Field Performance of Vorceed™ Enlist® Corn Rootworm Traits

CROP BULLETIN

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KEY FINDINGS:

- The corn rootworm traits in Qrome® corn and Vorceed™ Enlist® corn both provided effective control of corn rootworm larval feeding.
- The Vorceed Enlist traits provided a significant advantage at locations with a history of continuous corn production.
- All corn rootworm trait products provided a significant improvement in yield compared to the negative control under corn rootworm pressure.

A NEW CORN ROOTWORM MANAGEMENT TOOL

- Western and northern corn rootworms have a history of adapting to and overcoming control practices, which has increased the complexity and difficulty of successfully managing these pests.
- Field-evolved resistance in western corn rootworm has now been documented for all four Bt traits for corn rootworm protection currently on the market.
- Ribonucleic acid interference (RNAi) technology has been commercialized to provide an additional unique mode of action for protection against corn rootworm and is available in Corteva Agriscience seed brands in Vorceed™ Enlist® corn.

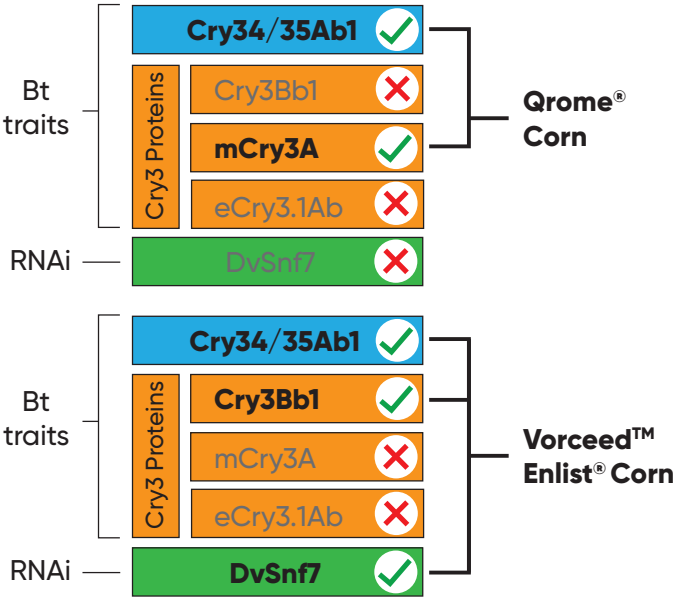

Figure 1. Corn rootworm protection modes of action in Qrome corn (dual-mode Bt) and Vorceed Enlist corn (Dual-mode Bt + RNAi).

STUDY DESCRIPTION

- Field experiments were conducted in 2020, 2021, and 2022 to evaluate efficacy of the corn rootworm traits in Qrome corn and Vorceed Enlist corn for reducing root feeding and protecting corn yield.
- The field experiments were conducted at locations with a history of continuous corn production or locations where a trap crop was used to boost corn rootworm pressure.
- A total of four different hybrid families were used across the research locations, representing 108 and 113 CRM groups.
- Four different combinations of corn rootworm traits and insecticide seed treatments were compared in the study (Table 1). The experiments used the major components of Qrome corn and Vorceed Enlist corn without the integrated refuge component.

Table 1. Corn rootworm treatments compared in 2020, 2021, and 2022 field experiments.

Treatment Description	CRW Traits	Insecticide Seed Treatment Rate (clothianidin)
Unprotected Check	none	250 IST
CRW Traits in Qrome + 1250 rate IST	Cry34/35Ab1 MCry3A	1250 IST
CRW traits in Vorceed Enlist	Cry34/35Ab1 Cry3Bb1 DvSnf7	250 IST
CRW traits in Vorceed Enlist + 1250 rate IST	Cry34/35Ab1 Cry3Bb1 DvSnf7	1250 IST

RESULTS

- All three corn rootworm protection treatments were effective at keeping corn rootworm feeding below a corn rootworm node injury score (CRWNIS) of 0.5 (Figure 2).
- The two treatments with the Vorceed Enlist corn rootworm traits (dual-mode Bt + RNAi) had significantly lower CRWNIS than the Qrome corn rootworm traits (dual-mode Bt).

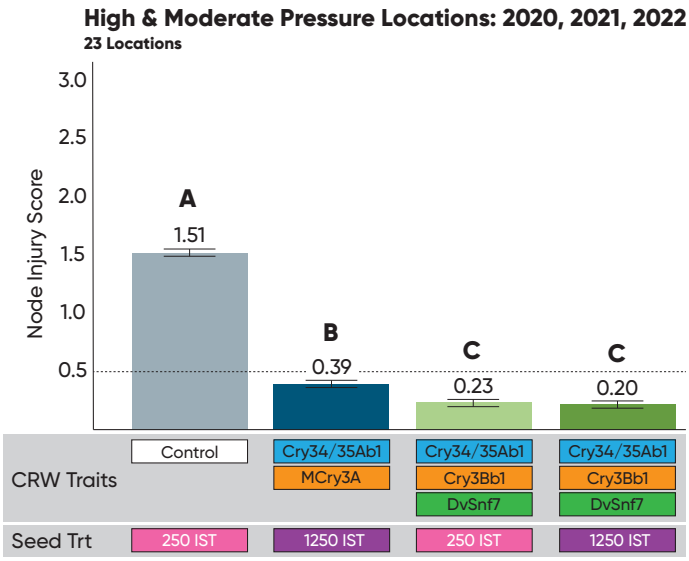

Figure 2. Corn rootworm node injury scores across 23 moderate and high-pressure locations. Bars with the same letter are not significantly different at α = 0.05.

- Among a subset of moderate and high corn rootworm pressure locations with a history of continuous corn rootworm trait use, all corn rootworm treatments significantly reduced feeding compared to the unprotected check, but CRWNIS scores were slightly higher (Figure 3).
- The two treatments with the Vorceed™ Enlist® corn rootworm traits had CRWNIS under 0.50, but the CRWNIS for the Qrome® corn rootworm traits slightly exceeded this threshold.

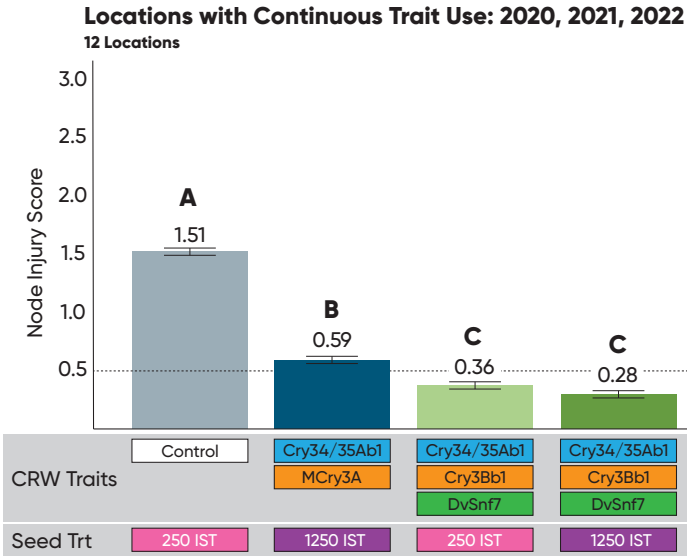

Figure 3. Corn rootworm node injury scores across 23 moderate and high-pressure locations. Bars with the same letter are not significantly different at α = 0.05.

Figure 4. The corn rootworm node injury score (CRWNIS) rating system ranges from 0 to 3 based on the number of roots pruned by corn rootworm feeding to within 1.5 inches of the crown. A maximum score of 3.0 corresponds to 3 full nodes of roots pruned.

- All three corn rootworm protection treatments provided significant improvement to yield compared to the unprotected check under moderate to high corn rootworm pressure (Figure 5).
- The two treatments with the Vorceed Enlist corn rootworm traits had significantly higher yield than the Qrome corn rootworm traits.
- The addition of a 1250 rate insecticide seed treatment to the Vorceed Enlist corn rootworm traits provided slight numerical advantages in CRWNIS and yield, but none were statistically significant.

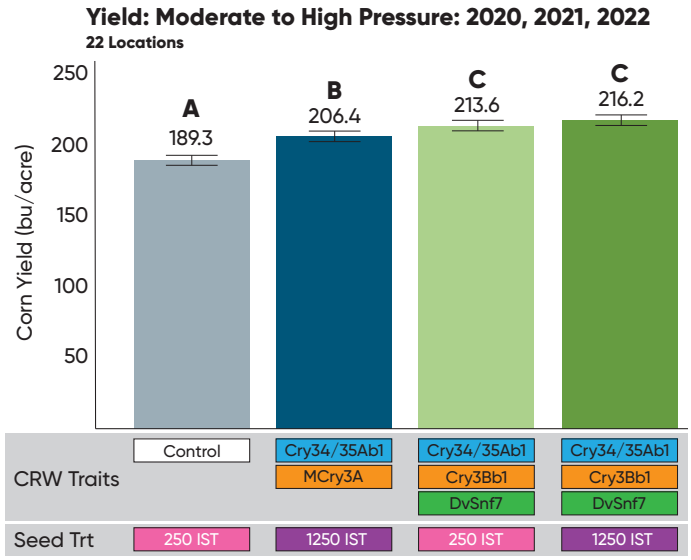

Figure 5. Corn yield across 23 moderate and high-pressure locations. Bars with the same letter are not significantly different at α = 0.05.

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