Corn increases weed growth

Weeds found to influence gene expression and growth in corn.

The axiom “growing like a weed” takes on new meaning in light of changes in gene expression that occur when weeds interact with the crops they infest, according to South Dakota State University plant scientist Sharon Clay.

Using sophisticated genetic mapping techniques, Clay and her research team have been documenting how corn and weeds influence one another. “Weeds grow like weeds” when they grow with corn, Clay said. “They grow bigger and taller in corn than by themselves,” and inversely, “corn grows less among weeds.”

Over the last 20 years, Clay has been studying weed management in range and cropping systems, weed physiology and interactions among herbicides, and cropping systems, weed physiology and interactions among herbicides, and cropping systems. She has been finding that weeds influence one another. “When grown with weeds, genes that control the major facets of the corn plant’s metabolism were decreased or down-regulated, according to Clay. These included its response to light stimulus, the amount of chlorophyll it produces and its ability to convert raw materials into energy.

In short, these changes in gene expression adversely affect the plant’s ability to grow and reproduce.

Long-term impact

When the researchers started taking weeds out of the corn at early points, such as when the corn had as few as two and four leaves, they still saw differences in gene expression compared to the corn grown without weeds. However, Clay pointed out, the amount of biomass — the stem and leaves — was not significantly different.

The genes never recovered,” even after the weeds were removed, Clay said. “The impact is long term,” which further builds the case for controlling weeds early.

These changes in gene expression can help explain instances when the yield is unaffected but a slight reduction has taken place in the plant that scientists cannot pinpoint.

The researchers also studied the effect of water stress on gene expression using corn planted on high and low ground. The genes of the water-stressed corn on the top of the hill were down-regulated in terms of phosphorous uptake, Clay explained.

Additionally, she said the circadian rhythm — the internal clock that controls the operation of plant cells — was affected. This, in turn, affected the plant’s wounding response and made it more susceptible to pest injury. Essentially, the water-stressed corn “was getting older faster,” Clay said.

The researchers now “have a clearer idea of how that stress is affecting the plant,” she explained. “We didn’t have that ability before we had the genome sequence.”

Early control

The increasing emergence of herbicide-resistant varieties of weeds has refocused attention on weed control, according to Clay. For the last 20 years, glyphosate has provided an inexpensive yet efficient means of controlling weeds. “Because we had such an easy control method, no one put money into the research,” Clay said, pointing out that the newest herbicides were developed years ago. “My bottom line is to get growers to use what they need, where and when they need it.”

By understanding how weeds and environmental stressors affect gene expression, she said scientists will have one more piece of the puzzle that will improve weed control and decrease crop damage.

Applicants sought for 2014 feed mill award

The American Feed Industry Assn. (AFIA) and Feedstuffs are now accepting applications for the 2014 Feed Mill of the Year award.

The award program recognizes overall excellence in feed manufacturing operations, emphasizing safety, quality, regulatory compliance, operating efficiencies and other industry awards.

Selection of the top plant starts with an online application process and concludes with personal visits to the top sites by an inspection team from AFIA and Feedstuffs. Final selection is based on a combined scoring of the application and visit.

The 2014 Feed Mill of the Year winner and runner-up will be announced this fall.

The award program benefits all applicants, with each candidate receiving benchmarking information at the completion of the competition.

The winner and runner-up of the competition are permitted to use the Feed Mill of the Year logo for one year for promotional materials. The top two facilities also receive features in the AFIA Journal and Feedstuffs newspaper.

Last year, judges reviewed more than 80 applications, making the decision that much harder when narrowing the applicant field,” said Keith Emperson, AFIA vice president of manufacturing and training. “Ultimately, the American Farmers Cooperative of Rockford, Tenn., was selected as the 2013 Feed Mill of the Year as they are third-party certified in hazard analysis and critical control points as well as AFIA’s Safe Feed/Safe Food Certification Program, among many other reasons.”

The Hubbard Feeds facility in Rapid City, S.D., was the 2013 runner-up.

Participation in the Feed Mill of the Year program is limited to feed mills with current AFIA membership. To apply for the 2014 program, please complete the online application that can be found on www.Feedstuffs.com. The application deadline is June 30.