

Biologicals:

Help Plants Handle Environmental Stress

Stress is a part of life, even for plants. Almost every crop experiences some kind of stress during a season, be it insects, disease or weather. Advanced crop protection tools to minimize the impact of the first two have been available for a long time, but the third, the environment, has always been thought of as uncontrollable, until now.

Environmental stressors, also referred to as abiotic stressors, are not derived from living organisms. They include environmental conditions such as temperature extremes of heat or cold, drought conditions and excess water.

Too hot? Too cold? The challenge of temperature

In addition to challenging germination and emergence, cold temps can delay or prolong maturity throughout the growing season. Too many cold periods and an early killing frost can cause a marked decrease in yield.

High temperature stress, on the other hand, can directly impact corn by disrupting pollination and reducing photosynthesis. It can negatively affect corn yield by reducing kernel number and weight, while shortening the duration of grain fill. Reduced photosynthesis and the decline of leaf growth can be a problem with temperatures of 87°F and above. And while pollination issues due to heat stress are rare, at 95°F or higher, pollen and silk dryout can occur. Pollination failure can occur at 100°F or higher.

Biologicals can provide answers

Things are changing, though. Corteva Agriscience has created biological products that can help farmers fight environmental stressors. There are five primary plant hormones. Auxins, cytokinin, and gibberellin are growth hormones, whereas ethylene and abscisic acid are stress hormones. Corteva biologicals contain EPA registered, specially formulated combinations of growth hormones that can be applied to pre-stress condition plants.

Take the temperature issue outlined above. Under ideal environmental conditions, a plant receives messages from signaling compounds, hormones, that tell it to expend energy on growth. However, these growth hormones change when a plant experiences excessive heat. In these cases, it no longer receives growth messages. Instead, signaling compounds tell the plant to limit its growth and development, thereby reducing yield potential. A foliar application of a biological product can help tip the scales in favor of the farmer. In such situations, the

Effects of extreme temperature on corn

View of a stalk with silk balling due to unseasonably cool nighttime temperatures. If silks fail to emerge in a timely fashion pollination will not occur, resulting in unfilled ear tips. ⚠️



A healthy, full corn ear with fully formed silks from proper pollination. ⚠️



biological product can provide the growth-signaling messages needed during essential maturation periods, even in the face of heat stress. Biologicals can also help the plant improve nutrient uptake and use while under stress.

Additional benefits of biological products

Not just limited to heat issues, biologicals can assist in other ways. For instance, a foliar application of a biostimulant can improve plant productivity by enhancing photosynthesis. A biofungicide seed treatment can provide more pest protection and better resistance management.

Marrying these natural tools with science, Corteva is able to further improve farm productivity and take yet another step toward providing farmers with proven, consistent performance.

biologicals