

Today's Agricultural Crisis

Will Low Prices Harm the Nation As Well As Farmers?

By Paul W. Syltie, Ph.D.

Who ever would have guessed that after a record net farm income of \$123 billion in 2013, the U.S. farm economy would have taken the nose-dive that it has. According to the U.S. Department of Agriculture, U.S. farm incomes are likely to drop 8.7 percent in 2017, a fourth consecutive year of declines amid a deep slump in prices for many crops.¹

The forecast highlights a deepening downturn in the U.S. agricultural economy, brought on by four straight years of bumper corn and soybean harvests that have added to record grain supplies globally. U.S. farmers last year harvested the biggest corn and soybean crops ever: 15.2 billion bushels of corn and 4.3 billion bushels of soybeans.²

Not only have crop yields been high in the U.S., but other major exporting countries like Brazil and Russia have harvested bumper crops as of late. As of 2016, Russia has surpassed the U.S. in world wheat

exports, and Brazil exceeded U.S. soybean exports in 2012-13.³ Not only has Brazil increased its acres of soybeans, but the yields for soybeans have been steadily increasing as well. With competition like this in the integrated world economic system, is it any wonder that crop prices are as low as they are?

Low Prices—Low National Income

The seriousness of this low income level for farmers is underscored by an obscure economic analyst by the name of Carl H. Wilkin. A farmer near Wall Lake, Iowa, Wilkin entered into his analytical studies of the U.S. economy armed with nothing but two years of study at the University of Iowa, an inquisitive mind, simple arithmetic, and an ability to ferret out important government economic data. He had no pre-conceived ideas or economic theories and simply wanted to scientifically analyze the economic records of the U.S. government to find out what "really" caused the Great Depression, and to determine if a future depression could be

prevented.⁴

Eventually, he teamed with a cadre of talented men, all dedicated to the single-minded purpose of setting the U.S. economy back on a path of permanent prosperity. With Wilken at the helm, they discovered a natural law of economics, based on arith-



Soybeans are a major commodity worldwide, and Brazil has now eclipsed the U.S. as the world's leading exporter.

metic and physics, that had escaped generations of supposedly-learned economists. They proved that raw materials income

See Parity Pricing Would Help, page 2

Is EM-Radiation Harming Our Crops ?

Some Interesting Results From Danish Schoolgirls

Foreign researchers are extremely excited for a biology project from five 9th grade girls. Researchers from England, Holland, and Sweden have shown great interest in the five girls' biology experiments.

Take 400 Cress seeds and place them into 12 trays. Then place six trays in two rooms at the same temperature. Give them the same amount of water and sun over 12 days, and remember to expose half of them to mobile [Wi-Fi] radiation.

It is a recipe for a biology test so brilliant that it has attracted international



attention among acknowledged biologists and radiation experts. Behind the experiment are five girls from 9b in Hjallerup School in North Jutland, and it all started because they found it difficult to concentrate during the school day:

"We all think we have experienced difficulty concentrating in school, if we had slept with the phone next to our head, and sometimes also experienced having difficulty sleeping," explains Lea Nielsen, who is one of the five aspiring researchers.

The school was not equipped to test
See Cress Plants Hurt By WiFi, page 6

Parity Pricing Would Help Us All!

Continued from page 1

governed national income unless the latter was expanded by debt.

His data also made it clear that expansion of trade beyond income destabilized the internal U.S. economy and edged U.S. wages towards an international common denominator that can not sustain the American standard of living. Of course, that is exactly what we see happening today: expansion of world-wide trade by multinational corporations, whose intent is anything but the promotion of a strong and free U.S.

Wilken's Conclusions

While studying the official statistics of the U.S. government—departments of Commerce, Agricultural Economics, Labor Treasury, Interior, and the Federal Reserve Board—he concluded that...⁵

1 The record proves that a policy of cheap raw materials cannot create the necessary markets, either domestic or foreign, to utilize factory output.

2 The U.S. should take the lead in helping the world create an honest and stable foreign exchange with the use of at least 25 basic and storable forms of new wealth, including the monetary metals.

3 Realizing the basic truth that *each \$1 of new wealth production utilized creates \$5 of national income*, we should abandon the theory of curtailing production to create price and substitute a positive program of new industries to use

more and more raw materials at a proper price level, thus creating an expansion in the national income, the buying power, and the standard of living.

4 Attempts to have prosperity with cheap raw materials mean cheap markets, a cheap income, excessive debt, and a mortgage against future income and profits.

5 *We can have whatever standard of living we are willing to produce and pay for* in line with the Golden Rule of Economics: "Every laborer is worthy of his hire." In line with the Bible, the more we use our talents the greater will be the prosperity we are entitled to have.

By lobbying Congress before and dur-

ing World War II, Wilken and his associates were able to influence U.S. fiscal policy so that farm prices remained near parity levels, and the economy prospered to such an extent that the year-by year GNP virtually paid for the war! Unfortunately, in the early 1950s the purveyors of Keynesian economics took over government policy and began to compound debt such that today the U.S. has a public debt of around \$20 trillion. This debt does not count that of states, municipalities, and individuals, which, according to the Federal Reserve in 2010, would bring the total public and private debt owed by American households, businesses, and government to \$50 trillion, or roughly \$175,000 per American and 3.5 times GDP.⁶ Such a degree of debt is dumbfounding, particularly when one understands that "The borrower is the servant of the lender."⁷ It may be thus concluded that we in America are servants of bankers and governments of other nations who are funding this incredible debt.

What Are We to Do?

Parity prices = Balance in prices and costs

Parity agriculture simply means that farmers and ranchers receive prices for their production that will enable them to buy the goods and services that are passed on to them so they can pay for them without being forced to mortgage their farms and ranches to support the jobs and business of all the others. It means the total amount of annual gross income that all rural America must receive from its production should balance payment of trade with urban America. Usually a base period is used as an ideal when costs and prices were in balance, such as between 1909 and 1914, or 1945 and 1950. The term "parity" has been deliberately made confusing, dirty, and ridiculous by all those who thrive through the exploitation of producers.⁸

In the face of these stark realities concerning the plight of the American farmer, who is not getting paid fairly for his crops and livestock, we must realize that every American would prosper with these higher prices, since as Wilken and others have shown, for each dollar placed into the economy from new raw materials, fisheries, and mined minerals there will be \$5 generated as those raw materials work their way through the economy, providing work for people of all ages and stripes. The problem of surpluses would also disappear, since there would be ample motivation for new industries to arise and use these raw materials.



Russia has become a major player in wheat exports, showing the changing dynamics in grain commodity trading.

You and I are not likely to turn the vast worldwide economy around so the workman would receive what is worthy of his hire. However, within the constraints of the present economic structure, there are several possibilities to consider.

1 Grow organic, and receive a premium price for your grain and livestock.

2 Sell direct to consumers through various channels. This is especially doable if you live near a city.

3 Cut some costs, but do not cut inputs that are profitable. For instance, modest fertilizer reductions along with Vitazyme use will maintain or increase yields while reducing costs.

4 Strive to do a better job on the acres you have, or even cut back the size of your operation and become more efficient on those acres. Consider reduced tillage, conservation practices, and soil organic matter buildup in whatever forms are good for your situation.

□

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Biostimulants Clamor for a Place in the Row Crop Market

By Jackie Pucci

The question these days isn't who is venturing into biostimulants — it's who isn't. Or more to the point: The space's ultra-low barriers to entry are propelling extraordinary growth, but are they here to stay?

"Everybody and their brother is going into biostimulants in row crops, whether it's seed-applied or soil-applied," says Pam Marrone, Founder and Chief Executive of Marrone Bio Innovations Inc. That includes Marrone, who struck a deal with Koch Agronomic Services last summer to bring Regalia Rx to the row crop market in the U.S. and Regalia Maxx to broad-acre applications in Canada. The product is registered as a biofungicide, but she also describes it as a biostimulant in the sense that it gives a yield bump in the absence of disease. Last summer, her company also inked a deal with Albaugh to sell a Marrone microbial product.

Albaugh, which is making a big push into seed treatments, partnered with U.S. arm of Italian organic fertilizer and biostimulant company Italtollina in late 2014 to provide microbial seed treatment solutions for the U.S. seed treatment market. Italtollina will also open a new \$9-million plant in Indiana to research and manufacture biostimulants this year.

There are heavyweights like BioAg Alliance, the Novozymes-Monsanto partnership, testing microbial strains on a scale never seen before. Its approach is to find a blockbuster: the Acceleron B-300 SAT inoculant will be applied to all of Monsanto's new 2017 corn hybrids sold in the U.S. Derived from a fungus found in soil, the product showed a two-year average yield advantage of more than 3 bushels per acre.



Biostimulants can improve yields substantially, such as shown here in South Dakota. Vitazyme greatly increased crop growth.

"We believe it could be applied to more than 90 million acres by 2025 and become one of the biggest biological products in the ag industry," says Colin Bletskey, Novozymes Vice President for BioAg....

Then there are the startups, notably Indigo Agriculture, the high-profile

Boston company that's raised over \$100 million in venture capital funding and taken a unique approach by essentially bypassing the distribution channel altogether. Instead of asking farmers to pay upfront for its microbial seed treatment for cotton, it asked them to pay a fixed amount per acre post-harvest, so long as they saw a certain amount of increased lint production.

As recently reported by Indigo CEO David Perry, Indigo Cotton, a product designed to improve yields in water-stressed areas, increased lint production by 11% in the target geography of West Texas — a region that produces nearly half of all U.S. cotton. For some farmers, that meant their crop was profitable....

Whether Indigo's model is scalable from last year's 50,000 acres to a million acres is yet to be seen.

Shakeout Coming

Other prominent startups entering the race to find biostimulants for soil health include BioConsortia, Inocucor Technologies, AgBiome, and NewLeaf Symbiotics.

Then there are the large distributors — CPS/Loveland, Helena, WinField Solutions — that are developing their own in-house lines of biostimulants. Will

See *Biostimulants the Wave*, page 6

Some Benefits of Organic Farming

By Pranic Organic

Organic farming is a holistic production method that is better for our environment and better for our health. Supporting organic farming is more than just an investment in your well-being. You're also supporting environmentally-friendly practices and animal welfare.

Organic farmers adhere to strict standards of production that prevent them from using synthetic chemical pesticides, synthetic fertilizers, or sewage sludge.

Here is what organic agriculture can do.

1. Respects our water resources. The elimination of polluting chemicals and nitrogen leaching, done in combination with soil building, protects and conserves

our water resources.

2. Builds healthy soil. Soil is the foundation of our food chain. Organic farming practices aim to restore, maintain, and enhance the soil's ecosystem and health, thus creating healthier and tastier foods.

3. Drives innovative research. Organic farmers have led the way with innovative on-farm research aimed at reducing pesticide use and minimizing agriculture's impact on the environment.

4. Preserves biodiversity. Many organic farmers and gardeners have been collecting and preserving seeds, and growing unusual varieties, for decades.

5. Keeps rural communities healthy. Organic agriculture can be a lifeline for

small farms because it offers an alternative market where sellers can obtain fair prices.

6. Reduces energy use. A typical organic farm can use 30 to 50% less energy than a typical conventional farm. □

[Abridged from pranic.com/blog/7-benefits-of-organic-farming/.]



15-Minute Soils Course

Lesson 45: The Many Soil Types Around the World

Soils around the world are as variable and interesting as are the various types of plants, animals, fish, and humans themselves. They vary in color, texture, structure, and chemical, physical, and biological composition. To the uninformed, soils may appear to be quite uniform, especially at the local level, but in reality they can be very different within just a few feet.

Soils are a function of the five soil-forming factors: climate, organisms, relief, parent material, and time, a subject covered in Lesson 12 (Winter, 2000-2001). Each of these factors range on a continuum, so there is nearly an infinite number of soil varieties. Because of the complexity of attempting to classify soils, some experts claim they should not even be classified at all, except in a general way.

Soil scientists have recognized 12 major

orders of soils. A soil order classification is similar to the system biologists use to classify animals or plants into groups that have common properties. These orders are further refined into suborders, great groups, subgroups, families, and series. Thus, a name such as fine-loamy, mixed, mesic Typic Haplaquolls (Webster series) tells a soil scientist a great deal about the specific soil.

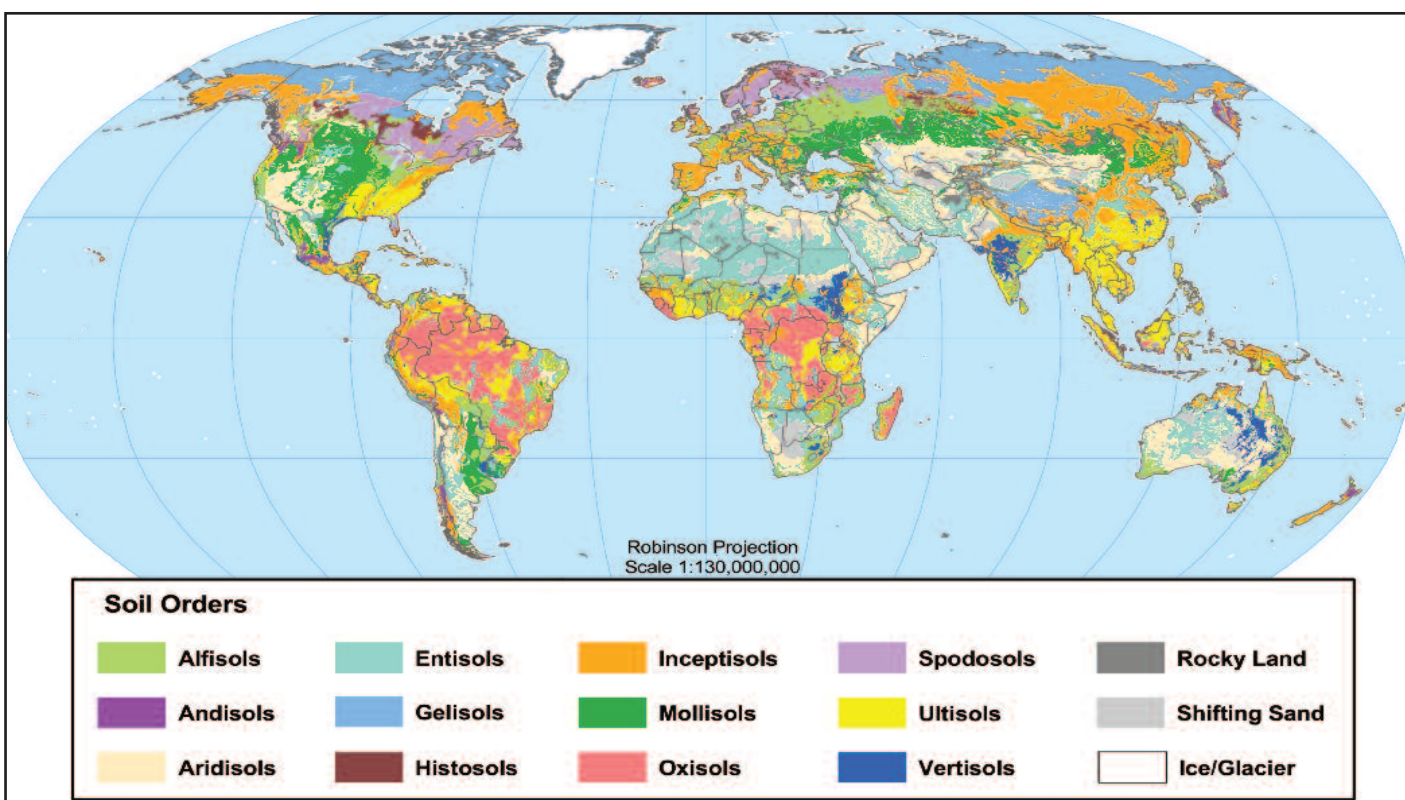
The 12 Soil Orders

Alfisols. Moderately leached soils often found in temperate forests, generally east of the Mississippi River in the U.S.

Andisols. Soils formed in volcanic ash, as in some parts of the Pacific Northwest in the U.S.

Aridisols. Desert soils, found in the desert Southwest of the U.S.

Entisols. Soils with little or no morphological (horizon) development, found on beaches, sand dunes, and flood plains



15-Minute Soils Course

Gelisols. Soils with permafrost, as in the tundra of Alaska

Histosols. Organic soils, found in very wet areas of Florida, Minnesota, Alaska, Michigan, Maine, and North Carolina

Inceptisols. Weakly developed soils, found in various areas of the U.S.

Mollisols. Grassland soils, or Chernozems, comprising most soils of the Great Plains, the most naturally productive of all soils

Spodosols. Acidic, sandy forest soils under conifers in Minnesota to the Northeast, plus the Atlantic coastal plain in the U.S.

Oxisols. Very weathered soils of tropical and subtropical environments, found only in Hawaii and Puerto Rico in the U.S.

Ultisols. Acidic, strongly leached, older soils, which are common in the Southeast of the U.S.

Vertisols. Clayey soils that swell when wet, such as in certain areas of west Texas, the desert Southwest, through Alabama, the Mississippi Delta, the Red River Valley of the North, and parts of California

An Example Soil Series

Soil types are typically associated soils that vary along a slope from top to bottom. Such is the case of the Clarion-Nicollet-Webster series found in southern Minnesota and northern Iowa. These are very fertile, highly organic, productive soils, some of the best in the world, developed on glacial till with prairie grasses.

Nicollet Soil Series

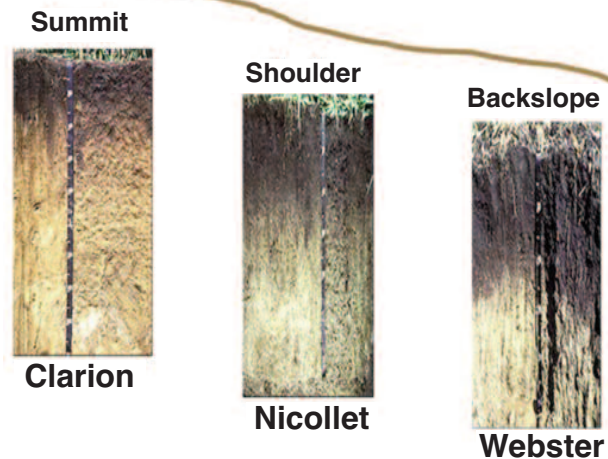
The Nicollet series consists of very deep, somewhat poorly drained soils that formed in calcareous loamy glacial till on till plains and moraines. Slopes range from 0 to 5 percent. Mean annual air temperature is about 9 degrees C (48 degrees F). Mean annual precipitation is

about 660 mm (28 inches).

TAXONOMIC CLASS: Fine-loamy, mixed, superactive, mesic Aquic Hapludolls

TYPICAL PEDON: Nicollet clay loam on a 2 percent plane slope in a cultivated field.

A Soil Series On a Slope (called a "catena")



See How Much You Learned

1. Soil scientists have created _____ groups of soils worldwide, called orders.
2. The following are soil orders. a. Vertisols, b. Oxisols, c. Mollisols, d. Alfiredosols.
3. Soils differ from one another because of the influences of parent material, vegetation, climate, and _____ working over time.
4. Mollisols are the most naturally productive of all soils. T or F.
5. The individual soil at any one spot on the earth is called a. a subgroup, b. a series, c. a family, d. a suborder.
6. Some soil scientists question whether soils should even be classified as we now do. T or F.
7. The most productive and high organic matter soils were produced under _____ vegetation.

Answers: 1. 12; 2. a, b, c; 3. topography, aspect, or slope; 4. T; 5. b; 6. T; 7. grass or grassland.

Cress Plants Hurt By WiFi Radiation

Continued from page 1

the effect of mobile phone radiation on them. Therefore, the girls had to find an alternative. And the answer was cress.

Six trays of seeds were put into a room without radiation, and six trays were put into another room next to two Wi-Fi routers. Such routers broadcast the same type of radiation as an ordinary mobile [phone].

Then it was just necessary to wait 12 days, observe, measure, weigh, and take pictures along the way. And the result was clear: cress seeds next to the router did not grow, and some of them were even mutated or dead. "It is truly frightening that there is so much effect, so we were very shocked by the result," says Lea Nielsen.

The experiment secured the girls the finals in the competition "Young Scientists," but it was only the beginning. Renowned scientists from England, Holland, and Sweden have

since shown great interest in the girls' project so far.

The renowned professor at the Karolinska Institute in Stockholm, Olle Johansson, is one of the impressed researchers. He will now repeat the experiment with a Belgian research colleague, Professor Marie-Claire Cammaert at the Université libre de Bruxelles, for the trial, according to him, is absolutely brilliant:

"The girls stayed within the scope of their knowledge, skilfully implemented and developed a very elegant experiment. The wealth of detail and accuracy is exemplary, choosing cress was very intelligent, and I could go on," he says.

He is not slow to send them an invitation to go on the road:

"I sincerely hope that they spend their future professional life in researching, because I definitely think they have a natural aptitude for it. Personally, I would love to see these people in my

team!"

The five girls from northern Jutland have not yet decided their future careers. They are still very surprised by all the sudden attention.

"It has been such a rollercoaster ride. I still cannot believe it," says Lea Nielsen.

And Mathilde Nielsen added:

"It's totally overwhelming and exciting. It's just not something you experience every day."

But there have also been other consequences of the cress trial, which is quite low-tech in nature.

"None of us sleep with the mobile next to the bed anymore. Either the phone is put far away, or it is put in another room. And the computer is always off," says Lea Nielsen. □

[This article is translated from Danish. <http://www.dr.dk/Nyheder/Indland/2013/05/16/131324.htm>. April 8, 2017.]

Biostimulants the Wave of the Future

the distribution channel duplicate its winning strategy for adjuvants and become the dominant suppliers for biostimulants, bundling their proprietary products with other offerings carrying more favorable pricing?

"We'll see on that. It's going to be very interesting how this is all going to shake out," Marrone says.

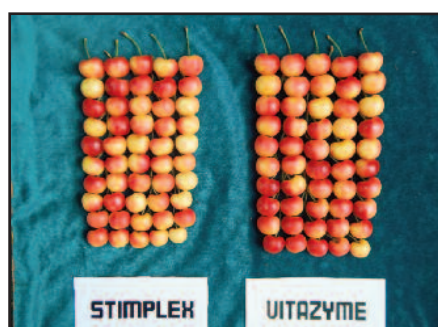
What happens could be determined by EPA. Today, barriers to entry are low, with regulations carried out by individual states. California forbids the mere mention of the word "stimulate" on a label, for example, while in others it's a relative free-for-all.

But all is set to change, as EPA is expected to publish a draft guideline of its view of regulations for biostimulants any day, after delaying it last year. The draft will then be open for public comment before a registration process is instituted likely between this year and 2019.

The hope for most companies is that any regulations that come into force are in line with the risks and sales opportunities of biostimulants, and "recognize these are not \$100-million products," says Mark Trimmer, Managing Partner

with biologicals market research firm DunhamTrimmer.

A \$10-million sale product would be considered absolutely huge in the biostimulant space — a far cry from biopesticides and synthetic pesticides that require far larger outlays of money and time. Biostimulants currently take on the order of months to launch, compared



Not all biostimulants are equal. A trial with Rainier cherries proves that Vitazyme was superior to seaweed.

with three to five years for a biopesticide.

The U.S. biostimulant market is valued at about \$400 million to \$500 million at the manufacturer level, according to Trimmer. He projects it to grow 13% on a consolidated annual growth rate basis to \$1.3 billion by 2025.

By contrast, the North American biopesticides market is worth about \$925 million, and is expected to top \$3.5 billion by 2025, and over \$3.9 billion including macroorganisms.

Trimmer says if EPA provides a favorable resolution, U.S. growth could surpass its forecasts. "The concern is that if EPA comes with a very stringent approach and applies current pesticide guidelines to biostimulants, it will definitely suppress market development in the U.S.," Trimmer tells CropLife. "If it is more in line with what the industry perceives as potential risk for these products, which are based on seaweed, amino acids, and microbials, a clear regulation on the federal level will be beneficial"

Marrone agrees: "What we don't want is that biostimulants become so bland and generic, that you just throw one in the tank and it's just an extra add-on. There're a lot of players with stuff that there isn't science behind — a lot of 'bathtub brews.' We do want that kind of shakeout and some regulatory framework. We don't want an over-regulatory framework, but some will certainly help that." □

From *CropLife*, April 3, 2017

Weed-Killing Robot Could Cut Herbicide Use

By Deena Shanker

Farmers that don't want to use herbicides for weed control are in for some good news. The time consuming, physically demanding job of weed pulling might be on its way out thanks to a new invention from Blue River Technology: a weed killing robot.

Non-organic farmers typically rely on herbicides to control their weed problems. Ingestion of these man-made chemicals has been linked to autism, ADHD, cancer,

change that industry practice and reduce herbicide use in the U.S. by more than 250 million pounds a year. The wheeled robot starts its job by scanning the ground with cameras. It then uses algorithms, to differentiate between good and bad plants. Once it finds a bad one (re: a weed), it injects it with enough fertilizer to kill it. The technology is about 98 or 99 percent accurate.

Right now the robot is only "trained" for lettuce, but with the company's announcement this week that it has raised \$3.1 million from investors, it is looking to commercialize its machines and bring them to the broader market. "We intend to invest the proceeds of this round in growing our engineering team and accelerating our new product roadmap," said Jorge Heraud, co-founder and CEO

of Blue River Technology. with its team of engineers now backed by millions of dollars, there's little reason to think it won't succeed. □

[From *ecorazzi.com*, September 17, 2012.]



This particular weed robot is just one of several that are under development today.

and other side effects, making them bad for consumers, bad for the farmers using them, and bad for the general health of our food system and our country. But because they have been the only alternative to manually pulling weeds, farmers often don't see another option.

Blue River's weed killing robot could

The Land and Its Care

As I grow older I realize that the land is much more than simply a commodity from which farmers can extract crops to make money and support their families and lifestyle. It is the very lifeblood of man and society, the source of all new wealth this good earth can give us, and the fount of the dust from which we are made ... and to which we are going. It is the foundation of nations whose pillars of power thrive upon its bounty if respected and nurtured, or which descend to the gates of the grave for peoples who despise and disrespect its need for loving care.

— Paul W. Sylie

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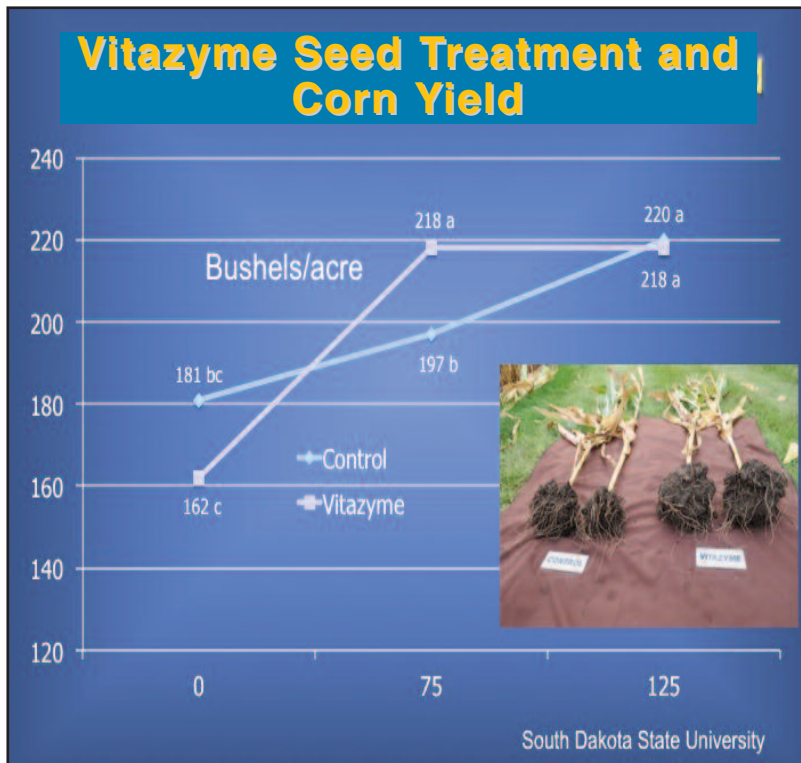
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Email to: **brian@vitalearth.com.**

Another Corn Trial Proving Vitazyme's Ability to Improve Nitrogen Efficiency

In 2016 a corn trial was conducted at the South Dakota State University Aurora Experiment Station near Brookings to evaluate the effectiveness of Vitazyme to improve nitrogen efficiency of utilization. This was a follow-up project to verify the results of a 2014 study at this same experiment station that showed significant improvements in nitrogen efficiency with corn.



Corn Yield

This study revealed a great improvement in grain yield at a reduced nitrogen rate. At 75 lb/acre of nitrogen (as urea), Vitazyme on the seeds increased grain yield by 21 bu/acre above the same nitrogen level without Vitazyme. This yield equaled the yield at 125 lb/acre of nitrogen without Vitazyme.

Corn Nitrogen Efficiency

An N-15 analysis using Mass Spectrometry showed a massive increase in nitrogen efficiency at a reduced nitrogen rate. Vitazyme on the seeds at the 75 lb/acre nitrogen rate moved 58.0 % of the fertilizer into the grain, while at the same nitrogen rate without Vitazyme only 40.3% of the nitrogen was moved into the grain. The difference in efficiency is 44%!

