



Corn Rootworm Feeding and Damage in High Populations

Corn rootworm (CRW) continues to be a major insect pest for corn producers in the United States, particularly in the Midwest. It is estimated that corn rootworms, consisting of both the western corn rootworm and the northern corn rootworm species, are responsible for a billion dollars annually in crop losses and control costs.¹ In 2020, corn rootworm pressure was noticeably higher in the Midwest than in recent years.²

Q. How can corn rootworms damage corn plants?

A. The larval stage of CRW causes the most damage to corn when larvae feed on the root system (Figure 1). Newly hatched larvae feed on root hairs and outer root tissue, later burrowing into the roots to feed. Damage caused by CRW larvae is most severe after the secondary root system is well established and brace roots are developing. Corn rootworm damage to roots can appear as feeding scars, roots that appear tunneled into, or roots that are chewed back to the base of the plant or the crown.

The loss of root tissue restricts the plant's ability to take up water and nutrients from the soil, which can have a direct impact on yield potential. Severe larval root feeding injury can result in up to 50 percent yield losses.¹ Severe root injury can also result in lodging or "goosenecking" which can cause difficulty at harvest (Figure 2). Adult CRW beetles can feed on above ground plant parts. Feeding on silks, known as silk clipping, can result in reduced pollination, plant fertility issues and lack of kernel development.



Figure 1A. CRW larvae feeding on corn nodal root. *Courtesy of Jim Valent, Bayer.*
1B. Damage from CRW feeding on corn roots. *Courtesy of Dawn Fraser, Bayer.*

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Q. Do the signs of CRW root feeding vary according to whether the corn contains insect protection traits or not?

A. Yes, the typical symptoms of CRW feeding are evident when digging up the roots of corn plants and assessing the amount of feeding damage present. In order to ingest the *B.t.* proteins from insect traited plants, CRW larvae must feed on the roots, resulting in some damage being evident. Both the insect protected (traited) and the non-traited corn will show signs of CRW root feeding but can differ in the amount of damage. Corn with traits for insect resistance commonly show less root feeding from CRW than non-traited corn. As a result of less root feeding in insect resistant corn, the plants may look visibly healthier, less lodged, with less “goosenecking” (bending).



Figure 2. Lodging resulting from CRW damage to corn roots.

Q. Does Bayer offer trait technology to help control CRW?

A. Yes, *B.t.* trait technology, which produces proteins in the corn plant that are toxic to insects, has helped provide root and yield protection benefits against CRW. Pyramiding traits with multiple modes of action, where products contain two or more *B.t.* traits, is now considered a key management strategy for CRW control. SmartStax® Technology offers two proven modes of action against both northern and western corn rootworm. SmartStax® PRO Technology* will combine the proven benefits of SmartStax® technology with an additional, new RNA-based mode of action, providing improved corn rootworm control over a range of pressure.**

*SmartStax® PRO corn products will be commercially available for the 2022 growing season.

** Based upon 2019-2020 Bayer internal trials comparing leading corn rootworm technologies in fields with moderate to heavy corn rootworm pressure.

Q. What other management options should growers consider when faced with high CRW pressure?

A. Crop rotation can be an effective management tool when dealing with high CRW population densities. Corn is the preferred agronomic crop for CRW to complete its life cycle. By rotating to soybean or another non-host crop, the food source that is essential for larval survival is removed, resulting in their death. Another option is the use of soil-applied insecticides at planting with a non CRW traited product.



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Q. How can growers monitor CRW pressure and help manage CRW in the future?

A. Regardless of management practices used, every grower should be sampling and scouting to assess the level of CRW pressure in their fields as well as to help determine the success of their current management plan. Yellow sticky traps can be used to help monitor adult beetle populations to determine if they should implement a corn rootworm management plan in their fields the following year. Growers may also choose to control adult CRW beetles prior to egg lay with foliar insecticide applications. Timely applications can help reduce egg laying which can result in lower pressure the following year.

For further information on scouting and management strategies, please see: Management of the Corn Rootworm Complex .

Sources:

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² Gullickson, G. 2020. How to beat corn rootworm in 2021. Successful Farming. <https://www.agriculture.com/crops/corn/how-to-beat-corn-rootworm-in-2021>

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SmartStax® PRO corn products will be commercially available for the 2022 growing season.

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