

# *Soysoap Research Report*





Farmers report that *Soysoap* gives you these benefits:

### Higher yield, quality



With timely application, expect an extra 2 to 5 bu. of soybeans and an extra 5 to 10 bu. of corn with a pound or two higher test weight. Soysoap-treated forages typically have higher feed value and yield. Fruit and vegetables sprayed regularly with Soysoap have higher sugars for more consumer taste appeal and storage life.

### Foliar efficiency



In five years of on-farm tests, Soysoap is proving itself as the missing link in foliar nutrition. Farmers say it's an "awesome carrier" to move foliar-applied NPK and trace elements into crop metabolism. This is especially helpful to offset glyphosate's chelation (tying up) of manganese, zinc and other trace elements.

### Herbicide "helper"



Soysoap's tiny colloids help translocate foliar herbicides into leaves and throughout weeds for more thorough control. Many farmers say this benefit alone makes Soysoap profitable. Soysoap also keeps your spray system cleaner, so residues don't build up.

### Drought buffering



Applied at V1-V2, the early two-leaf stage, Soysoap encourages corn and soybeans to push bigger, deeper roots which develop a healthy rhizosphere. More root mass helps build capacity to maintain growth through dry stretches. Dry seasons show the largest yield differentials with Soysoap vs. untreated crops.

### Eco-friendly



Soysoap in normal use is safe around people, livestock and home gardens. If you want to quickly get familiar with Soysoap, we suggest using it in your vegetable garden or flower garden. Our basic formulation for crops is Soysoap<sup>2</sup>. We also have Soysoap<sup>1</sup>, which is highly effective for cleaning vegetables and other cleansing tasks.

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*Soysoap* is our federal trademark for a non-toxic surfactant to improve absorption and translocation of moisture and nutrients in crops. Soysoap is formulated from botanically based food additives on the U.S. Food and Drug Administration's EAFUS list of "Everything Added to Food in the United States." Soysoap is also privately labeled under local distributor agreements in the U.S. and overseas.

*In a normal Midwest season, Soysoap typically adds 5 to 10 bu. of corn yield.  
In a dry season, big corn roots built by Soysoap can mean 10 to 15 bu. more yield.*

# Corn

**Average yield gain over three years of random-rep trials with Soysoap is 12.4 bu. per acre on corn.**

This average is from yield trials conducted by S&R Consulting of Indiana. The chart at right summarizes those yields. The 2011 yield is the average of 8 locations in Ohio, Indiana and Illinois. Each location typically had 8 plots.

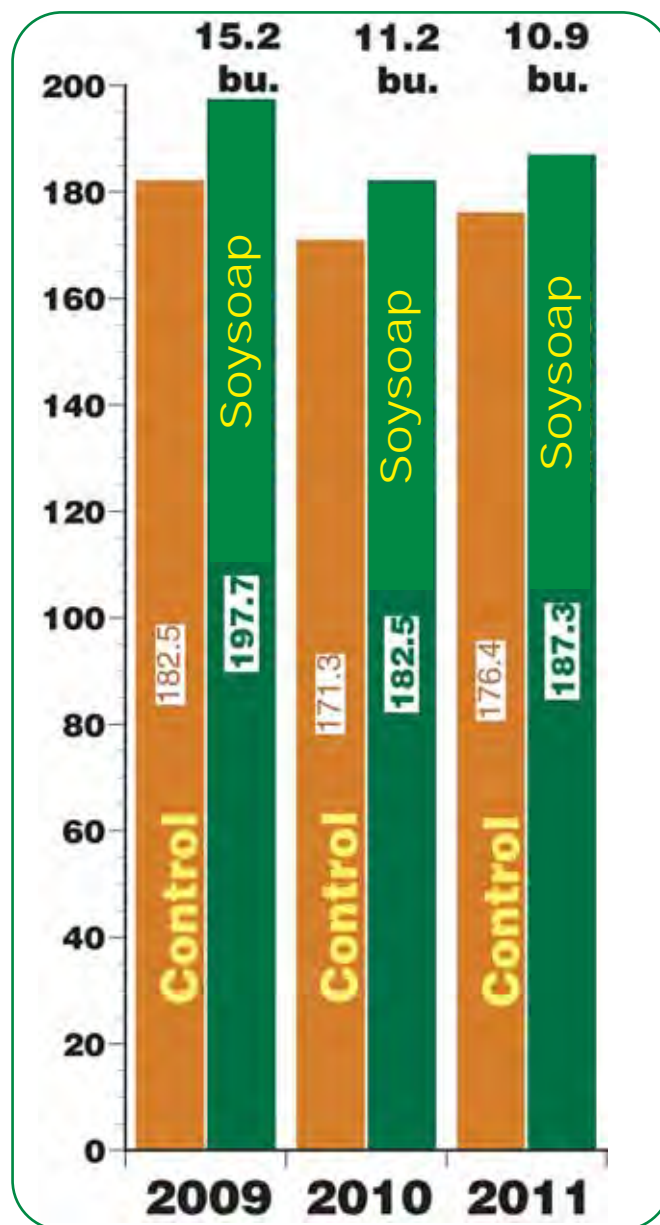
As you know, it's hard to "see" an extra 5 or 10 bu. from your combine when you're harvesting well-managed corn averaging 175 to 200 bushels. You've probably watched your yield monitor vary 40 bu. or more across a level field.

That's why we encourage farmers to apply four or five test strips *with and without* Soysoap, and check the total yield for each strip with a weigh wagon or well-calibrated yield monitor. Farmers who've done that are now applying Soysoap for the fourth consecutive season.

We like to be conservative. So we suggest that you peg your corn yield benefit expectations for 4 to 10 bu. of corn when you apply Soysoap on time — early V2 stage. *This V2 timing is critical to encourage early root growth, and an extra two rows of kernels per ear on a third of your corn population.*

Farmers like to save a spraying trip by tank-mixing Soysoap with an early-applied contact herbicide. They've seen Soysoap improve the coverage, translocation and effectiveness of herbicides. However, one challenge we've faced is convincing farmers to *make sure to apply Soysoap at the V2 stage of corn and soybean growth*. Waiting until V4 or V5, until more weeds emerge, means less of an opportunity to develop strong, early roots.

**How Soysoap enhances roots:** In the photo below, corn grown in soil-filled boxes a foot wide, three feet deep and six feet long was seed-treated with Soysoap, then sprayed twice with Soysoap — at V2 then again at early V4. At maturity, soil was washed from the roots. Treated roots are at right, untreated on the left. *Roots from treated corn weighed twice as much as untreated roots*. Also, more soil particles clung to the massive roots when they were washed, indicating they had more root hairs.



**Small roots may be adequate** for decent yields in a season with good soil moisture. However, massive roots can make a big yield difference when you encounter dry-weather stress.

Soysoap applied *early* — at the two-leaf stage — accelerates sugar translocation from leaves to roots. Soysoap dramatically reduces surface tension of water and crop nutrient solution. This reduces the energy needed to move plant sap through sieve elements in phloem tubes, a process which involves ion transfer. Young roots exude into the soil part of these sugars and other nutrients. This stimulates reproduction of beneficial soil microbes and mycorrhizae. These organisms accelerate conversion of nutrients in soil for faster, healthier season-long crop growth.



# Corn *We confirmed in earlier tests that Soysoap helps mobilize foliar-applied nutrients. Now we're learning about its benefit when you apply Soysoap with starter fertilizer.*

**One of our innovative clients** tested whether Soysoap would mobilize in-furrow starter fertilizer. Result in 2011: Adding 3 oz. per acre of Soysoap, versus 1 oz., lifted corn yield 8 bu. per acre more.

In the chart at right, you'll note that his starter combination had a microbial mix plus humates, which we consider a biologically sound approach.

We asked AgriEnergy Resources of Princeton, IL to culture Soysoap with their microbial mixes, SP-1 and Residue, in Petri dish tests. They found that Soysoap did not reduce viability of their beneficial organisms. Our own greenhouse work on oats in 2008 indicated that microbial soil inoculant effectiveness was not reduced by Soysoap, as measured by emergence.

Adding Soysoap with in-furrow fertilizer probably helps soil moisture absorb into the kernel faster. It's like a seed treatment with Soysoap.

**Verity Farms of Maurice, IA** has an effective crop research system. (Visit [www.verityfarms.com](http://www.verityfarms.com))

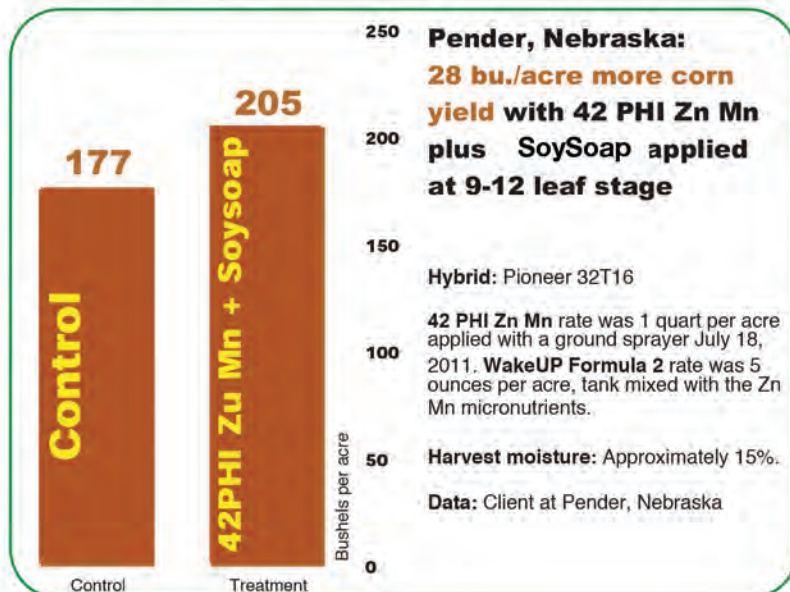
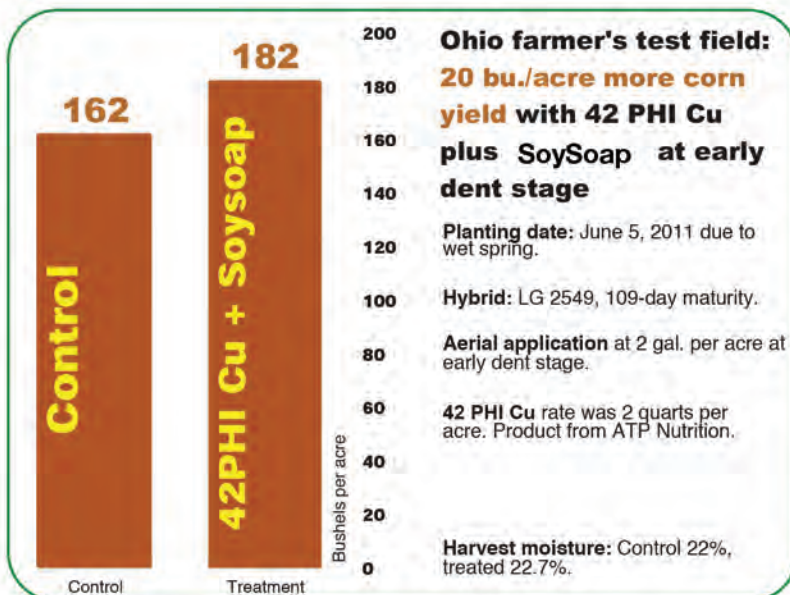
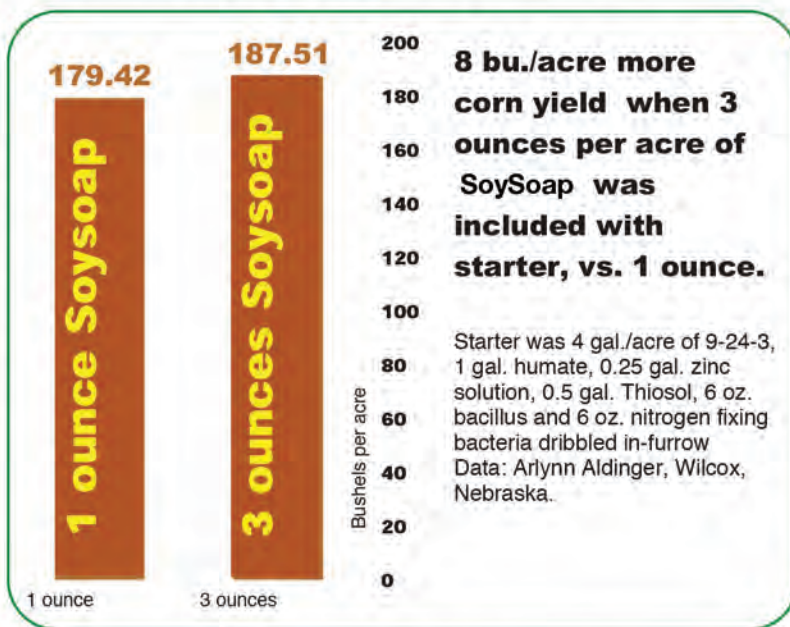
The company organizes groups of leading farmers in several states with a goal of producing top-quality, toxin-free crops and livestock.

Members in each crop district coordinate field trials and share results. This accelerates the "sifting" of new ideas so all members can adopt the most productive technology faster, with less risk. Verity research farmers tested Soysoap extensively in 2011.

The chart at right shows an example of Verity corn trials in Ohio. Soysoap and an effective trace-element blend improved corn yield by 20 bu. when aerially applied at early dent stage. The purpose of Soysoap in this mix was *increased absorption and translocation* of the nutrient. A second trial showed a similar result.

**In Nebraska, corn responded** to a zinc-manganese foliar plus Soysoap with a 28-bu. yield jump (details in chart at right below.)

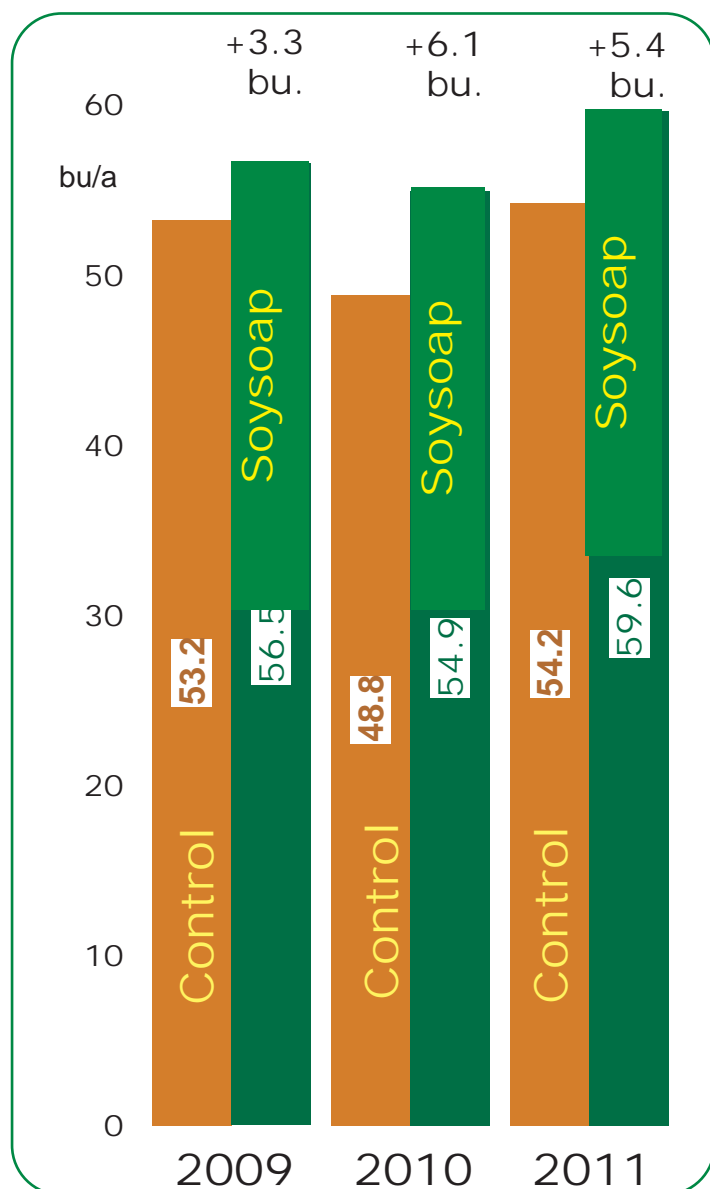
**Synergism between Soysoap and certain soil organisms** showed up in our 2011 greenhouse trials on corn (photo below). Emergence and early growth was faster when Soysoap was included in seed treatment with a hormone-producing PPFM bacteria called Trophomax from CST Growth, Inc. ([www.cstgrowth.com](http://www.cstgrowth.com)). This combination increased soybean yields when foliar-applied in our trials.





Random-replicated trials with Soysoap show an average soybean yield increase of 4.9 bu. per acre over three consecutive years.

# Soybeans



Three-year average soybean yield increase with Soysoap: 4.9 bu. per acre. That's based on random-replicated yield trials by a professional consulting agronomist, Steve Wolf of S&R Consulting, Indiana.

Those field trials were in Illinois, Indiana and Ohio. Each year, there were 8 to 10 sites across those states, usually with 8 plots at each site. Several soybean varieties were used.

About 5 bu. per acre benefit on soybeans is consistent with reports from farmers' strip trials: Not awesome, but definitely profitable.

David Mohler of Frankfort, IN has tested Soysoap four consecutive years: "I've never seen overwhelming yield differences, but I have seen overall plant health improved dramatically. This leads to a more consistent whole-farm yield. In 2010 our farm average was 66.5 bu. on soybeans, our all-time best. In 2011, we averaged 65 bu., which was above typical yields in our neighborhood. I'm not sure Soysoap deserves the credit for that, but I just know that something's going right."

That 65-bu. average in 2011 occurred in spite of a late, wet spring followed by stressful summer weather. Mohler is a Pioneer seed dealer, so he keeps track of his customers' yields. Mohler sums up: "I continue to be excited that Soysoap is a tool that can help us reach the next level of production gains in Midwest agriculture."

We're learning there are three primary opportunities to lift yield with Soysoap (more detail, page 16)

1. Include 3 ounces per acre with in-furrow pop-up liquid nutrients to help mobilize nutrient uptake.
2. Spray 5 ounces of Soysoap per acre at V2. Apply Soysoap alone or tank-mixed with herbicide.
3. At later growth stages, tank-mix Soysoap with trace elements or NPK as crop needs are indicated by tissue tests or appearance. *Soysoap mobilizes these nutrients.*



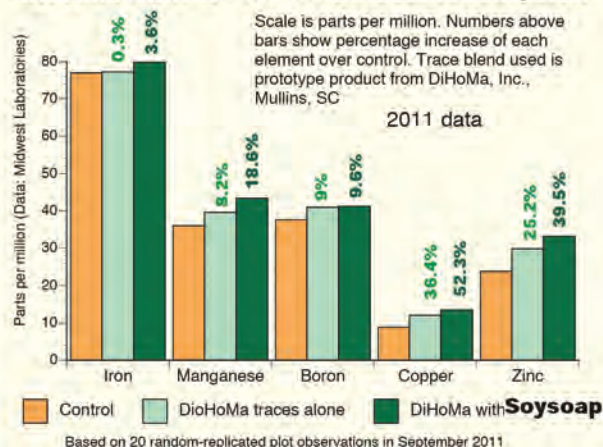
Soybeans sprayed with a micronutrient solution alone in water at the rate of 20 gal. of spray mix per acre show droplet formation from surface tension of water. Droplets lead to excess runoff and less absorption.



Soybeans sprayed with the micronutrient solution tank-mixed with Soysoap show a smooth coating. Soysoap greatly reduces surface tension so absorption and translocation of nutrients is faster, more complete.



## Trace element content of soybean pods and beans with foliar DiHoMa trace element blend, with and without Soysoap surfactant/transporter



In 2010, our random-rep tissue trials showed that Soysoap, tank-mixed with nutrients, increases absorption and translocation of those foliar-applied nutrients.

In the 2011 crop season, we confirmed how Soysoap enhances translocation of trace elements into maturing soybeans — into the actual “fruit” of the crop.

The chart above shows results of foliar-applying a new trace element blend made by DiHoMa Chemical Corp. of Mullins, SC on soybeans at about R4. At application time, pods were filling and nutrient demands were high. The DiHoMa “Micro Pack” is complexed with pharmaceutical grade lignen. It spreads smoothly on bean leaves, even without the surfactant effect of Soysoap. Based on such results, DiHoMa recommends tank-mixing with Soysoap to nudge absorption and translocation of their product.

The comparison we’re showing in these charts is the trace nutrient mix with and without Soysoap in solution, versus the control. The data averages five random replications for each treatment.

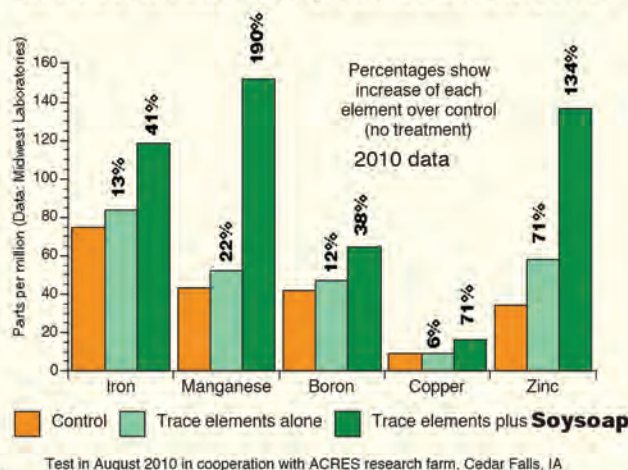
The table below shows the trace-element analysis of the DiHoMa product, alongside the analysis of the product we tested in 2010 — Defender G from FHR Farms. Both were applied at the rate of one quart per acre.

The tank mix with Soysoap contained one ounce of Soysoap per two gallons of spray solution.

### % of total by weight

		DiHoMa	Defender G
Copper	Cu	0.89	0.25
Iron	Fe	1.19	1.00
Manganese	Mn	2.38	3.00
Zinc	Zn	2.38	3.00
Boron	B	1.19	0.30
Sulfur	S	3.25	0.0
Cobalt	Co	0.0	0.0005
Molybdenum	Mo	0.0	0.0005

## Trace element content of soybean pods and beans with foliar-applied trace element blend, with and without Soysoap surfactant/transporter



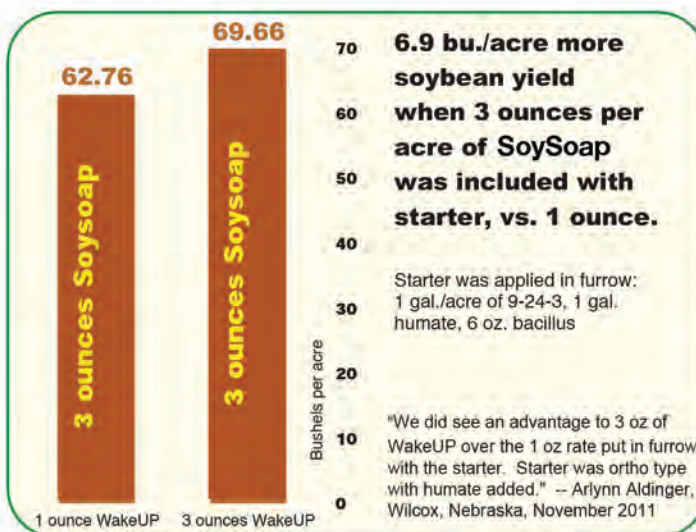
The increase in trace elements shown in the beans and pods with the DiHoMa trace mix show the same pattern we saw in 2010 when we tank-mixed Soysoap with Defender G.

Soysoap in the tank mix increases translocation into the “fruit” part of the plant. The differences are consistently positive across five elements measured.

**Bottom line:** For a second year, the pattern is consistent. Soysoap mobilizes trace-element metals which are difficult to move into and through crops.

The same translocation power applies to in-furrow nutrient blends. One of our clients, Arlyn Aldinger, found that increasing the rate of Soysoap in his soybean starter fertilizer — from 1 ounce per acre to 3 ounces per acre — raised soybean yield almost 7 bu. more.

He was using an excellent pop-up blend, shown in the chart below. The test also suggests that Soysoap was compatible with the nitrogen-fixing bacteria which Arlyn used in the starter.



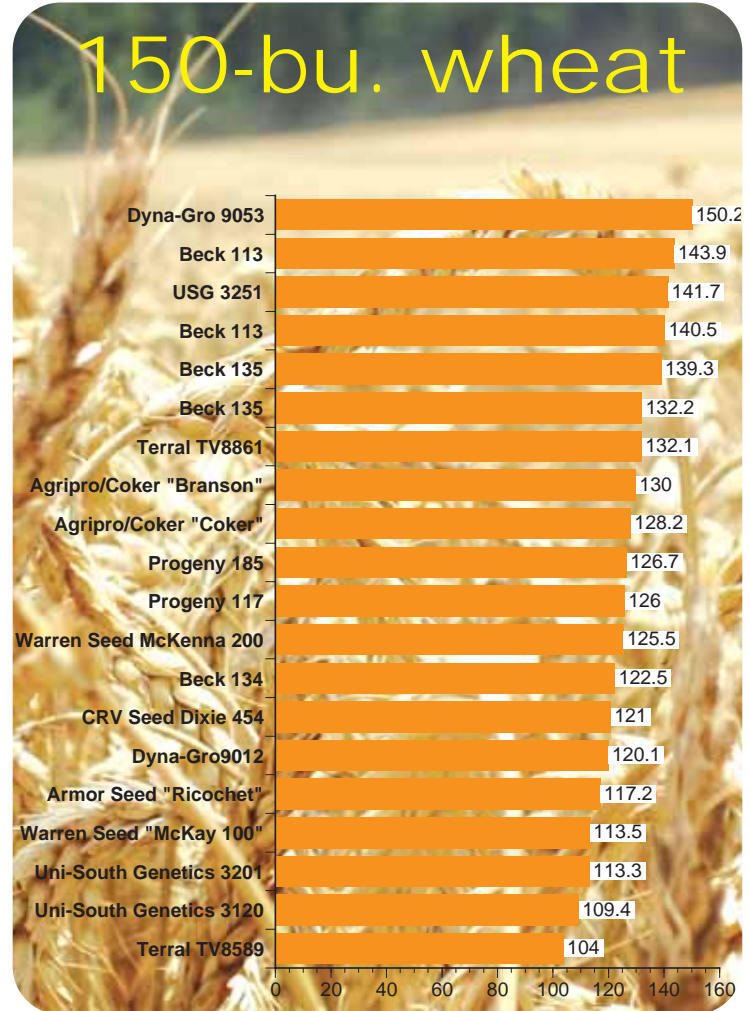


Wheat responds with deeper rooting, higher protein, higher yield, improved lodging resistance and more vigorous health under stress.

# Wheat



Darker, healthier winter wheat in the Montana field above shows up on both sides of a center strip which didn't get sprayed with Soysoap. The untreated strip is lighter in color. The difference in color appears more dramatic when you see it personally in the field.

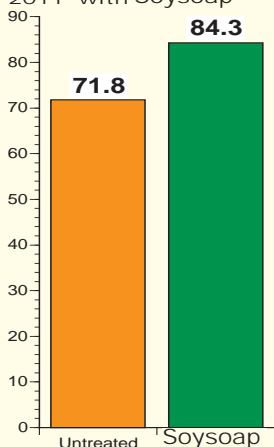


Larry Williams, TN, averaged 132-bu. wheat when he grew 20 varieties of winter wheat in cooperation with the University of Tennessee in 2011. Fertility included 2 tons of poultry litter and 120 units of N as UAN. He sprayed Soysoap in February and again in April, both times tank-mixed with fungicide and insecticide. All plots received identical treatment. Each harvested test area was .39 acre. More than half the plots had test weights over 60 lbs.; one was 63 pounds. We don't claim Soysoap was the main reason for consistent high yields, but certainly it contributed to mobilizing the abundant nutrients applied. The background image is a closeup of some of the wheat.



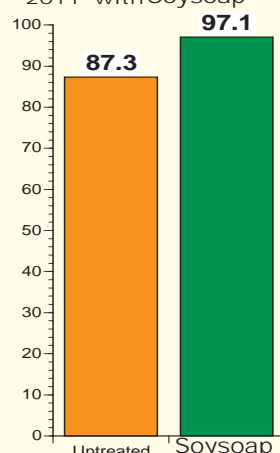
Winter wheat kernels on the right are from a Montana field sprayed with Soysoap as the wheat broke dormancy in spring. Typically, wheat treated with Soysoap tests a pound heavier, and protein is a point or two higher.

John Smith: 12.5 bu. more winter wheat in 2011 with Soysoap



John Smith, TN, measured a 12.5-bu. gain with Soysoap-sprayed wheat in 2011 (chart above). "The wheat had a healthier color all season, and we had good yields," he reports.

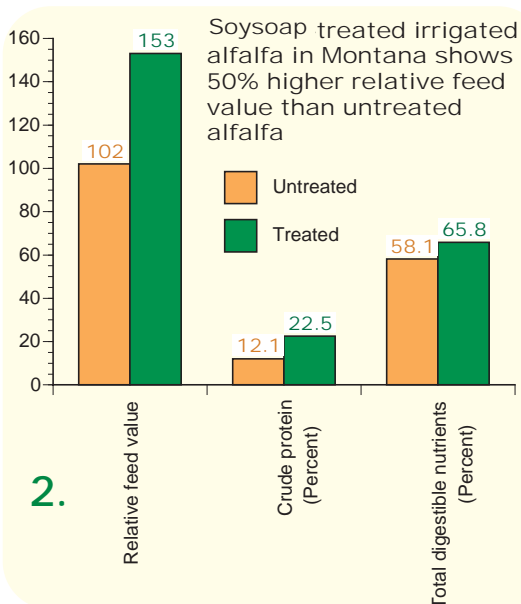
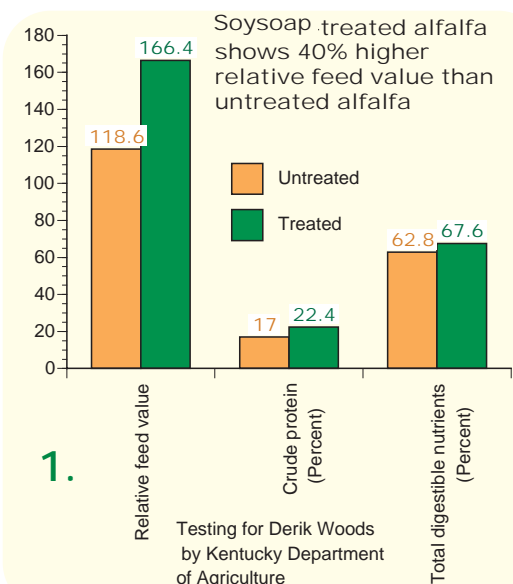
James Miller: 9.8 bu. more winter wheat in 2011 with Soysoap



James Miller, MS, sprayed Soysoap on half of a 120-acre field. Treated wheat "had more tillers, better color, and yielded 9.8 bu. more," says Miller (chart above).

# Forages

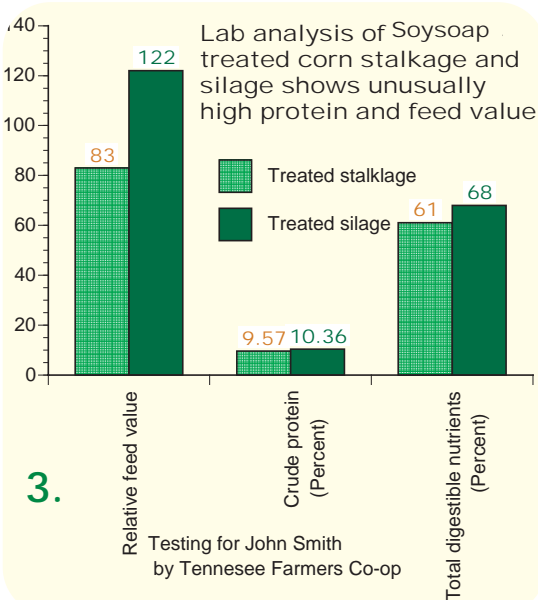
Every time we've seen a forage test with and without Soysoap, the analysis shows higher feed value with Soysoap. Yields rise, too.



1. David Woods and son Derick raise alfalfa near Lexington, KY, heart of American race horse country. They market hay as Woods and Son Hay Service, and need to raise the highest quality hay possible. In 2011, they tested Soysoap on the right half of the field (photo above).

They sprayed the first time as alfalfa emerged from dormancy. They could tell some difference on color after the first application. Two weeks before the first cutting, they applied a second spray of Soysoap. They cut the untreated half first. Weather delayed harvest of the untreated half about 10 days. "On the treated alfalfa, I could see regrowth beginning by the time we picked up the bales," says Derick. Regrowth in the treated field soon caught up with the untreated side which had been cut 10 days earlier. They sprayed after each cutting, as regrowth occurred.

By Nov. 29, the treated side was thicker and growing more vigorously. "Normally we wait 30 days between cuttings," says Derick. "With Soysoap, I'm sure we can cut every 25 days, and get more total tonnage of high-quality hay." The lab report shows Soysoap-treated hay had higher protein and 40% higher feed value. It also had more leaves and a brighter green color in bales — thus more customer appeal.




2. An alfalfa producer in Teton County, MT raised the Relative Feed Value of first-cutting alfalfa from 102 to 153 by applying Soysoap. The alfalfa rating system in his market calls that RFV Prime Grade!

Total Digestible Nutrients rose to 65.8%. Crude Protein almost doubled over the untreated control, to 22.5% (dry matter basis) compared with 12.1% for untreated alfalfa. Baled hay yield from the treated 60-acre half of his 120-acre pivot-irrigated field rose by 1,480 lbs. per acre over the untreated 60 acres. Soysoap was injected in the irrigation water.

3. John Smith of Henry County, TN ran a feed value analysis on corn-stalks baled from fields which had been treated with Soysoap. Crude protein was an amazing 9.57%, and stalks had a relative feed value of 83. Corn stalkage typically averages 6.5% protein. Smith also had his corn silage analyzed. When lab technicians saw an exceptionally high silage reading of 10.36% protein, they ran the test again to make sure. Silage normally has about 8.5% protein. Smith says his savings in protein feed supplements will pay for the Soysoap. We attribute the higher feed value to Soysoap's ability to increase sugar translocation in the crop. Oh, yes... Smith's corn yields were excellent too!





Normally you wouldn't spray a crop covered with heavy dew, but this was done to demonstrate how fast Soysoap is absorbed into leaves.

Soybeans on this side of the red line were sprayed with Soysoap at 6:45 a.m. on a cool, cloudy June morning. This photo was taken 20 minutes after spraying. Most sprayed beans were dry. Dew remained on unsprayed beans.

**Soysoap micelles are about the size of a water molecule.** They dramatically reduce the surface tension of water. Thus, dewdrops sprayed with Soysoap quickly disperse across leaves. Sprayed leaves quickly absorb Soysoap, water and any herbicides or nutrients in the spray mix. Inside the plant circulation system, sugars and other nutrients translocate more readily from leaves to roots. Since roots exude nutrients from photosynthesis, beneficial soil organisms respond with rapid multiplication, making more soil nutrients available to crops.

## *Soysoap speeds translocation of nutrients through crops*

**Tissue tests prove Soysoap increases translocation** of water and nutrients through crop circulation systems.

When Soysoap is applied early in a plant's growth (the two-leaf stage of corn or soybeans is critical), enhanced translocation of nutrients from leaves to roots speeds root growth by triggering more sugars and other exudates from the roots. Soil organisms respond to this energy flow by converting more soil nutrients to plant-available form.

**The resulting larger root system** helps keep crops growing through dry periods. We've seen the largest yield benefits from Soysoap in seasons when moisture is limited, or where soils have low organic matter and low cation exchange capacity.

We often find 8% to 10% higher levels of sugar in fruit, vegetables and immature seeds, such as corn kernels in milk stage. The "brix" readings in treated soybean and corn leaves are a bit higher, but those sugars are being rapidly translocated *out* of the leaf through the phloem tubes and into roots or seed or other growth points.

In garden crops, we've pushed fresh green beans past 12 brix. A grape grower who used Soysoap for the first time in 2011 saw his grapes test well over 20 brix. He had the best grape crop ever.

One of our favorite garden crops is butternut squash. The squash has a high sugar content, and many are so nutrient-dense they won't float in the cleansing tank as we prepare them for winter storage. The meat is a deep orange and very sweet; typically over 12 brix. And these sweet, healthy squash stay solid in storage for months — usually we finish the last of them the following May. If you want a quick demonstration of Soysoap's ability, try it in your home garden!

**To monitor crop quality in the growing season** — especially in vegetables and fruit — an optical or digital refractometer can offer useful answers.

It measures total dissolved solids, which are mostly sugars. You read the percent solids as a "brix" percentage, so named after the inventor of the concept, who needed a quick way of checking grapes for optimum winemaking.

We encourage checking treated and untreated corn kernels at the milk stage, when the plant is pumping in sugars for kernel fill.

You can also measure brix in treated and untreated soybean seed when they are green. Take leaf or seed samples from 5 to 10 plants spaced well apart in the field, then squeeze the bundle onto the refractometer for a representative reading. Take readings at the same time of day, such as early evening. Note cloudiness and temperature with each reading: these influence photosynthesis.

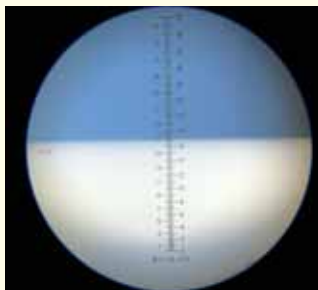
The goal: pump photosynthate nutrients into the edible, saleable part of the plant — not just accumulate high sugars in leaves. If leaf sugars reach capacity during a sunny day, photosynthesis slows down. Thus the leaf must pump *out* its sugars to other parts of the plant quickly. Soysoap helps speed this translocation to seeds, fruit and roots. Over 95% of crop mass is carbon, hydrogen and oxygen from photosynthesis. *Vegetables and fruit with over 12 brix are less attractive to insect pests.*



To check brix reading, first squeeze leaves or fruit to start flow of juice...



... and let several drops flow onto refractometer prism.



Read the brix level directly on the scale as you look through the optical refractometer. You can also buy digital refractometers which read dissolved solid levels directly; just put a few drops on a sensor plate. However, this "old fashioned" instrument is rugged, reliable and doesn't need batteries.



**Soysoap increases conductivity — and speeds nutrient flow from crop leaves to seed and fruit.**

## Why Soysoap works

Nutrients move through crop phloem and xylem systems by ion exchange. *not* by capillary action as presumed years ago. Thus, mobilization of sugars and other nutrients requires good electrical conductivity in plant nutrient solutions.

Our lab and field tests indicate that Soysoap enhances nutrient flow two ways from leaves to growth points:

1. *Increases* conductivity in soil water and plant nutrient solutions.
2. *Reduces* the “stickiness” or surface tension of liquids. Easier-flowing solutions need less energy to translocate sugars from leaf cells to roots, seed and other growing or nutrient storage parts of the crop.

**Improved conductivity** can also benefit cell formation. Crop cells grow with cation-anion interactions which world-famous crop consultant Dr. Carey Reams first called “biological ionization.”

Recent studies show that variations in soil conductivity explain 40% of variations in crop yields.

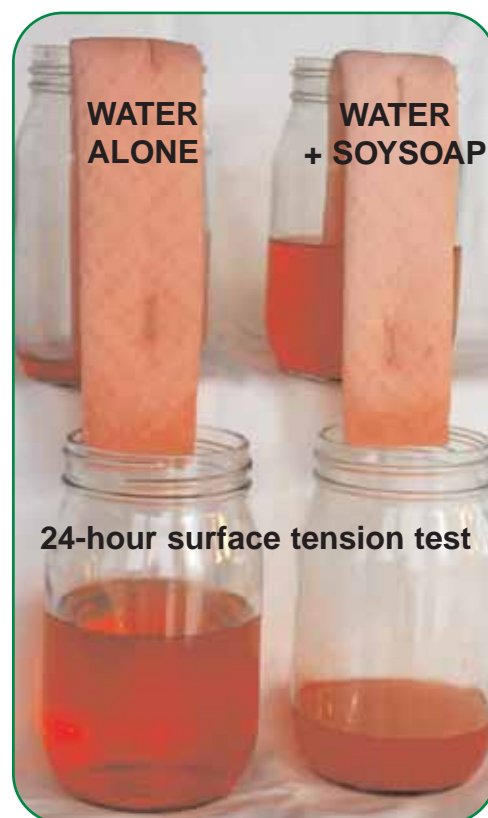
Our charts below are examples of how Soysoap raises conductivity in soil moisture and fertilizer solutions.

**Nutrient solutions flow easily** in crops with tiny amounts of Soysoap present. Soysoap reduces surface tension of water or sugar solutions, making it easier to pump plant sap through the tiny sieve plates in phloem tubes.

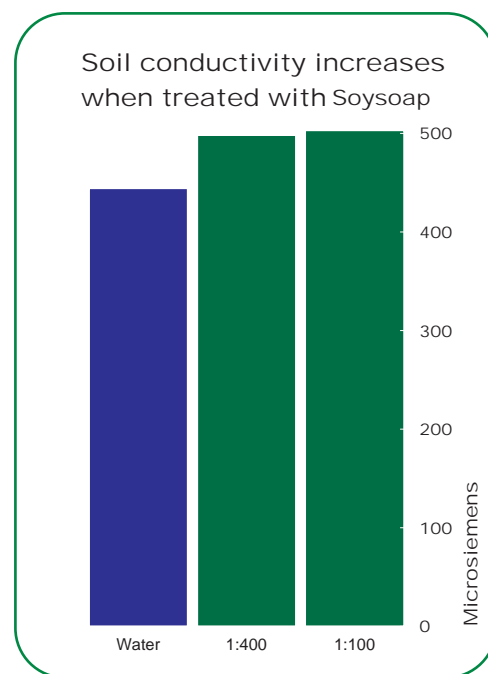
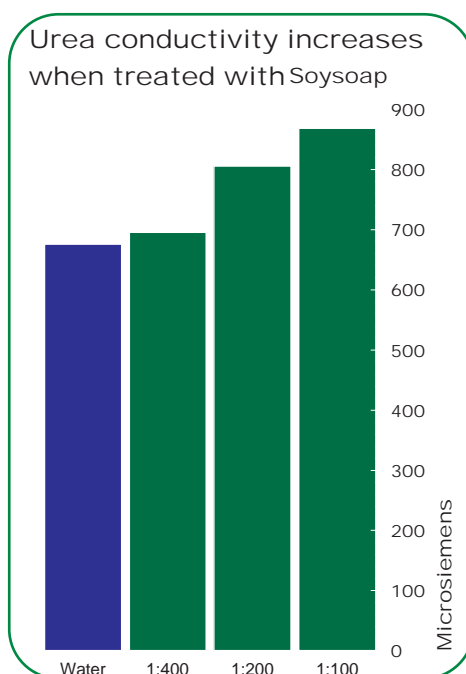
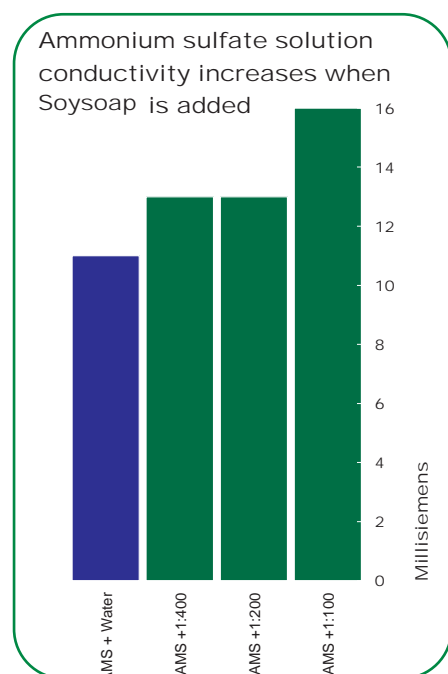
You can test Soysoap’s dramatically lower surface tension with a simple experiment like the one at right: Capillary action, which is related to surface tension, drops about 75%. (We’re also testing whether this helps soil retain more moisture against surface evaporation.)

When you add Soysoap in the tank mix of a computer-controlled sprayer which is set to deliver a fixed volume per acre at a specific field speed, the computer will typically adjust pressure 2 to 5 lbs. lower. That’s because a spray solution with Soysoap flows more freely through spray nozzles than a solution without it. Your spray system stays cleaner, too.

And when Soysoap spray mist hits leaves, the solution coats leaves smoothly — without surface-tension droplets. That enhances fast absorption of spray material into the leaf and very little runoff loss.



**In 24 hours, a folded paper towel “wick” moves almost 8 oz. of water (with food coloring for visibility) from the upper jar to the lower jar. Identical water, with a few drops of Soysoap added, wicks only a fourth as much because of lower surface tension.**



**Soysoap intensifies conductivity of moist soil and fertilizer solutions.** Adequate soil conductivity, in the 500 to 1,000 microsiemens range, is critical for high yields. Nutrients translocate through roots, stems and leaves via reactions between elements with a positive charge (cations) and those with a negative charge (anions). About 95% of your harvested crop’s dry weight is composed of hydrogen, carbon and oxygen from air and water. Metabolizing those elements requires moving large volumes of liquid through plant vascular systems by ion exchange.



# 12 reasons Soysoap is environment-friendly

**Soysoap meets standards for safety, health and quality** which we consider “Beyond Organic.” In the U.S., organic standards are set by USDA's National Organic Program (NOP). Most certification is by OMRI, the Organic Materials Certification Institute. We have not applied for OMRI certification in the U.S. because OMRI requires disclosure of our proprietary formulation. We hold our product to a broader set of safety standards while preserving the security of our product against imitations. Here are some safety and effectiveness tests and certifications we currently meet.

**1. Non-hazardous and non-toxic.** Our formulation complies with OSHA CFR-1910.1200, which specifies that products containing no hazardous or toxic components do not need warning labels. Our ingredients are derived only from botanical sources. They are essential oils, alcohols and other food ingredients originating from trees, sugar, corn and other plants. We wash fresh vegetables with the same formula we spray on crops.

**2. FDA-approved food ingredients.** Additives or ingredients in processed food for domestic use or export are considered safe if approved for the “EAFUS list,” which stands for “Everything Added to Food in the United States.” All ingredients in Soysoap are on this U.S. Food and Drug Administration list of approved food additives.

**3. Certified safe for drinking water and soil.** The Florida Department of Environmental Protection, Bureau of Petroleum Storage Systems, accepts our original formulation for remediation of petroleum and other contaminants in groundwater and soil. This certification comes from one of the most environmentally strict states in America.

**4. No genetically modified organisms.** The rising global concern about health effects of genetically modified ingredients in our food supply is scientifically well-founded. One of the world's largest firms, BASF, has closed its GMO research in Europe because of such concerns. We verified that our formulation is GMO-free with tests by Genetic ID, in Fairfield, Iowa, a specialty lab with worldwide clients.



**5. No heavy metals detected.** We tested our product using EPA 6010 / 7471 for heavy metals. The report was “no detection” for Arsenic, Cadmium, Cobalt,

Molybdenum, Nickel, Lead, Selenium, Mercury, Copper, or Chromium. Soysoap contains a trace amount of zinc, which is essential for plant and human nutrition. The NPK and trace element analysis is on our label.

**6. Radiocarbon analysis assures it's “Bio” based.** Each variation of our product is obtaining certification as a USDA-certified “BioBased Preferred” product. Radiocarbon analysis shows that all carbon in our product is of



present-day plant origin, not a petroleum or mined source. For example, a widely retailed cleansing formulation of our product is USDA approved to carry the “USDA Certified Biobased Product” label shown here.

**7. Safe for air quality.** We had Soysoap tested by stringent standards of the California South Coast Air Quality Management District, using method 313-91. This is the summary of their report: “Your submitted product successfully met all requirements for a Clean Air Solvent Certificate: No VOHAP (Volatile Organic Hazardous Air Pollutant), ODC (Ozone Depleting Compounds) or GWC (Global Warming Compounds). Your VOC (Volatile Organic Compound) emission is less than 1 VOC.”



**8. Benign when blended with beneficial soil organisms.** We have run lab tests to check whether our product impacts specific beneficial soil bacteria, and organisms which digest livestock pit manure. Marketers of those biological products assure us they see no negative effect on a wide array of live organisms, such as rhizobia, mycorrhizae and nitrogen fixing organisms. A major goal of agricultural production is to enhance the population and diversity of these organisms which are synergistic with crop roots. No microbial or fungal organisms, or their products, are used in formulating Soysoap. We make no bactericide or fungicide claims for Soysoap in the United States.

**9. Field-proven in enhancing health and nutritional density of crops.** This is our primary objective. “Organic” standards of certifying agencies such as OMRI are useful in prohibiting certain practices or toxins which may detract from nutritional quality of food. But organic certification does not assure nutrient density and life-enhancing quality



of the crops actually raised. The most consistent comment we hear from farmers is that their Soysoap-treated crops are healthier, with higher test weight and brix levels indicating enhanced nutrient density.



**10. The government of Panama certifies our product for unrestricted “organic” use on crops.** It's marketed in Panama and other Central American countries as *Vigoroso 3 en 1*. The certifying document, shown above, is effective through 2022.



The Philippine government has also granted registration for our product marketed as an “organic based liquid fertilizer” trademarked *Paradiso Green*. It's being used with much success by farmers and plantation owners across the Philippine Islands. In fact, many Southeast Asian farmers are rapidly becoming major customers. The Philippine registration certificate is shown above.

**11. Field-proven in enhancing health and nutritional quality of crops.** That's our primary objective. “Organic” standards of certifying agencies such as OMRI are useful in prohibiting certain practices or products such as genetic engineering which may detract from the nutritional quality of food. But organic certification is not a consistent assurance of nutrient density and life-enhancing quality of the crops actually raised.

**We encourage the U.S. National Organic Program.** In fact, we'd also like to see measurable nutritional quality labeling on foods, which would help consumers choose fresh produce and other foods which build human health.

Of the 12 rigorous criteria we list above, the U.S. National Organic Program requires only one for organic certification: No GMO seed may be used.

We meet all 12 health and safety standards. Soysoap is an ecologically sound, economically valuable product which meets agricultural standards “Beyond Organic.”

## Soysoap economics for 2013

The product cost of spraying Soysoap at a 5-oz. per acre rate at the V1-V2 growth stage is about \$6 per acre.

A soybean yield gain at the minimum expected range of yield benefit would be 3 bu., and could be upwards of 5 bushels. If cash soybeans stay above \$10 per bu., that's at least \$30 or more of added gross income, or a 500% return on product cost.

Growers report about 5 bu. or more of corn yield benefit with a timely V1-V2 application — when the second leaf is unfurling. That's worth about \$30 or more added gross income if cash corn stays over \$6 per bushel. It's roughly a 500% return on product cost.

There are at least two other opportunities during the season for enhancing corn and soybean yields with Soysoap: With pop-up or starter, and with foliar nutrients or other products as the season progresses and your crops indicate a nutrient need. See also page 16.





# 16 farmers tell why Soysoap is profitable

*This year we're expanding our report to include personal observations of farmers who've profited from the performance of Soysoap. Several have applied it for three seasons and they plan to include Soysoap in their cropping program for 2013.*



## 1. Mitch Ramsey, Osceola, IA

If a neighbor was to ask me why I've sprayed Soysoap the past three years, I would tell them that *if you get it on at the right stage — V1 to V2 —* it will increase your yield substantially, compared to unsprayed parts of a field. That's true especially if the season is dry.

You can dig soybean roots in the treated beans and see that they're about twice as big as in the untreated beans.

In 2011, we harvested some soybeans that yielded over 70 bu. an acre on our bottomland fields. That's the first time we've ever raised that kind of beans. Anywhere. *Ever*.

And we had some 57-bu. beans on our poorer hill ground. I'm really happy with Soysoap. Last year, 2011, was the first year I sprayed Soysoap when I was supposed to, at that early V2 stage.

If someone was to tell me I'm wasting a spray trip when beans and corn are at the one-leaf to two-leaf stage because no weeds have shown up and there's hardly any crop leaf area — I'd tell them they're wrong. That's when you need to get roots growing faster.

This season, we'll take a closer look at applying Soysoap in-furrow, and then coming back again with a foliar at that V1-V2 stage. With all the weather challenges in southern Iowa, it would be good to have more than one opportunity to add several bushels with Soysoap.

## 2. Dale Lenz, Hillcrest Farms Ltd., Vail, Iowa

Soysoap has worked out really well for us. We tested it on a limited number of acres in 2009 before using it farm-wide in 2010 and 2011.

In side-by-side strip trials, we found average yield

increases using Soysoap of 2 to 3 bu. per acre in soybeans and 2 to 5 bu. per acre in corn.

More important to us is Soysoap's ability to allow plants better use of glyphosate, foliar fertilizer, micronutrients, or whatever is sprayed with the Soysoap. Any yield increase after that is extra profit.

We use it three ways: mixed with glyphosate, mixed with foliar fertilizer, and alone as foliar spray. We use it with glyphosate on soybeans at the V3 stage, and at the V6 stage on corn. We plan to continue Soysoap as part of our 2012 management plan.

## 3. Bruce Johnson, Osage, Iowa

We use Soysoap on ground and air applications with our micros, liquid fertilizers, 21-1-0 and Procidic.

Soysoap makes our spray lay down efficiently and smoothly. When we performed ground inspections of our aerial sprays done with Soysoap, there was a big difference in how the spray adhered to the leaf compared to our aerial spray applications without Soysoap.

There was much better overall coverage and efficiency when Soysoap was used in the aerially applied spray at a rate of just 3 to 4 ounces per acre in about 5 gal. of solution.

Without it, the sprays beaded up, and significantly less spray reached the lower leaves.

On ground applications we typically tank-mix 6 ounces of Soysoap per acre along with our foliar-applied materials.

Our crop health has been improving yearly using Soysoap as part of a sound nutritional program.

## 4. David Mohler, Frankfort, IN

Since I started testing Soysoap in 2009, it has continued to provide positive yield response. We are in a 50-50 crop rotation on 2,600 acres.

I was very surprised at our yield levels in 2011. Last September, I was not very optimistic on the 2011 crop. This would have been about a week before we began harvest.

The end result of our efforts were farm averages of 65 bu. per acre on soybeans and 183 bu. per acre on corn.

These averages are almost hard to believe with the severe stress that we experienced in July and August of 2011.

The corn average matches our 10-year average. The soybean average is 16 % above our 10-year average and is our second highest average next to 2010.

I am a Pioneer sales rep with roughly 40 customers. As I have met with all of them, it became very obvious that a huge difference in yield existed on other farms in a 15-mile radius of our place.

Many clients had fields that performed well. However,



most did not come close to the consistency that we experienced on our farm.

Consistency over a variety of conditions and soil types is the greatest benefit that Soysoap is providing for our farm. By spraying Soysoap, I am convinced that improved plant health is allowing greater consistency and higher average yields.

#### 5. Bob Streit, crop consultant, Boone, IA

We saw enhanced nutrient uptake when Soysoap was used with foliar sprays, resulting in better plant nutrition. In beans, we noticed that aphids didn't show up in areas where we had previously seen aphid problems. We attribute this to improved nutrition, resulting in a healthier plant signature that is less desirable to insects.



#### 6. Arlynn Aldinger, Wilcox, NE

Our favorite use of Soysoap is with starter applied in the furrow for corn and soybeans. There is a definite yield response.

In 2011 when we added 3 oz. of Soysoap in our starter — compared with just 1 oz. — corn yields in strip trials went up 8 bu. per acre.

When we increased the Soysoap rate in our soybean starter blend from 1 oz. to 3 oz., the soybean yield rose by 6.9 bu. per acre.

Those yields are profitable, but we wouldn't have noticed the increase without our combine yield monitor. There are so many variables in every field and every season that yield benefits of that magnitude don't show up unless they're measured carefully.

I like Soysoap as a drift control when spraying crops. The spray just stays together. It also makes nutrients and herbicides adhere to the leaf better. The applied material absorbs faster and more completely.

Usually we apply herbicide and foliar nutrients six or eight weeks after the crop is up, and tank-mix Soysoap with the other ingredients. So far, I haven't applied Soysoap at the 2-leaf stage.

#### 7. Steve Henning, Clarksville, IA

I have used Soysoap since 2009 and love it. Whenever my sprayer heads to the field, there's Soysoap in the tank. I top off every spray mix with 3 to 5 ounces per acre of Soysoap.

In 2010 I had my best soybeans — over 60 bu. — on sandy ground where I sprayed Soysoap at the first two trifoliolate stage. In 2011, the elevator was complimenting me on the consistently high test weight in corn. That was unusual, considering our weather stress.

After 2010, I haven't done yield checks. I just assume a yield benefit because I saw it in 2009 and 2010. I would use Soysoap anyway, just for improved weed control.

Glyphosate-resistant weeds are showing up all over my

area, but my fields are totally clean.

Soysoap with foliar herbicide makes the spray lay down smoothly on leaves, and the herbicide penetrates in minutes.

I think we'll find more and more ways to use Soysoap, and improve the performance of other nutrients and crop protection products.

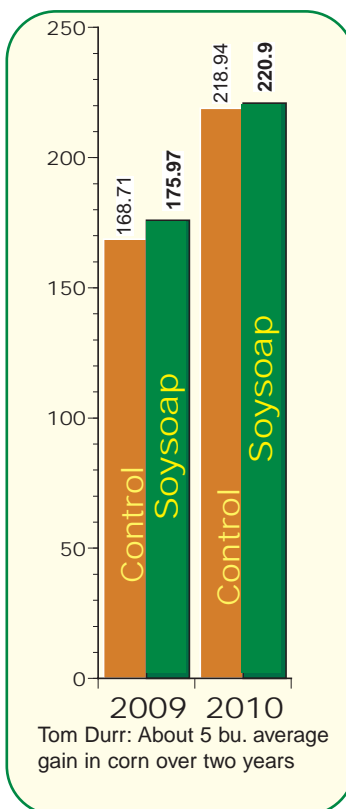
#### 8. Ron Monson, ag consultant, Detroit Lakes, MN

Several of my dairyman clients have applied Soysoap, and two of them have told me they've seen more milk production. We can't attribute that totally to Soysoap, as we've tried several new things. But from what our dairymen say, they intend to continue applying it on alfalfa and silage, as it appears to raise nutritional quality.

I'm also interested in seeing how Soysoap works with other ways to encourage soil biological life, such as applying some raw milk on pasture. My clients have seen very encouraging results with milk, and it's gaining some attention in the media.

#### 9. Tom Durr, Colo, IA

In 2009 and 2010, our strip trials show that Soysoap applied at V2 has given us another 2.5 bu. of soybeans and usually 5 bu. of corn or better. In 2011, it was hard to measure any yield improvement in treated areas because we had serious wind damage. In the first week of July 2011, I



walked our cornfields and thought we had the best-looking corn we've ever grown. There weren't any leaves with brown on them; they were completely green, clear down to the ground. I really had high hopes for it.

Then on July 11, we had high winds that tore up our cornfields. Maybe 30% green snap. Our crop consultant said we lost at least 50 bu. an acre. Then for the rest of July and August, we didn't have over two inches of moisture until it rained on Labor Day weekend.

Corn was hard to combine; I had to stay on the upwind side to avoid running over downed corn. But even with those problems, we ended up with about 150-bu. average corn yields. Not a disaster, but we would have had 200 bu. or

better without the weather setbacks.

I'm planning on using Soysoap again in 2012. Possibly I'll include some in the starter as well as the V2 application.

I've always wondered how that early application at the V2 stage can help very much, because there's not a lot of leaf area yet.

However, the results with a V2 spray are profitable, and



anything we can do to increase early rooting has to raise yield potential.

#### 10. Brad Hockemeyer, Holland, IA

I applied Soysoap on soybeans for the first time in July 2011, using it to mobilize a micronutrient blend. I also included sugar in the tank mix; I think that was helpful as a carbon source.

Where we sprayed this combination, we had the best soybean yield I've ever had — 70 bu. per acre.

I attribute the Soysoap and micros, applied together, as giving us a 10-bu. yield increase compared to our unsprayed beans. We'll do this again in 2012.

I've been studying the impact of glyphosate on trace element tie-up in soybeans and have to learn more about what this means. I know you encourage tissue tests and we'll definitely look at that.

The spray coverage was smooth on the leaves, and the micros apparently absorbed quickly without runoff or droplets.

#### 11. Rick Nervig, Hardy, IA

What's most clear to me about Soysoap is that any spray tank-mixed with Soysoap lays down smoothly on leaves. No droplets or runoff on either corn or soybeans.



That appears to make a real difference in herbicide effectiveness. When I sprayed volunteer corn in our soybeans with herbicide plus Soysoap, the corn was taken out faster than I've seen before without Soysoap. (Photo)

I'm still unsure of another "test" with Soysoap in spring 2010. I had planted some soybeans really early. By May 6 the cotyledons were out. Forecasters warned us of severe frost for the night of May 8. I took a chance: On May 6, I sprayed the field with 8 oz. of Soysoap in water, having heard that Soysoap increases leaf sugar somewhat.

On the morning of May 9, 2010, all the beans were white with frost. The reported low was 28 degrees. A lot of corn in our neighborhood was severely frosted.

By that afternoon, beans in that field looked dead. I watched them for a few days, and saw beans pushing new trifoliate leaves. We lost some population, but not enough to replant.

By May 19, the second trifoliate leaves had emerged and I sprayed Soysoap again, 8 ounces per acre.

So that field had two applications of Soysoap by the time it reached the second trifoliate stage.

The 110 acres averaged 65 bu. per acre — my best soybean

field for 2010. But I can't say that was due to Soysoap. We didn't have any check strips.

In 2012 I'll use 3 oz. per acre of Soysoap in starter fertilizer, and then spray 15-in. bands of Soysoap over the row on corn and beans.

#### 12. Joel Grabin, Oxford, IA

In 2011, I had some weed escapes and tank-mixed Soysoap with my herbicide to take out those large weeds. I really like the way Soysoap makes the spray lay down smoothly on broadleaf weeds. I saw a few droplets on the foxtail, but the control was very good.

Based on that experience, I'll use Soysoap in 2012 as a surfactant/mobilizer with trace elements and other foliar.

#### 13. Shawn Weirich, Lawrenceville, IL

I didn't have any test strips on wheat or second-crop soybeans after wheat, but I saw what I needed to know.

I sprayed Soysoap on winter wheat as soon as it greened up in 2011. It made 71 bushels. My best wheat before had been 58 bushels.

Then we planted soybeans following wheat and sprayed the beans with Soysoap really early, right at the first one or two trifoliate leaf stage. The beans made 48 bu. per acre.

Actually the biggest response we've seen is in our garden and house plants, where we spray several times. You'll be hearing from us for product in 2012.

#### 14. Mark Underwood, Burr Oak, KS

I've tested Soysoap for two seasons, 2009-10. In those seasons, I've seen treated soybeans generally yield 10 bu. more than untreated soybeans — if I apply Soysoap on time at that early V1 to V2 stage.

The most clear-cut result I've seen on soybeans was in 2010, when it was terribly dry here in north central Kansas. One wheat field was so dry it only yielded about 20 bu., even though I had sprayed it with Soysoap in spring 2010. I disced up the wheat and noticed something unusual: The ground was mellow in spite of our drought.

I drilled soybeans July 5, double-planting by running 90 degrees across the first drill rows, because late-planted beans don't branch very much. We got a rain the next day, and the beans came up fast.

When they started showing the second trifoliate, I sprayed with Soysoap and glyphosate. Our next rain was Aug. 10, with almost no showers until harvest. The beans shaded out any volunteer wheat, and grew waist high with pods all the way up. I've never seen anything like that on double-crop beans.

They made 52 bu. per acre, and test weight was 61 lbs. per





bu. or better. I'm gradually gaining confidence to get Soysoap on crops early, when wheat just breaks dormancy and beans show their first two trifoliate leaves.

I'm even noticing that my soil is more mellow where we've applied Soysoap for two seasons. We have a lot to learn about that.

#### 15. Heath Seeker, Trenton, NE

I had good row crops in both 2009 and 2010 where I applied Soysoap. This year I plan to spray test strips to measure yield benefits more exactly. But as long as our crops keep improving each year, and our soil is gaining a better granular structure, I'll keep using Soysoap.

What I see is that our ground isn't powdery and doesn't crust over or blow as much. That could be a sign of more active soil organisms left from breakdown of the larger root structures from Soysoap applied early.

We had dry weather stress in 2011, and my corn came through very well — it was a lot better than many of my neighbors had. Sunflowers and soybeans did well too.

In 2012 we'll try some Soysoap on yellow peas, then follow with winter wheat.

#### 16. Lonnie Luers, Keota, IA

I first used Soysoap in summer 2011 as a surfactant and nutrient carrier. Our corn in southeast Iowa was under stress, and I wanted a broad-spectrum foliar nutrient blend.

I tank-mixed Soysoap with Rondo, Seed Set and Defender — plus a copper product. Following this foliar application, corn leaves stopped deteriorating, ear development continued without tipping back, and roots stayed healthy. I had over 200-bu. corn.

The way I see it, Soysoap pays for itself with more effective use of foliar nutrients, which enhance yield. Because of translocation data I had seen with Soysoap in 2011, I figure I can trim the rates of trace elements and NPK in my foliar a bit, and still make them very effective.

In 2012 I plan to spray Soysoap with Defender trace mix and molasses at V1-V2, going for bigger root growth.

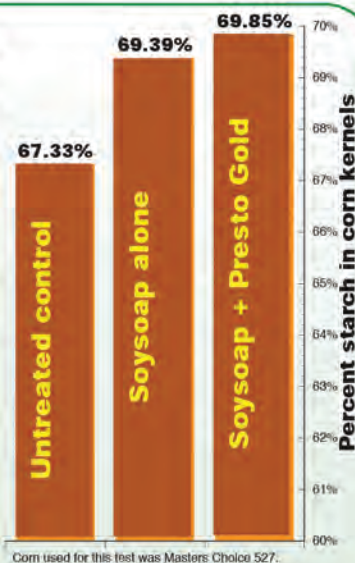
Then depending on tissue analysis, I will probably come back at V4-V5 with Procidic, 8-19-3, molasses and traces.

Before tassel, I'll apply Soysoap, Defender, molasses and a copper product, plus 21-1-0. With good nutritional health, I hope there will be less need for rescue treatments such as fungicides. Later I'll also apply a bulking foliar to assure good ear fill. This program will apply to some test fields.

I also encourage soil biological life and fertility by using soft rock phosphate, humates, micronutrients, and sugars from mineral-rich molasses. (*And by not using 0-0-60!*)

There is no magic bullet — but every biologically sound growth aid can help build a few more bushels per acre.

The percentage of starch rose in corn which we treated with Soysoap early in 2011. The chart at right shows Midwest Lab results averaging kernels from five sample ears in each test. In 2012, we'll test more hybrids to find if the higher starch content is a consistent response. We typically see heavier test weights when Soysoap is applied. Increased starch levels are valuable for ethanol yield. Higher starch indicates that more sugars were pumped from leaves into the kernel endosperm.



### How you can profit with Soysoap in 2013

**1. Tank-mix 3 ounces per acre of Soysoap with your corn and soybean starter fertilizer** — whether in the seed furrow or 2x2 beside the row. This helps early absorption of nutrients into roots for more vigorous emergence. On-farm tests indicate yield gains for corn (see page 4) and soybeans (see page 9).

**2. Apply 5 oz. per acre of Soysoap at early V2**, the two-leaf stage, on corn, beans and wheat (photos, right). On soybeans, that means when the second trifoliate leaves are starting to emerge. This timing is critical for early root stimulation. Our consultants say this timing encourages 30% of corn plants to set two more rows of kernels. Yield benefit: 2-5 bu. for beans, 5-10 bu. on corn.



**3. Tank-mix Soysoap** with products such as trace elements as indicated by tissue tests.

Only about 5 ounces of Soysoap per acre are needed in tank mixes to create a smooth, uniform coating on leaves for more complete absorption and translocation.

On average, yield benefits from applied micronutrients and other late foliar products was amplified by 80% in eight random-rep soybean field trials in 2011 when we added Soysoap to the blend and applied at V3 and V4.

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