Yield Protection

New Research Redefines the Importance of Controlling Weeds Early to Protect Yield

Cutting-edge research has given a more critical meaning to the importance of controlling weeds early to protect yield. The traditional belief is that early-season weeds compete with the corn plant for resources – nutrients, water and sunlight – which causes yield loss. This is still the case. **However, new studies show that irreversible yield loss has already occurred if weeds are present at corn emergence.**

Research from the University of Guelph, Ontario, reveals that the environment in which a seedling grows is more significant than previously thought for protecting yield. Corn seedlings are able to detect the presence of weeds at emergence and will change their growth pattern in response.

The detected changes in light quality, caused by the presence of weeds, lead to the seedling's adjustment of carbon allocation and leaf orientation to optimize interception of light quality and quantity. In addition, in a weedy environment, newly emerged corn shifts energy from developing roots to developing shoot mass to increase plant height, leaf dry weight and leaf area. The development of weak roots and random leaf orientation will negatively affect yield.

In growth chamber A, corn seedlings were placed in pots surrounded by flats filled with potting soil, which approximates the same light reflectance as bare, weed-free soil.

In a second chamber B, corn seedlings were placed in pots surrounded by flats planted with sod, which approximates the same light reflectance of a weedy field.

Research compared a weed-free condition to a weedy condition, and light reflectance and response were measured.

***Trial Results:** The presence of weeds made the corn grow 17 percent taller, produce 45 percent more leaf area and 40 percent more dry leaf weight, producing a smaller root system, which is 10-15% **less** than in the weed-free environment. A smaller root system struggles to support the plant, but also isn't developed enough to respond in unfavorable growing conditions.*

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Highlights of New Cutting-Edge Research

- Weed pressure alters the quality of light surrounding developing seedlings, triggering changes in the plant before competition for resources occurs.
- Corn plants sense weeds as soon as they emerge.
- Corn reacts to altered light quality by adjusting the position of leaves in relation to the plant, much like a house plant reacts to capture the optimum sunlight in a room.
- Corn leaves positioned perpendicular to the row result in more rapid canopy closure, growth and suppression of weeds between rows. Under weed-free conditions, 94 percent of the leaves are likely to grow perpendicular to the row. Under weedy conditions, leaves were 19 percent *less* likely to grow perpendicular to the row.
- All these factors can set the crop in an irreversible pattern that may limit its total yield potential.

Bottom line:

Research shows early-season weed control is absolutely critical to achieving full yield potential.

Lumax® and Lexar®, the highest-performing pre-emergence herbicides available, offer unprecedented broadleaf weed and grass control that keep fields clean early in the season when it's needed most. And, the long-lasting residual manages weeds all the way to crop canopy.

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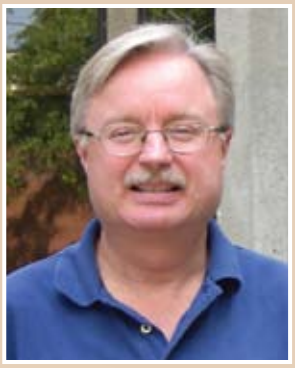
About the Researcher



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For more than 20 years, Dr. Swanton has been an integral part of the University of Guelph, first as an assistant professor of weed science and then as a professor. His achievements have included serving as the first chair of the Department of Plant Agriculture from 1998 to 2004, publishing 144 papers and three book chapters, and co-authoring *Weed Ecology in Natural and Agricultural Systems*. His current research is focused on the development of integrated weed management systems for field and horticultural crops. The Weed Science Society of America (WSSA) has recognized his work through such prestigious awards as the 2006 Paper of the Year, the 2005 Fellow Award and the 2002 Outstanding Researcher Award. He also was elected a Fellow of the Canadian Society of Agronomy in 2002. Dr. Swanton obtained his bachelor's degree in botany from the University of Toronto, his master's degree in agrometerology from the University of Guelph and his doctorate in plant ecology from the University of Western Ontario.

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