



## Protecting from A to Z

Combinations of *L. plantarum*, *L. casei* and *L. buchneri* strains cover silage from beginning to end.

**T**he goal of silage management is to harvest, preserve and feed as many of the nutrients produced in the field as possible. Inoculants are a valuable tool for achieving this goal, and the best inoculants work from the beginning of the ensiling process through feedout.

Pioneer provides combination products that include three key genera and species of lactic acid bacteria to help preserve nutrients and help prevent spoilage. *Lactobacillus plantarum* and *Lactobacillus casei* strains help preserve nutrients on the front end while *Lactobacillus buchneri* strains limit losses on the back end, at feedout.

“The biochemistry of the fermentation process works to reduce nutrients from the time of harvest on,” notes Scott Dennis, Ph.D., Pioneer technical services and educational manager for forage additives. “Pioneer uses three different species of lactic acid bacteria to overcome these natural biological processes.”

### From front to back

*L. plantarum* and *L. casei* reduce losses on the front end by outcompeting detrimental organisms that reside in harvested forages.

Forage can contain from 10,000 to 10 million micro-organisms per gram of forage at harvest, Dennis notes. Both *L. plantarum* and *L. casei* work by efficiently using silage’s sugars to reproduce rapidly and to produce large amounts of lactic acid, which effectively inhibits the organisms that can grow in silage.

“If the yeasts, molds, bacilli and other bacteria are allowed to grow, they use up the most digestible nutrients in the silage and generate heat,” Dennis says. “*L. plantarum* and *L. casei* lowers the pH quickly, stopping the growth of these detrimental microorganisms.”

At feedout, yeast and molds can grow, causing the silage to heat up. They not only consume and destroy nutrients, they make the silage less palatable to animals. You can smell the difference between good and bad silage.

This is where *L. buchneri* is most beneficial. It inhibits the growth of yeasts, which heat up silage and allow the damaging molds to grow.

“Once you expose silage to air, you face the danger of it starting essentially to turn into compost,” Dennis says. “The detrimental organisms target the highest-quality

nutrients that you need to feed to your animals. You need proven inoculant products to overcome this tendency.”

Good bunker management will help an inoculant preserve nutrients, but poor management — even with the best inoculants — will result in harmful nutrient losses.

### Selecting top strains

Pioneer® brand inoculants are developed by first selecting *L. plantarum* and *L. casei* fermentation-enhancing strains for specific crops: corn silage, high-moisture corn, grass or alfalfa silage. *L. buchneri* strains are chosen for their ability to produce aerobic stability and to work in combination with *L. plantarum* and the other strains. If strain combinations are not chosen properly, the effectiveness of the inoculant can be greatly reduced. Pioneer picks only the best strains from thousands in its warehouse.

“A good inoculant, such as Pioneer® brand 11C33, will encourage rapid fermentation, less dry-matter loss and improved animal performance due to actions of the *L. plantarum*,” Dennis reports. “Meanwhile, *L. buchneri* enhances bunklife and palatability, leading to better animal performance.” 