Healthy root systems provide increased yield, profit potential

Experts focus on understanding roots at Global Root Health Forum

Future yield increases will come from improving root health, but this is an area with great opportunity for research, Dr. David Wright, North Central Soybean Research Program, shared this thought in his keynote address to fellow researchers at the Syngenta Global Root Health Forum. He added that problems with pathogens will increase as farming practices are intensified.

To emphasize the importance of root health and start a conversation on the topic, Syngenta hosted the first Global Root Health Forum in Palm Beach, Fla., in February 2011. Nearly 100 researchers from 15 countries shared their expertise from different regions, climates, crops, diseases and pathogens in three-division information exchange.

“The goal for bringing together such a wealth of knowledge and experience was to make great strides forward in understanding roots and the rhizosphere in general,” said Christian Schlatter, Syngenta global business manager and event host. “We want to keep exchanging information to define and discuss what we are learning about root health, and the Forum was an excellent kick-off.”

As one presenter said, maximizing seed yield starts and ends with a healthy root system. To this end, Forum discussions focused on threats to root health; interactions between pathogens like Rhizoctonia, Fusarium and Pythium, crops and the environment; known yield losses to key pests; and understanding plant physiology.

“Rhizoctonia causes a whitish discoloration of the root cortex, and the root tips are highly darkened. Symptoms are worse during warm, moist conditions, which are conducive to pathogen growth,” said Dr. Tim Paulitz, research plant pathologist, University of Illinois. “Incidence of these soilborne pathogens has increased steadily with evolving production practices, such as no-till, and the cool, wet weather we’ve experienced the past several spring seasons.”

While growers tend to fix their attention to production challenges that prove a significant yield threat, researchers are becoming more attuned to the long-term threat from Rhizoctonia. Pythium and Fusarium, which can “pick away” at yield and profit potential little by little with each passing season. (Continued on page 2)

What root health means to me

“Root health” is a term that plant pathologists have used for many years to describe a plant root that has very little disease. Most of the time these studies have focused on specific diseases, such as Pythium or Fusarium root rot. But, in the field there is always a combination of diseases, and they are affected by the environment. There have been numerous rating systems, but it has been difficult to correlate root ratings to yield. Environment makes a major impact on which diseases are limiting yield. For example, in cool, wet soils, Pythium may be the major problem, while in dry, sandy soils, other pathogens are most important. (Continued on page 4)

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Healthy root systems

It’s important to ensure cereal crops are protected against these yield-robbing diseases. Seed treatments, like Excalibur®, do a great job of creating a barrier against root diseases like Pythium. Direct-Ex tends to control stem and root damaging fungus, including those from the Fusarium and Rhizoctonia families. We believe that quality seed treatments are better able to harvest wheat genetics, seed treatments and crop decisions are affecting the health of developing seedlings. The root system to support that development has already been established, and the root systems to develop because the root tips more efficiently take up water and nutrients. Root tips subsequently increases moisture uptake, and develop stronger plants, which ultimately leads to increased yield potential.

Anastomosis Groups (AG-groups) Explained

To better understand this commonly mistaken disease, Syngenta and Dr. Paulitz are collaborating to map the occurrence of Rhizoctonia across the United States and identify the different rhizoctonia anastomosis groups (AG-groups) present in soils. AG-groups are classifications that categorize various strains of Rhizoctonia. These groups help scientists understand interactions between chemicals and their potential impact on the crop. How two strains of Rhizoctonia interact indicates their compatibility, or ability to exchange genetic information and reproduce. Different groups cause different diseases and have different host ranges; they’re almost like distinct species.

Management Recommendations

It is critical to monitor and observe disease symptoms for different systems of Rhizoctonia to manage the following growing season. Another important step in understanding the history of the field, maintaining awareness of the disease and implementing both cultural and chemical management tactics. Apply any seed starter fertilizer in the furrow at the time of planting to help the seedling pick up nutrients, even if some of the roots are nibbled away by Rhizoctonia, he says. Seed treatments that...