

## Plant Biology Generates New Industry

By Bob Wanzel, Senior Editor

**Editor's note:** Back when this reporter was a young cub, my major contact with day-to-day farming was John, a central Illinois farmer who really knew his stuff. Twenty-five years ago John would talk to me about his crop, what the major challenges of the week were and how he was going to attack them. I remember one Sunday, we always visited in the church library during the Sunday school hour, he admitted that sometimes after all of the fertilizer and crop protection products (we called them chemicals back then) were in place, he would go out into the field and talk to his crop. He was fairly serious when he said, "There's something we just don't know about those beans, and talkin' to them seems to help." The following story about plant health and the new products to serve this emerging concept might just be what John was talking about. — RJW

There's a new industry emerging in agriculture and it involves the many complicated biochemical reactions occurring inside a growing plant. The name crop health has been applied to this new industry, and closely connected, if not synonymous with it, is the practice of regulating plant growth to benefit both health and yield. It's an industry that depends mostly on the plant's own substances and biological activity. It involves concepts that are very difficult for growers to talk about early in the morning at a local diner over a cup of coffee. It's not about killing weeds or improving plant nutrition, it's about signaling the plant to act in a certain way.

For the Midwestern ag professional who deals with mostly row crops, this bio-derived industry has not created a very large blip on the radar screens. The professionals working with vegetables, fruits and nuts, as well as some higher-value row crops, have seen the results of this new technology first hand.

We've interviewed technical and marketing professionals associated with three of the leading plant health

and growth regulator firms. Even though the products their companies produce fall under an umbrella category of crop health, the modes of action are quite variable, as are targeted crops and marketing strategies.

### STOLLER MAXIMIZES GENETIC EXPRESSION

"This technology is neither fertilizer nor pesticide," says **Neil Stapensea**, director of business development for the Stoller Group, Houston, TX. "Crop health therapy fits more with seed and biotechnology in terms of extracting and realizing the genetic potential of plants."

The Stoller Group began as a small micronutrient company 30 years ago and is now marketing its crop health products worldwide. "Crop health therapy," says Stapensea, "is based on the use of naturally occurring growth factors applied to the plant to maximize its genetic expression. Plant stress, which is mostly created by unfavorable weather, results in an imbalance between growth hormones (auxin, cytokinin and gibberilic acid) and stress hormones (ethylene and abscisic acid). Products such as Root Feed, X-tra Power, BioForge, Stimulate and Sugar Mover help maintain the appropriate hormone balance throughout the growing season to make plants more resistant to stress, allowing the full expression of a plant's genetic potential in terms of yield and quality."

Stoller has pending patents on the use of plant hormones to enhance physiological growth characteristics and for insect and disease resistance. "Whether it's grain weight, brix, soluble solids, lint quality, protein, oil or absence of physiological disorders, the quality characteristics bred into plants are always more highly expressed with Crop Health Therapy, explains Stapensea.

**Rudy Allen** operates Ag Tech Services, LLC. He is a private consultant from Mount Vernon, WA. "You have to understand that plants are hormonally balanced just as humans are, and when they go out of balance the plant



The increased lateral branching, number and size of the bolls (plant on right) demonstrate the effectiveness of the Stoller Crop Health Therapy product Sugar Mover. The photo was taken last fall in Lubbock, TX, on the Steve Becton farm.

goes out of balance," he says. Allen works with potato growers in the Skatit Valley of Washington and studies plant stress, watching for critical times when that plant requires an extra boost of a certain hormone. "I know there are many times when I can supplement a critical hormone and see a positive potato yield outcome," he says.

"We are working with progressive retailers and distributors holding grower training sessions," says Stapensea. "Retailers are able to differentiate themselves with value-added service and production-enhancement technology that benefits both themselves and their customers."

### NUTRA-PARK PRODUCTS IMPROVE QUALITY

Nutra-Park is perfecting uses for the biomolecule lysophosphatidylethanolamine (LPE), a naturally occurring substance in the cell membranes of every living organism. Research has demonstrated that LPE affects the natural process of growth, maturation and decay in living plant cells.

"We've solved a lot of the big problems in terms of weed control and pest management and we know how to fix most things that might go wrong with the growing plant," says **Kim Nicholson**, vice president Sales and Marketing for

# CROP HEALTH PRODUCTS

Nutra-Park. “So our products do some of the fine tuning; they use the plant’s own resources to achieve higher quality.”

According to Nicholson the company markets six bio lipids with the trademarked name Masterfresh Technology to the agriculture and floral markets. “Originally research was conducted to reduce the impact of early frost on Wisconsin’s cranberry crop,” she says. “Out of that research it was discovered that LPE could enable ripening of the cranberry plant.”

The natural lipid was discovered to stimulate the plants to achieve uniform ripening and at the same time slow decay, allowing fruits and vegetables and cut flowers to stay fresher and last longer.

“LPE technology teaches us that ripening is not necessarily aging,” explains Nicholson. “When fruit is physiologically mature, but not ripe, LPE promotes ripening by stimulating the ethylene pathway to enable ripening. When fruit is already ripe, LPE inhibits the production of an enzyme called phospholipase. This enzyme is known to break down cell membranes and cause aging.”

The Nutra-Park products, according to Nicholson, are pharmaceutical grade and relatively expensive to manufacture. “We often contact growers with large acreages and offer to treat half, measure the value we bring to the crop and split that extra value with the grower,” she says. This is basically how we establish our product pricing. We charge by the acre, not by the ounce.”

The LPE technology is federally registered by the EPA and approved for application in 48 states. Nutra-Park has several strategic research partners including Valent BioSciences, Syngenta Crop Protection, BASF Corporation and Seminis, Inc.

## EDEN BIOSCIENCE INTRODUCES HARPINS

The discovery of harpin was announced in *Science* in 1992. Harpin is a naturally occurring protein produced by diseases when attacking plants, and plants have early warning receptors that detect harpins. The first product developed from these findings was Messenger. The harpin proteins and technology developed by Eden



*Nutra-Park’s main lab facilities are in Madison, WI. The company conducts basic discovery work for both floral and produce markets at this location.*

Bioscience are marketed under the umbrella brand of Harp-N-Tek.

This season, Eden is introducing the next generation of harpin. The new harpin protein, according to Dr. **Ned French**, director of Field Biology and Development for Eden, is very active and provides similar or better performance than the first-generation protein at  $\frac{1}{6}$  to  $\frac{1}{12}$  the rate of active ingredient. “The new product is called ProAct, and it received unconditional registration from the EPA this year,” he says.

“After a droplet of ProAct lands on a leaf, harpins bind to receptors on the leaf surface,” explains French. “Once it binds, the direct action of ProAct is over; everything that happens afterwards is due to activity of the plant. “Receptors respond to harpin by initiating an ‘inside-out plant response’ that turns on a plant’s intrinsic growth and stress-defense capabilities,” French says, “and this results in improved plant vigor, increased plant stamina, and healthier plants.”

ProAct was originally designed to increase yield in field crops. “We have seen considerable yield increases in cotton and corn, and we are continuing to research ProAct in other field crops,” says French. “In 11 replicated trials in corn, leading independent experts documented average yield increases of 8 to 10 bushels per acre with ProAct. We know that the root mass of treated corn plants tends to increase when we use

harpin, and we find higher levels of nutrients in plant tissue.”

Last season, independent cotton scientists and consultants conducted a broad range of trials with ProAct. “ProAct provided an average yield increase of 11 percent when applied with glyphosate herbicide and 9 percent when applied after glyphosate. In results from over 20 trials, plants treated with ProAct consistently averaged more cotton bolls, heavier bolls, and more lint,” says French.

Eden has launched a test program with the National Corn Growers Association. The company will supply ProAct to be applied with the grower’s post-emergence herbicide program. The program will provide further information on ProAct performance in a variety of weed management systems, growing conditions and tillage systems across the Corn Belt. “NCGA members also qualify for a \$1 per ounce discount on ProAct,” says French.

“Our past efforts in marketing Messenger have taught us to describe what’s happening in the plant with a short description before people start to grow glassy eyed,” he says. “We know we are going to increase yields the vast majority of the time. But some growers just don’t seem to latch on to something that’s applied to the crop to just increase yields. Farm managers and growers who want a little extra yield will be interested in ProAct.” **AP**