrid cars). Regenerative braking transfers energy back into the battery packs and reduces the amount of brake pedal pressure required. That means a smoother, quieter ride.

The rig has a gross vehicle weight rating of 80,000 pounds. Learn more about this rig at peterbilt.com.

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