Preserving Yield: Doing the Right Things Right

When it comes to plant yield, how growers perform specific tasks is every bit as important as which tasks they perform. Seed germination, application strategy, and the observed benefits of high-quality soil microbe enzymatic and plant growth regulator (PGR) contributions can make a drastic difference in yield.. The importance of emergence and timing can't be underestimated, either.

Preserving Yield

As growers, we do not create yield, we preserve yield. The best growing management decisions are based on two fundamental principles:

1. Determining and executing the right decisions to achieve the highest seed genetic potential; and
2. Eliminating the bad decisions that will decrease seed genetic potential

The genetic yield potential of plants in the field is abundant and rich, but it is what we do as growers to make sure we preserve that yield potential that counts, including supplying the right environmental conditions and providing the right crop nutrition to prevent potential bad days of growing.

The Role of Microbes in Seed Germination

Microbes contribute many beneficial functions to plant growth. Soil microbes produce enzymes which soften the seed coat to allow soil moisture and nutrients to penetrate the seed. The amylase enzyme they produce converts the endosperm starch into sugars. This process is critical for creating the energy needed for germination and early growth. Soil microbes also produce jasmonic acid (JA) and indole-3-acetic acid (IAA) which stimulate seed germination and cell division. This is how the seeds grows into plants.
The microbes also produce auxins which stimulate the root to grow and branch optimally for an early, large, and healthy root system. Finally, the microbes produce gibberellic acid (GA3), which is responsible for cell elongation, ensuring the seedling has a strong push through the soil crust.

The soil microbe-contributed enzymes and PGRs:

- increase the speed of seed germination
- make the seeds less vulnerable to rot in cold soil temperatures prior to germination
- make seed germination more cold temperature tolerant
- increase the percentage of seed germination
- build larger, healthier root systems
- increase the strength of seedling emergence through soil crust
- result in a faster, more uniform seedling stand

Direct Observation: Application Strategy Matters

Pacific Gro + Metagro ST, applied directly observed the impact of soil microbes and application strategies in the field recently. Two fields using our microbe program with differing application strategies were studied. The first field had the microbes applied with a two-inch offset on both sides of the seed line. The second field had the microbes applied directly over the seed line.

As you can see from the following photo, although the results were positive in both fields, it was visually apparent that the microbes applied directly over the seeds were yielding the benefits of soil microbe supplementation previously described.

Yield Loss: The Importance of Emergence and Timing

Well supported seed germination is critical to limiting yield loss, and the importance of emergence and timing cannot be overstated. It is well documented that neighboring corn plants which emerge in excess of 24 hours of each other (the “weedy” siblings) result in a yield per plant that is significantly lower (25-28% loss in kernel numbers, or between 8 and 15 bushels per acre). This loss is even greater when emergence is delayed two or three days. The plants emerging later continue to starve for nutrition and sunlight, competing against the healthier plants adjacent to them.

Total yield loss is dependent on the percentage of plants negatively affected, but this information certainly inspires growers to want to clearly understand why some seeds are emerging later than others. This is why we focus on supporting seed germination every step of the way. When corn is over $5 per bushel, a loss of even a more conservative 5 to 8 bushels per acre would quickly represent a real problem for growers.

A 12-hour emergence appears to be significant, and it has a positive effect on preserving yield. Growers using Pacific Gro Sea Phos and Sustainable Growing Solutions SGS (Metagro ST, Mfood) experienced a significant improvement in 12-hour emergence. Root growth was enhanced at the V3 stage, giving the plants the best chance for optimal growth and preserving yield.