

Workshop To Explore The Mycorrhizal Connection

Since the inception of the computing era, a simple acronym evolved to become an icon of visual acuity and perception: WYSIWYG. The concept works for tangible objects as well as for digital data, but not so much for agricultural purposes. What-you-see-is-what-you-get might be fine for digital publishing or Web site creation, but in farming the exact opposite applies-what you can't see is what you get.

That's because the most critical processes involved in seed germination and plant health lie beneath the surface of the soil, and even then most can only be viewed on the microbial level through powerful microscopes. This hidden world -more a universe only now divulging its secrets, scientists say-is literally the root of all agriculture. But then, the term "root" might need to be redefined as well.

According to Larry Simpson, director of training and education for Mycorrhizal Applications, Inc., in Grants Pass, Ore., roots don't do what people think they do.

"Getting nutrients and water from the soil is actually not a primary function of the root," he said. "The root's main function is to host mycorrhizal fungi, and the fungi's task is to get nutrients and moisture from the soil. It's a symbiotic relationship that's relatively little known. Only in the past 50 years has it started to be understood, and the vast majority of that knowledge has come to light in the last 10 to 20 years."

While the fungi is naturally-occurring, modern agricultural procedures such as extended fallow rotations, coupled with advanced tillage equipment and huge amounts of acreage under cultivation, have disrupted its vast interconnected web, Simpson said.

"Think of a huge dense spiderweb radiating out from the actual root of the plant," he said. "The mycorrhizal filaments extend out a couple of feet from the host plant, so many in the growing season that there might be nine miles of filaments in a single teaspoon of native prairie soil. And they're all interconnected, whether corn or wheat or soybean. Most of that population has been lost. We're basically planting in soil that's lost a critical component in how plants operate and perform. It's a downward spiral."

Reestablishing a mycorrhizal fungal element to crops as well as understanding the role of mycorrhizal fungi in soil and plant health will be the focus of an upcoming workshop on Friday, August 21, at the Salina Ambassador Hotel, 1616 W. Crawford, Salina, Kan. Registration begins at 8:30 a.m. followed by the workshop at 9:00 a.m. An afternoon field tour will be held at the Land Institute in Salina, located at 2440 E. Water Well Rd. A block of rooms is being held at a special discount until August 14. Call 785-833-2079 and ask for the Amazing Grazing room rate of \$69 plus tax.

On Saturday August 22, an all-day bus excursion will depart from the hotel parking lot for tours of a Star Seed test plot with four cover crop farmer tours. Early bird registration is \$100 for both days or \$75 for any single day by August 14, or \$125 for both days or \$85 for one after August 14. Friday lunch and both meals on Saturday are included with registration.

Both the workshop and bus tour are sponsored by Amazing Grazing III, a collaboration of the Kansas Farmers Union and the Kansas Graziers Association, in partnership with Star Seed.

Mycorrhizal fungi (literally, "fungus roots"), have co-evolved with plants and soils for more than 460

million years. They proliferate on the roots of plants in undisturbed natural habitats, spreading into the surrounding soil as a sprawling mass of microscopic hair-like threads. Host plants use their leaves to synthesize carbon for the fungi while the fungi returns the favor by supplying nutrients and water from the soil.

"The plant shares a small amount of sugar that keeps the fungus alive," Simpson said. "Mycorrhizal fungi cannot feed themselves but require a living root to survive. If the plant dies, the fungus dies."

Adding mycorrhizal fungus to the soil when planting seeds has several key benefits for farmers. In moist conditions the fungi acts as a primary immune system against fungal root disease caused by soil pathogens attacking the roots. In dry conditions the fungi allows host plants to not only tap into water sources more efficiently but even to store water for dry times, he said. The fungi promotes beneficial organisms that increase organic matter in the soil, thereby improving soil health, and they also help prevent potential effects from climate change through carbon sequestration.

"Farmers are always looking for better yield at less cost, and that's what the fungi does," Simpson said. "It increases the efficiency of the root system, enables individual plants to access more resources in the soil, improves growth in the host plant, requires less water and less fertilizer, further reducing costs. These are straightforward benefits no matter what kind of soil you have."

Considering that these microbial interactions take place beneath the soil unseen by the farmer, it might be easy to dismiss this as nothing more than academic or commercial postulation. After all, mycorrhizal filaments are microscopic, about 1/25th the diameter of a human hair, so it's not as if they can be seen in action. Seeing is believing, however, so participants will be treated to a walk through a freshly-dug soil pit where entire root systems can be viewed in their natural environment. The field tour will be conducted by Wes Jackson, president of the Land Institute, a nonprofit research and education organization whose goals include developing an agricultural system with the ecological stability of the prairie and a grain yield comparable to that of annual crops.

Simpson suggests that farmers who are interested but not totally comfortable in adding mycorrhizal fungi to crops start by controlled planting in contiguous sections. "When treated and untreated crops are planted side by side, they will definitely see a difference," he said. "Our approach is to ask the farmer to try a reasonable number of acres and plant it next to a crop treated without the mycorrhizal fungi and see for themselves. It slows down the overall process but gives them confidence when they see it happening. "

Though still in its formative years, research into mycorrhizal fungi continues to unlock secrets of the interconnections between plants, soil and microorganisms. Farmers wishing to educate themselves on cutting-edge techniques based on solid science would benefit from the one-day workshop, Simpson said.

"Certainly their fathers and their grandfathers and beyond benefitted from the fungus, because in their day the soil had a natural abundance," he said. "It was part and parcel of the ways things worked."

For more information on upcoming workshops sponsored by Amazing Grazing, call Mary Howell at 785-562-8726 or visit Amazing Grazing's Web site at <http://www.kansasfarmersunion.com/amazing-grazing>.

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Mycorrhizal Connection Workshop & Land Institute Tour, Friday, August 21

Speakers will be Dr Christine Jones, Amazing Carbon, Soil Scientist, Australia, Mike Amaranthus and Larry Simpson, Mycorrhizal Applications, Oregon, Kansas Farmers Dale Strickler and Gail Fuller. An afternoon field tour will be held at the Land Institute with Wes Jackson, located at 2440 E. Water Well Rd, Salina KS.

Cover Crop Bus Tour, Saturday, August 22

On Saturday August 22, an all-day bus excursion will highlight the benefits of using cover crops. The bus will depart from the Salina Ambassador Hotel parking lot, 1616 W. Crawford, Salina, promptly at 8:00 am for tours of a Star Seed test plot and four farms using cover crops. Lunch & supper are included and the bus should return to the hotel at approximately 9 p.m.