

# BIOBASED.US

## 2010 SoySoap Research Update



*We're racing for BioBased farming!  
Watch our sprint race cars  
on your favorite racing channel!*

Farmers report that *SoySoap* gives you these benefits:

*Drought protection* In seasons with dry-weather stress, farmers report SoySoap-treated corn and soybeans yield 10 to 20 bu. more than adjoining control fields. Midwest random-replicated field trials in 2009, a cool and wet season, showed average yield benefits of **1.7 to 3.3 bu. on soybeans, 3.8 to 9.5 bu. on corn.**

*Uniform crop stands* SoySoap is a powerful surfactant which improves moisture absorption for uniform germination, seedling emergence, and deeper rooting.

*New NPK efficiency* Faster nutrient transport within crops may raise yield per unit of fertilizer — foliar or soil-applied.

*Lodging resistance* Massive roots and larger stalks resist lodging in summer storms and late-season bad weather.

*Higher crop quality* Healthy crops produce higher test-weight grain, which matures earlier with less moisture. Fruit and vegetables typically have higher sugars for more consumer taste appeal and storage life.

*Help for herbicides* SoySoap's nano-sized colloids help transport herbicides into leaves — and throughout weeds — for more complete kill of resistant weeds. Farmers also tell us *soybeans and corn rebound faster* after temporary stress of glyphosate application.

BioBased USA reserves the name *SoySoap* for its family of biobased, non-toxic "nano-technology" formulations to clean our environment and improve efficiency of crop moisture and nutrients — especially under stress of dry weather or low-organic soils. Our research shows that on highly fertile Midwest soil and ideal weather seasons, grain yield benefits may be modest. **SoySoap products are made with food additives on the U.S. Food and Drug Administration's EAFUS list of "Everything Added to Food in the United States."** Our product supports the Clean Water Act farm approval certification, and is approved by the Florida Department of Environmental Protection as safe for groundwater and soil remediation. Authorized distributors private-label BioBased USA formulations under requirements of their state. BioBased USA does not sell directly to growers or consumers. For information or dealer contacts, please Email [donwilshe@biobased.us](mailto:donwilshe@biobased.us) or call **800-995-9203**. Please see on-farm videos and field research reports at our website: [www.biobased.us](http://www.biobased.us) Our home office and manufacturing plant is at 4237 Cornelius Road, East Bend, NC 27018



# Corn *We've known since 2007 that SoySoap helps corn yields come through in a dry year. In 2009, research showed that on average, it pays its way even in a wet, cool season.*

In 2007-08, Southeastern corn growers who encountered dry weather in June or July typically gained 10 to 15 bu. higher yields in corn sprayed with **SoySoap**.

Then in 2009, farmers across the Corn Belt tested it — during a cool, wet season when deep rooting with **SoySoap** wasn't as critical for overcoming dry-weather stress. Here's what they learned:

**Ohio, Indiana, Illinois:** One of our distributors, GreenYields of Ohio, retained research agronomist Steve Wolf of S&R Consulting, Atlanta, IN to test **SoySoap** in 2009. Wolf weighed corn yields at 11 locations in Ohio, Indiana and Illinois. Each location had three random plots plus a control plot. **SoySoap**-treated corn out-yielded control plots by an average of 9.5 bu. per acre (see chart at right).

In separate trials at six Midwest locations, corn which Wolf treated with an experimental "**SoySoap II**" formula out-yielded controls by 15.2 bu. per acre. Please see the chart and caption on the facing page. This product will be tested in 2010, and may be available in 2011.

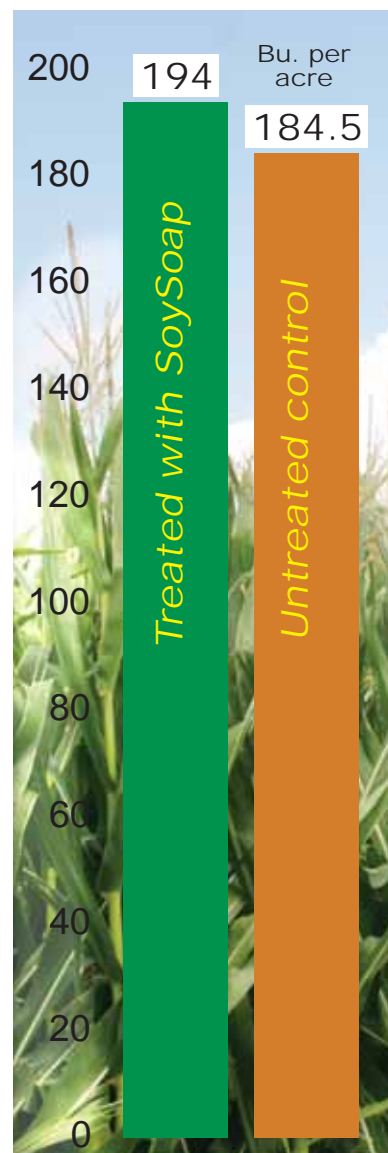
**Iowa:** In 27 paired trials across Iowa using the Practical Farmers of Iowa random-rep field strip protocol, the average corn yield gain was 3.84 bu. for 8 ounces of

**SoySoap** per acre. That yield gain was statistically significant above the 99% confidence level. Early application (V2 to V3) led to the best yield response.



A 2009 corn yield trial by Dr. Bertel Schou at ACRES Agricultural Custom Research, Cedar Falls, IA resulted in a 4.3 bu. yield gain when the planter dribbled a diluted solution of **SoySoap** into the seed furrow. We'll study this more in 2010.

**We're also testing SoySoap** to measure how well it enhances the yield effects of foliar and planter-applied fertilizers on corn. In 2009, field trials with 2x2 starter showed that corn roots quickly grew toward the band of fertilizer, then plunged deep. **SoySoap** apparently improved soil capillary movement of moisture and nitrogen. We'll have yield trials in 2010 to measure the benefit. Let us know if you'd like to participate.



The 9.5-bu. average corn yield gain shown in the chart above comes from 33 treated plots and 11 control plots in Ohio, Indiana and Illinois. Research agronomist Steve Wolf applied 8 oz. per acre of SoySoap on each 4-row plot. The 9.5-bu. difference showed up in the data though all plot yields were high, and the season was cool with abundant moisture.

**Growers also tell us** that treated corn often has a percentage point or two less moisture at harvest, plus a pound or two higher test weight. We found this true in Iowa strip trials. In four replicated strips, yield was about the same, 194 bu. per acre, but SoySoap-treated corn samples consistently had 1 lb. higher test weight. That indicates higher nutrient density. These four reps were averaged in with 23 others, and the average of all 27 strips showed a 3.84 bu. benefit for applying SoySoap.



**Untreated corn** (above) was grown in a terrarium with the same soil as the treated corn. These roots are adequate in a season with good soil moisture. The biggest yield differences between untreated and treated crops typically show up after dry-weather stress.

**Roots of corn treated with SoySoap** (above) are 50% more massive, with roots reaching almost 3 ft. deep. A North Carolina State U. corn plot trial by agronomist Ron Heiniger in 2009 found a 14-bu. gain with two SoySoap treatments. This was under dry-weather conditions.



*We encourage you: Try this on your farm in 2010!*



You can get a close-up of root growth in a “terrarium” like this, which we built in late spring 2009. Two soil-filled growth chambers each about a foot wide, three feet deep and six feet long, have glass sides. During the growing season, the glass is insulated with solid foam board and protected from the sun with reflective roofing. Air circulates behind the roofing to keep the soil at a nearly constant temperature. At season’s end, you remove the glass and wash away some of the soil to examine root growth under varying treatments. In our

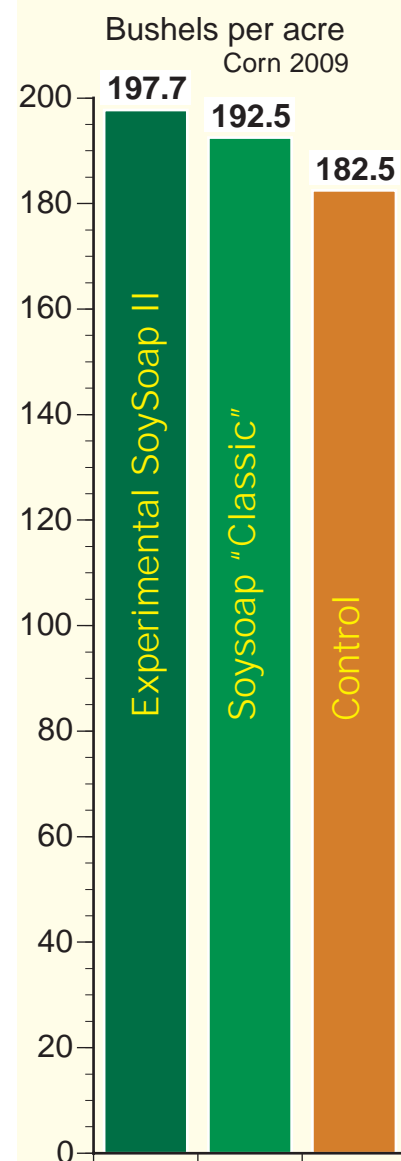
experiment, corn was seed-treated with SoySoap, then planted in a standardized soil mix and sprayed twice with SoySoap at V2 and V4. No extra water was applied except at planting, then again during three dry weeks in early September. SoySoap-treated corn had more massive roots with more root hairs, as shown in the photos above. But the difference was most clear when we washed away all the soil and hung up the roots for comparison (photo on opposite page). If dry weather hits, this is when deep, big roots bolster your yield.



“Dent” corn had rounded kernels extending a third of the length of the ear, not just a the tip, indicating complete nutrition. These ears (photo above) were raised in 2008 in North Carolina, treated with SoySoap.

Sweetcorn near Belle Glade, FL (right) had larger roots and sugar levels of 18 brix, about 23% higher than untreated sweetcorn. This sweetcorn was treated in-furrow at planting and sprayed twice. Growers there are very competitive, and thus tight-lipped about any competitive advantage.

Where we could collect corn test weights in Iowa strip trials in 2009, corn treated with SoySoap typically had about 1 lb. higher test weight. Growers also reported that treated corn often had a deeper blue-green color early in the season. This season we’ll do nutrition analysis of treated vs. untreated corn and soybeans.



An experimental formulation of SoySoap which we’ll call “SoySoap II” resulted in an average corn yield increase of 15.2 bu. in trials at six locations across Ohio, Indiana and Illinois in 2009. These plot trials were conducted by independent consulting agronomist Steve Wolf.

We are obtaining 55 gal. of this formulation for 2010 research in Iowa. That’s enough for 880 acres.

Typically, it takes about four years of field research to understand and manage the reasons for field variability in any adjuvant, especially one as unique as this surfactant.

In 2010, we plan to encourage using SoySoap along with foliar-applied calcium and NPK nutrients, trace elements and biological products like fish emulsion. If SoySoap intensifies the effectiveness of such yield builders by increasing absorption and internal translocation, the synergistic effect could build larger yield gains than we saw in the Midwest in 2009 — even in a season of favorable weather. However, long-range weather guru Larry Acker sees a warm, dry summer coming in 2010!



# Soybeans

*In an ideal season, trials show average yield gains of 1.7 to 3.3 bu. per acre. Under heat stress, farmers report up to 28 bu. benefit.*

In a Midwest season like 2009 with lots of rain and little heat stress, 8 oz. of **SoySoap** applied at the first two trifoliate leaf stage may give you only a bushel or two of yield benefit on soybeans. That's enough to at least pay for the **SoySoap**.

You also get "stress insurance" and other benefits which farmers report to us, such as less lodging, healthier beans and heavier test weight. *Yield data from 2009:*

**Iowa:** Average yield gain for **SoySoap** on 32 paired-strip trials was 1.73 bushels. This was at good yield levels: 57.70 bu. (treated) and 55.97 bu. (untreated). It was statistically significant beyond the 99% confidence level. Our "terrarium" experiment is an example of drought resistance (see photos at right).

**Ohio, Indiana and Illinois:** Plot trials by independent research agronomist Steve Wolf at six locations showed a 3.3-bu. yield gain for **SoySoap** on soybeans (Please see chart at right). This occurred at yield levels above 50 bu. in favorable weather.

**South and Southwest:** As in 2007-08, **SoySoap** showed larger yield benefits where heat or moisture shortages made bigger roots vital as "stress insurance."

See the photo and caption below reporting Blake Williams' experience as an example.

**North Carolina:** We appreciate research by our friends in Extension and at NC State. One of their 2009 plot trials compared 8 oz. of **SoySoap** per acre applied at V2 against a humate product applied at the same growth stage. **SoySoap** had a 27% yield advantage. In 2010, we're looking for researchers to test how **SoySoap** can enhance benefits of foliar-applied nutrients in tank mixes!



A three-week warm, dry stretch in late August and early September stressed the untreated soybeans at left. They're in a soil-filled box 12 in. wide, 3 ft. deep and 5 ft. long. On the same day (Sept. 13, 2009) when both of these photos were taken, SoySoap-treated beans had not wilted. Both had identical soil fertility and moisture. The treated beans had bigger, deeper roots, like the corn roots grown in this same terrarium, shown on p. 2.

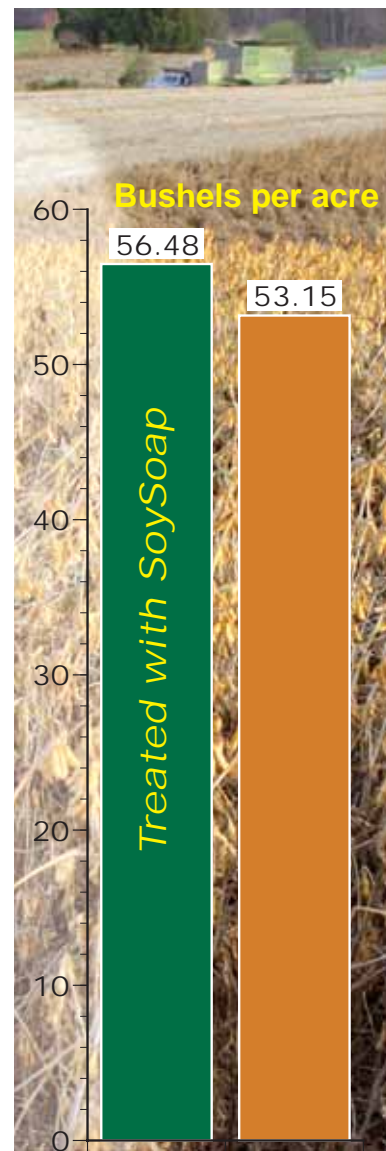
**Thicker soybean stalks, deeper rooting.** In 2009, heavy and persistent fall rains prevented many North Carolina farmers from harvesting beans until December or later. These soybeans held by distributor Steve Mosely (photo, left) were treated with 8 oz. of SoySoap. They have massive stalks and deep roots. Beans didn't lodge or become moldy in spite of a soggy fall. The owner, Allen Warren, harvested over 50 bu. per acre from this field, one of the highest soybean yields he has had from this very sandy land.

Allen's cotton in an adjoining field also had thick stalks — and more cotton per acre than he had ever raised on that field (See page 7). We attribute massive stalks and roots to early SoySoap application and enhanced nutrient transport within the plant. The early root exudates stimulate soil organisms, which improve the root rhizosphere and make more soil nutrients available to the crop.

**Beans treated with SoySoap in Red River County, TX** yielded 48 bu. per acre in a high-stress season. Blake Williams shot this photo of treated soybeans July 27, 2009. Untreated beans in an adjoining field were about 10 inches shorter on the same date. Blake's untreated beans yielded just 20 bu. per acre — 28 bu. less than this treated half of the field. Asgro 4546 beans were planted April 23. Heavy rains followed. Then, reports Blake: "All through June, we had no rain. We had 13 days in June where the heat index was over 110 degrees. The rains started again July 4."

This is an example of substantial yield differences which farmers report after hot or dry stress hits their crops during vegetative and seed set stages.

Farmers tell us SoySoap helps speed maturity, which reduces frost threats. *Growers also report that a spray of SoySoap on the day of a predicted overnight frost offers crops a degree or two of freeze protection. SoySoap's tiny micelles somehow reduce cell-freezing damage.*



**The distributor for Indiana, Ohio and Illinois** retained independent research agronomist Steve Wolf of S&R Consulting, Atlanta, IN to conduct plot trials of SoySoap on soybeans at six locations in those three states in 2009.

Each location had three random-rep plots plus one control plot. SoySoap-treated soybeans outyielded control plots by an average of 3.3 bu. per acre.

Here are other field observations from Midwest soybean growers in 2008-09:

✓ **Higher average leaf sugar levels.** Double-cropped beans in Michigan averaged 12.2 brix vs. 10.2 brix for untreated beans with three treatments. An Iowa grower who treated once found an average 8.5% higher leaf brix levels.

✓ **Darker green, healthier soybeans.** Growers who encountered stretches of dry, warm days reported that SoySoap-treated soybeans had a deeper shade of green, and resisted wilting longer than untreated beans.







Both photos taken on July 17, 2008.

*One spray caused the difference in growth, vigor and yield of these two soybean fields.*

Both were planted by Freddie Doub in Yadkin County, NC June 5, 2008 with the same variety, on adjoining fields with the same soil types. Both were sprayed with glyphosate on June 26. Both had the same dry weather: three summer months with only 0.75 in. of rain. The field on the left had SoySoap tank-mixed with glyphosate when it was sprayed June 26 at V2 stage. The field at right was sprayed June 26 with glyphosate alone at V2 stage. Treated beans had deeper roots, larger leaves, and 4 lbs. per bu. higher test weight. In spite of the dry season and deer damage, the SoySoap-treated field yielded 49 bu. per acre — 17 bu. more than the adjacent field which wasn't treated early with SoySoap. This was one of our early confirmations that deeper roots with SoySoap help keep crops growing longer through dry periods. Across the Midwest in 2009 — a cool, moist season — yield gains in field trials with SoySoap were less dramatic, but profitable. Example: A Pennsylvania farmer has averaged 63 bu. for years with a non-GMO soybean variety. In 2009, he treated this variety with SoySoap, and it averaged 76 bu. per acre. He reported that with SoySoap, "Crops looked dark green and kept on growing through dry stretches in June and July."



Our 2008 Iowa soybean research data is from 32 random-replicated field trials at a dozen locations across Iowa. Strip trials were side-by-side pairs across a field, using a protocol established by Practical Farmers of Iowa, a research and education association. Our data summary was analyzed by Dr. Shonda Kuiper, Professor of Mathematics at Grinnell College. Data and procedures were overseen by Dr. Jerry DeWitt, head of the Leopold Center at Iowa State University.

Dr. Kuiper's analysis shows that the paired-trial yield differences were statistically significant above the 99% level. Yield gains for SoySoap were modest but consistent in Iowa's cool, wet season.

Dale Lenz (above) of Crawford County, Southwest Iowa, ran several very precise GPS-based strip trials. In Black Hawk and Grundy County,

Iowa, we used a weigh wagon operated by Pioneer seed dealer Tyler Schmidt (photo above). We'll be glad to provide our data summary and Dr. Kuiper's analysis by e-mail if you're interested. Greenyards of Ohio also has extensive 2009 plot data which shows somewhat higher yield benefits than we gained in Iowa. In 2010, our field research trials will focus on how to "amplify" the benefits of foliar nutrients by tank-mixing them with SoySoap. We plan to study in-furrow application, which costs very little and showed nearly a 4-bu. benefit in our 2009 corn trials. We will test whether just 5 ounces per acre, in a 1:256 dilution, will perform as well as the usual recommendation of 8 ounces per acre. This would bring down the cost of SoySoap per acre from about \$8.75 to just \$5.50. Ask your distributor about tests on your farm!



# Wheat, rice, other small grains

## A few on-farm reports from 2009-season wheat growers around the nation:

✓ A North Dakota grower treated spring wheat with **SoySoap** in 2009 strip trials. He reported 8 bu. more than the control in one trial. In a second strip where he used a higher application rate, the yield gain was 13 bushels.

✓ Under severe drought, a Montana grower raising spring wheat had average protein content of 18.1% on 1,000 acres treated with **SoySoap**. His 6,500 acres of untreated fields averaged 16.5% protein. A protein premium of 30¢ per bu. for each 1/4-point increase would pay this producer \$1.90 per bushel. On his drought-damaged yield of only 16 bu. per acre, that's a benefit of about \$30 per acre, or about a 300% return on the cost of **SoySoap**.

✓ Tim Disher, northwestern NC, had *too much* rain in 2009. Most of the wheat in his area had head scab and low test weight. "A lot of farmers didn't get a wheat crop at all," he says. "My wheat yield wasn't great, but I had a crop. The test weight is what blows me away: 65 lbs. per bushel. I delivered some wheat on contract, and the broker told me he would buy *all* the wheat I had raised — plus they'd haul it from the farm. My wheat had stayed healthy all season — and free of head scab."

✓ In North Dakota near Deering, hard red winter wheat treated with **SoySoap** yielded 62 bu. per acre in 2009. Untreated control wheat yielded 58 bu. per acre.

✓ Also in North Dakota, dark northern spring wheat treated with **SoySoap** yielded 68 bu. per acre and tested 15.3% protein. The untreated control yielded 55 bu. per acre and 14.4% protein. At 2009 cash wheat prices and protein premiums, the higher yield and quality meant an extra \$151 per acre in gross income.

**We saw one replicated plot trial** in the Eastern Corn Belt where treated wheat had no statistically significant yield increase over untreated wheat *when all plots averaged over 100 bu. per acre*. Growing conditions were ideal all season, and the trial was on highly productive land. This particular wheat variety may have reached its genetic yield potential, and deeper rooting had no additional benefit.

**In 2010, we'll see if we can raise wheat yield potential** at very high yield levels by including *foliar-applied fertilizers and micronutrients* blended with **SoySoap**. The concept: **SoySoap** should increase nutrient absorption and translocation, making foliar treatments more efficient.

A Minnesota distributor has been testing yield results of tank-mixing **SoySoap** with liquid foliar treatments containing high-quality NPK nutrients and humates.

He first tested this combination in 2008 on a neighbor's wheat, spraying a band diagonally across the field. "You could clearly see taller wheat in the sprayed strip," he reports. "When the combine cut into the treated strip, the yield monitor jumped from around 70 bu. to over 100 bushels." *That's the kind of yield gain we want!*



**This wheatfield on Freddie Doub's farm, and others like it in North Carolina,** convinced hundreds of producers in 2008 that SoySoap has a beneficial effect on crop health and yields by building massive roots and vigorous nutrient circulation. North Carolina producers found that with SoySoap, they could raise 90- to 100-bu. wheat where they had never seen 70 bu. before. *Wayne Smitherman* reported in 2008: "We're having the best yields we've ever had. It's beautiful grain. Yields are 90-plus bushels; test weights 63 to 64 pounds. It was not overdone with fertilizer; just cow manure and a little nitrogen. We applied one spray of SoySoap with top-dressed liquid nitrogen." *Freddie Doub* said: "We're not used to seeing wheat like this — with a 5-inch head and four rows of grain in most of the heads. Wheat straw yield was double what we're used to."



**Winter wheat pulled in spring 2009:** The larger tillers on the right are from a strip sprayed with SoySoap in fall 2008. Larger roots don't always mean higher yield, but they can give you a huge yield difference in a hot, stressful season.

**Wheat heads** picked at random June 30, 2009 in a Montgomery County, IA field were larger where spring wheat was sprayed with SoySoap at 2 to 3 inch height. North Carolina wheat growers also report longer heads and higher test weight in treated wheat.





*Small grains respond with improved yield, stronger stalks and health. In Asia, rice growers gained up to 45% more yield, and they can raise rice on land that wouldn't produce before*

**Untreated**

*Rice*

**Treated**

**Field trials in the Philippines and Vietnam** show SoySoap increased rice yields as much as 45%. This is a Vietnamese research field. Rice on this side of the red line was sprayed with SoySoap. It has healthy green leaves as rice heads reach maturity. It's a signal of crop health: Seed is maturing and drying naturally on live stalks, not dying on dead stalks.



*Canola*

**Near Deering, ND, canola** treated with SoySoap in 2009 yielded 200 lbs. more per acre than the untreated control.



*Oats*

**In a Black Hawk County, Iowa field trial** with nine replications and precise weigh-wagon measurement, oats sprayed with SoySoap yielded 7.3% more than untreated control oats. Test weight of treated oats was 2 pounds per bushel higher than untreated oats, reports researcher Jerry Carlson. There was no weather stress from planting until harvest. Southeastern growers on poorer soil report that they're seeing yields of oats *50% higher than any they've ever produced*.



*Barley*

**Barley growers in the Carolinas** who applied SoySoap in 2009 reported yields 30% to 50% higher than they can recall growing in any previous year. Although late rains delayed harvest, this field yielded close to 100 bushels.



*Lentils*

**In northeastern Montana** — an extreme drought area in summer 2009 — a producer treated 1,200 acres of lentils with SoySoap and left 4,200 acres of comparable adjoining land untreated. Average yield on untreated fields: 5.5 bu. per acre. On treated fields, average yield was 11 bu. per acre, *doubling lentil yield under severe drought conditions*. *This is a characteristic of SoySoap: Deeper rooting "insures" your yield under stressful conditions, when you need it most.*



# Cotton

*In warm, dry cotton-raising climates, deep roots can make a big yield difference! We've found SoySoap most effective in regions with hot, dry weather stress.*



Allen Warren of Stokes, NC (photo, left) reports: "My best-ever cotton yield on this sandy field (photo, above) had been just over 900 pounds. My 2009 yield was 1,260 pounds. I attribute much of that yield increase to healthy cotton and one treatment of 8 oz. per acre of **SoySoap**. A neighbor stopped last fall before harvest and told me, "I've never seen cotton look so pretty on that sandy land."

In the photo at right, Warren's friend Steve Moseley holds roots and stalks pulled from Warren's field after cotton was harvested and stalks were shredded. Warren says the root structure and stalk diameter was "at least 50% greater than I've ever seen on cotton raised on this sandy land."



# Peanuts

*SoySoap accelerates nutrient transfer from leaves to roots. And when you're raising peanuts, that also means more pegs, more peanuts, and higher yield.*

Southeastern farmers reported 250 to 500 more pounds of peanuts per acre in 2009 when applying **SoySoap**.

In one typical test, untreated peanuts averaged 4,969 lbs. per acre while peanuts with two 8-oz. applications averaged 5,267 lbs. — a 298-lb. benefit.

At \$480 per ton, the net benefit after cost of **SoySoap** in this test was about \$54 per acre. In tests on various crops, the most pronounced impact of **SoySoap** is usually on root growth. And that's where the payoff is on peanuts! The photos at right show why.

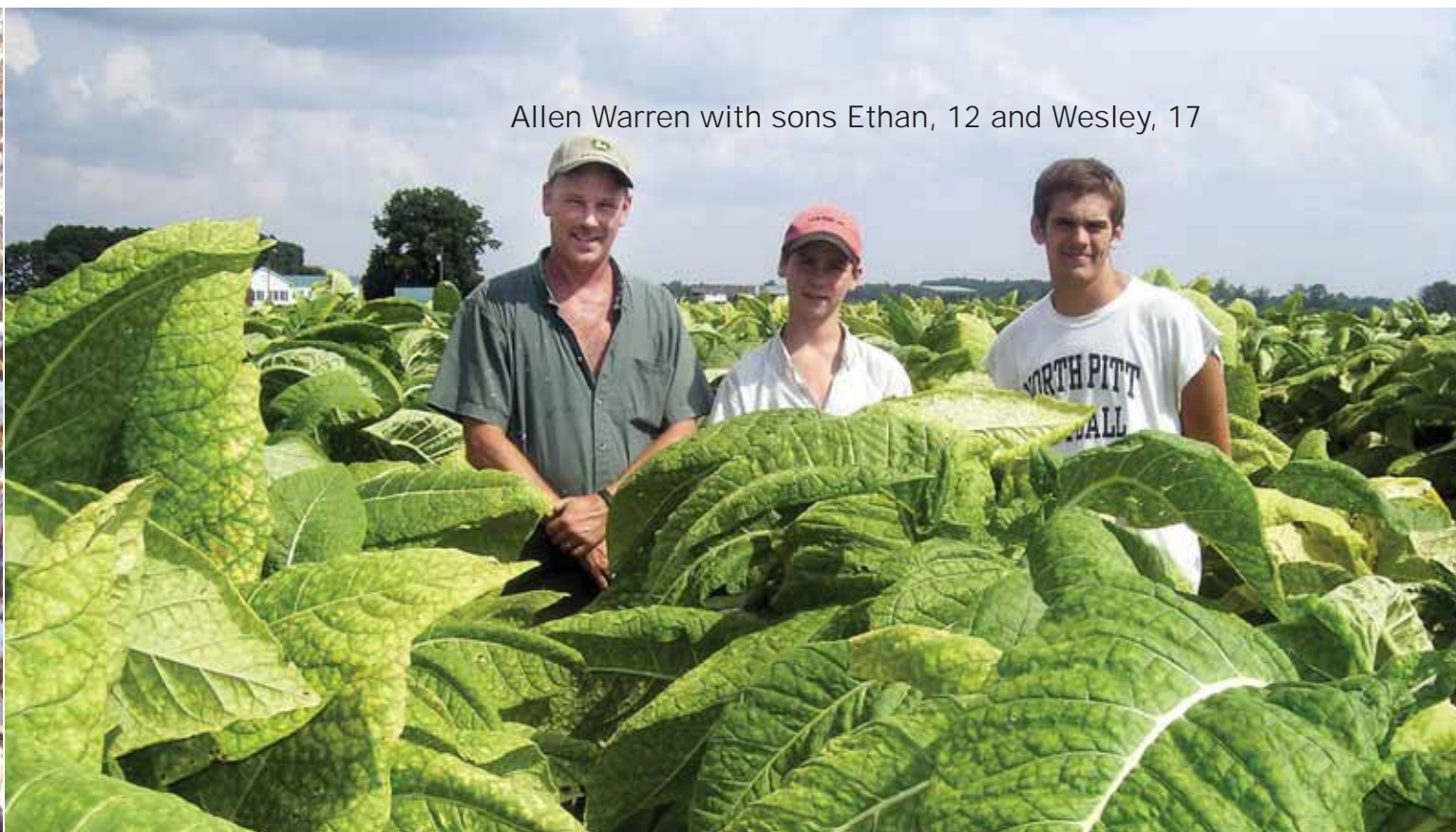


A North Carolina peanut grower reports: "When I pulled representative plants, I was shocked. Treated plants had 21 to 24 pegs; untreated plants had about 9 or 10."



# Tobacco

Flue-cured and burley growers know: Quality is more crucial than ever!  
Healthier plants enhance quality with our non-toxic tobacco formulation.



Allen Warren with sons Ethan, 12 and Wesley, 17

In 2008 and 2009, more than 75 innovative growers of all types of tobacco discovered that tobacco is one of the most responsive of all crops when sprayed with **SoySoap**. Here are some examples reported by farmers:

**Flue-cured tobacco farmers using SoySoap** have seen yield gains up to 50%, plus better-curing tobacco that grades higher. Mark Smitherman of East Bend, NC says: "You can smell the healthier aroma of the high-quality flue-cured leaf." *Improvement in flue-cured leaf density* is a sign of quality that flue-cured buyers like. In fact, tobacco growers who can't raise high-grade flue-cured and burley have a tough time getting contracts.

Flue-cured grower Larry Doub says that in 2008, North Carolina growers who baled their first priming of flue-cured into the usual 4x4x4 bales found at the scales that their bales were often 200 lbs. heavier than the 800-lb. maximum weight per bale. They learned to cut back on the volume of tobacco in a bale. *They had more pounds to sell, at higher grades!*

**Dark-fired tobacco:** High quality and finish is especially important. Todd Harton of Cadiz, KY says he had *250 to 300 lbs. more dark-fired tobacco per acre* where he sprayed **SoySoap** in 2009. Quality was excellent. Todd says the **SoySoap**-treated tobacco took finish easier: "We only had to fire twice on some tobacco we sprayed with **SoySoap** two times." Todd raises 300 acres of dark-fired.

Assuming 250 lbs. per acre more yield worth \$600 per acre, that's \$180,000 more total gross income.

**Burley tobacco responds to SoySoap** the same way, as Allen Warren and his sons (photo above) of Stokes, NC proved in 2009. Here's a summary of the Warren family's experience on 4.5 acres of tobacco raised with only family labor:

1. **High-quality leaves earned premium prices.** Burley from one acre which Allen sprayed *twice* sold for \$1.84 per pound, with most bales grading 1. Burley from 3.5 acres sprayed *once* brought \$1.80 per pound and graded 1 or 2.

2. **Outstanding yield.** In this area, a 2,000-lb. per acre burley yield is considered good. Tobacco Allen treated twice yielded around 3,000 pounds. Tobacco treated with **SoySoap** just once yielded around 2,300 pounds.

3. **There was virtually no disease** in Allen's tobacco, even though he didn't fumigate the soil. Insect pressure was light, indicating a healthier plant with a strong immune system.

4. **Allen estimates his tobacco sales were \$1,500 per acre higher** because of higher yield and grades from **SoySoap**.

**Cold weather in Fall 2009** revealed another benefit of **SoySoap**: **Frost protection.** In mid-October 2009, Barry Newsome of Farmington, KY heard a forecast low of 29°F the night of Oct. 17. He called for an immediate delivery of **SoySoap** for his dark-fired tobacco, and sprayed just ahead of the cold night. Freezing temps lasted six hours overnight on Oct. 17.

Ice formed on the leaves of his tobacco, but the crop had no injury. Nearby tobacco and other crops had killing freeze damage from the 29°F low the night of Oct. 17.

We've seen similar freeze protection on soybeans in Michigan and North Carolina — and vegetables in Florida.



# Forage

*Dairy cows, beef cows and hay analysis will show you higher nutrient density with SoySoap treatment. And deeper rooting helps extend summer growth.*

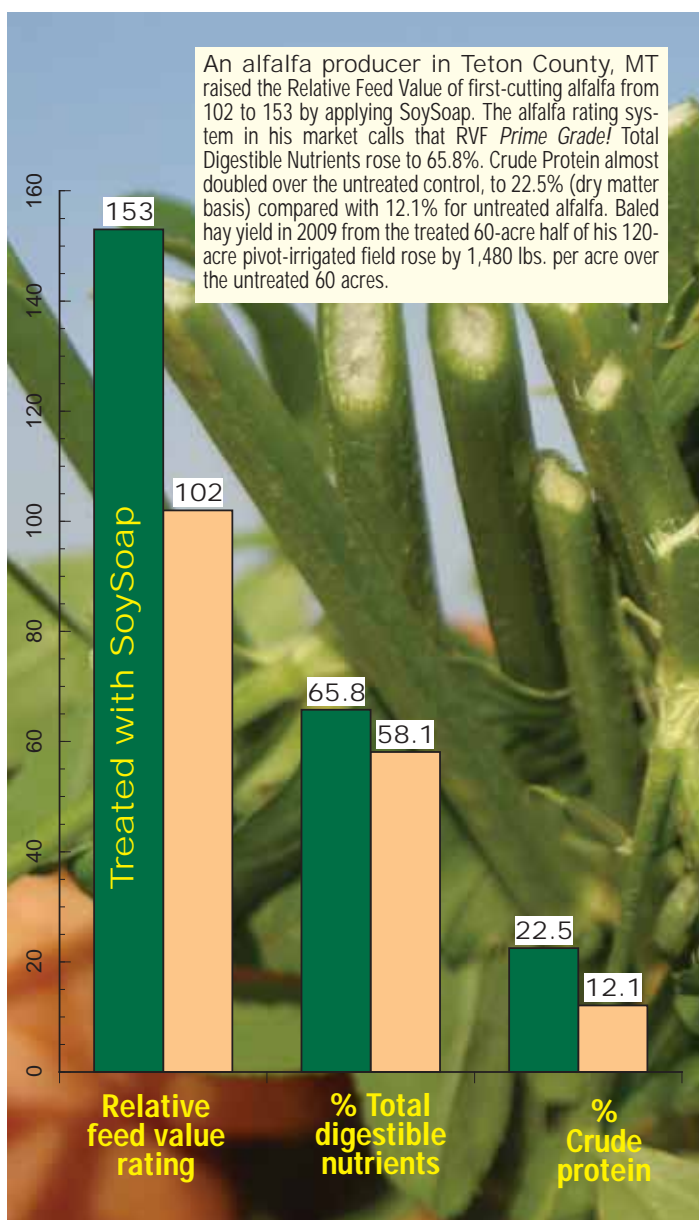
When you feed your own hay and pasture treated with **SoySoap**, you benefit three ways: Higher forage yield, higher quality feed, and improved herd health.

It all starts with deeper rooting. Crop consultant Jon Linker of North Carolina says, "You may not notice a lot of lush growth after spraying with **SoySoap**. But dig those roots, and you will see a difference between treated and untreated grass. And if your weather turns dry, you'll see a substantial difference in growth which can extend your haying and grazing season."

Linker says that some of his most-convinced clients are Southern golf course managers who need to keep fairways attractive all summer. "When they see how bentgrass treated with **SoySoap** stays green and healthy with less water and fertilizer, they're enthused," says Jon.



**Bob Morgan, Forsyth County, NC** sprayed SoySoap on his fall-planted fescue April 11, 2009 and shot this photo 25 days after spraying. He tells us: "I left a strip like you asked, so we could take pictures. We got 280 bales from the four acres. No doubt we would have gotten 400 bales if we had sprayed all of it."



**Mike Johnson** saw orchardgrass and fescue hay hit 4 tons per acre after spraying with SoySoap. "It's not fertilizer," he says. "It just makes fertilizer work better." He also saw his cattle graze SoySoap-sprayed areas of his pasture first: "Maybe the treated grass tastes sweeter." A cow's taste buds are a good 'brix meter!'

**In a forage research demonstration**, SoySoap-treated Coastal Bermuda at the Sunbelt Expo in Moultrie, GA was taller and more lush than Coastal in the unsprayed control plot. Treated Coastal was higher in protein and also scored a Relative Feed Value of 84.87% versus 80.58% on the control plot. The samples at right are representative of Coastal in the display plots. A study of the roots would probably show even larger differences.



**Various hay markets** use differing standards to compute relative feed value, but all depend on high-quality fiber and highly digestible nutrients. When you mobilize nutrient transport with SoySoap, the result is *higher nutrient density*.



# Landscaping *You can renew the vigor and beauty in blooming plants, ornamentals and grasses with SoySoap*

Southern golf course operators who rely on bentgrass for their fairways are among our most enthused **SoySoap** clients. They've found how bentgrass roots plunge deeper into moisture and nutrients, saving major costs for water and fertilizer while keeping courses more appealing.

Farm families also delight in "borrowing" some **SoySoap** from crop use to brighten their house plants year-round, extending the blooming time and encouraging healthier growth. Sometimes, a wife with flowers is the one who convinces her farmer husband that "this stuff works."

These photos are just a few of many which farmers and homeowners have sent us from around the world.



Untreated (left) and treated (right) potted plants in a greenhouse offer a way to demonstrate SoySoap's ability to mobilize moisture and nutrients. One benefit in warm, humid greenhouse environments is enhancing natural health and leaf sugar levels. In treated plants, brix (sugar) levels often rise by 10% to 20%.



**This Azalea was distressed (left)** in September 2008. Bill Morgan, NC, says, "We had six others like this and we were going to dig them up. Then I thought we'd spray them with SoySoap and see what happened." By June 2009 the same Azalea looked vigorous and loaded with new branches (right).

Bill adds, "All our Azaleas recovered and look great." *Some homeowners have learned to buy stressed plants from the big "box" stores for pennies, and rehabilitate them with SoySoap!*



**Bill Morgan's lawn** in North Carolina remains vibrant through midsummer heat because of deeper rooting. If you spray SoySoap on a perennial ryegrass lawn, look for deeper rooting rather than heavy top growth. Consulting agronomist Jon Linker of North Carolina says that's what golf course owners need: Deep-rooted bentgrass and other grasses for durable fairways which remain green all summer with less need for irrigation.

**We've conducted experiments** on greenhouse plants and house plants in Iowa since early 2008. Generally, sprays every couple of weeks will intensify and prolong blooming in hanging plants. But you need to keep the concentration of SoySoap diluted to only an ounce in two gallons of non-chlorinated water (1:256 ratio) or less. Too concentrated a mix can shock leaves, yellowing them on the outer edges.

We see people buying "junk" shrubs and perennials from Home Depot and Lowes late in the season for a few cents on the dollar — then reviving them into thriving landscape plants using SoySoap. It's a non-toxic soap, safe to spray around home. (We also use it to clean vegetables before juicing them.)



**New health and life for a dying Althea shrub.** A Landscape consultant, Brad Mayfield, showed us how he restored a shrub (left photo) which was dying from stress. After several sprays of SoySoap over two weeks, the plant pushed new



leaves (center photo). After another four weeks of rehab sprays, it had exploded in new foliage (right photo). If you were to examine the rooting structure, you'd likely also see a profusion of healthy new roots as nutrient translocation improved.





# Vegetables and fruit respond quickly



**SoySoap and vegetables go together** like peas and carrots. SoySoap first caught on with the produce industry as a cleanser for fresh fruit and vegetables. Now, home gardeners and commercial growers are discovering how SoySoap enhances health, production and taste of fresh produce. A few examples:

**1. Tomatoes** blossom earlier and longer, with higher-brix fruit that keeps well, even when picked ripe.

**2. Leafy vegetables like kale, cabbage and lettuce** respond vigorously to repeated light sprays of SoySoap through the season.

**3. Okra responds to SoySoap in big way.** Jim Shellenback, Florida distributor for SoySoap, is 6 ft. tall, and Okra on a Brevard County farm is up to his shoulders.

**4. Strawberries and SoySoap offer a special opportunity.** North Carolina crop consultant Jon Linker has developed SoySoap plus nutrient foliar that stimulate bearing two weeks early and extend it two weeks later. For one grower in 2009, that added \$3,000 an acre to gross income. "We're constantly getting comments about the fantastic taste of strawberries sprayed weekly with SoySoap and our nutrient packages," says Linker.

**5. Peppers** and other succulent veggies grow firm, sweet and crisp. Blooming tends to extend late into summer.

**6. What's so special about this butternut squash raised with SoySoap?** It was harvested in Iowa in October 2009, and *it was still firm and fresh five months later* when this photo was taken. It was simply stored in a cool room all winter. Really high-brix produce usually doesn't rot; it just gradually dries in storage.

**7. A rural legend is emerging about string beans sprayed with SoySoap.** The joke is that gardeners finally pray for frost, because they're weary of picking, eating, freezing and giving away pole beans and bush beans. In this photo, farmer and master gardener G.L. Barringer of North Carolina shows that even after four hard freezes, some of his pole beans were still growing in late November 2009.

**8. Raspberries and other berry bushes** sprayed regularly bloom more profusely, attracting bees and multiplying yield. Spraying with SoySoap over a two-year test didn't appear to bother the bees at all. They loved the extra blooms, especially late in the season when other flowers are scarce.

**9. Sweetcorn brix levels climb** when growers apply SoySoap. Florida growers are finding they can lift brix levels (dissolved sugars and other solids) to about 18, offering more consumer appeal than normal sweetcorn hybrids with brix readings of 13. Higher brix levels mean tastier sweetcorn and longer shelf life. Often, treated fields reached peak sugar levels earlier than untreated fields. Ears in treated fields often had 18 rows of kernels, compared to the 14 and 16 rows in untreated corn of the same hybrid. Stalks and roots were larger in treated fields. Our only problem: Commercial growers using SoySoap don't tell competitors their "secret."





*Here's where high quality, taste and shelf life from SoySoap pay off with big profits per acre!  
Many growers first prove to themselves — in their own gardens — that SoySoap really works*

10. For sweeter oranges which have longer storage life, SoySoap can be easily blended with foliar sprays throughout the growing season. We also anticipate that growers can gain some freeze protection on citrus crops, as we've seen in soybeans, tobacco and onions.

11. Juicy, sweet peaches with explosive good taste don't have to be just a fond memory of your childhood! They can happen again with regular SoySoap applications. SoySoap enhances transfer of sugars from leaves into fruit. It can be easily blended and applied with other nutrients all season.

12. Using SoySoap in commercial carrot production is just as practical as using it in your home garden. It's non-toxic to field workers and approved by Florida's Department of Environmental Protection for cleanup of groundwater contaminants. An Iowa gardener applied several sprays of SoySoap on carrots in 2009: "They grew a foot long and three inches at the top — but even that big, they were really sweet."

13. Including SoySoap in apple orchard spray schedules is economical and easy. You may be able to reduce rates of foliar nutrients, as SoySoap helps carry nutrients into leaves efficiently. Expect sweeter apples!

14. Summer squash usually has a brief life before heat and damping-off wilts them down. We've seen SoySoap-treated yellow squash vines grow bigger, and stay productive longer.

15. You can overdo it. Not everyone wants to push cabbages to 14 pounds. But this family sprayed SoySoap repeatedly, just to test the genetic potential of this variety.

16. A mission that's our mission too: These four heads of cabbage were part of a test on a small mission farm which supplies food for orphans at Baguio City, on the island of Luzon in the Philippines. The mission, affiliated with Bethesda Care International, is called "Feed the Hungry Children." Since 1983, the team has nourished more than 5,000 children.

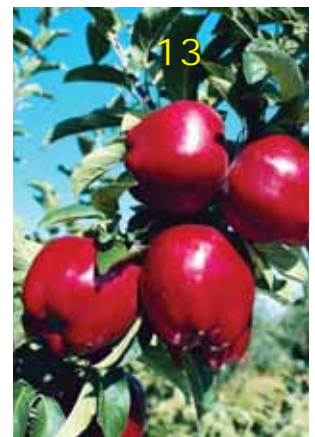
Pastor Donald Soriano (photo with girl at lower right) tells us the smallest cabbage in this group of four had no SoySoap. It's what the farm normally expects to see, grown at 5,000 foot elevation. By intensifying the SoySoap rate and frequency, farm workers have increased head size from a half-pound to over four pounds. They use a dilution of 1:500, and spray every two weeks.

The farm also raises rice to feed its orphan children. Pastor Soriano says "We spray 32 ml. of SoySoap in 16 liters of water every 28 days after transplanting. The 2.3 hectares that used to raise 100 to 120 sacks of unmilled rice now produces an average of 160 to 170 sacks."

Sweet potatoes that normally yield 4 to 5 tubers now produce 8 to 10 full-sized tubers when sprayed with SoySoap every 30 days after transplanting, says Pastor Soriano.

He adds that when SoySoap was sprayed on tomatoes on a mountainside garden at a 2,500-foot elevation, yield per plant nearly doubled and tomatoes had a healthier appearance.

*This mission is an example of our goal: Raise the yield, quality and safety of food worldwide!*





# How SoySoap works

*"Nano" micelles speed nutrient transport into leaves and throughout crop systems*

Nanotechnology is one of the most promising realms of modern science. A "nano-colloid" of **SoySoap** is one billionth of a meter.

If you apply five ounces of **SoySoap** per acre, each square inch of a plant's leaf is coated with more than 20 trillion **SoySoap** colloids.

The tiny size of **SoySoap** colloids makes them effective in carrying other blended products into plant leaves and transporting natural nutrients through the plant's circulation system.

**SoySoap** colloids are roughly the size of a water molecule. They are "non-ionic," meaning they are very close to a neutral charge. Within a plant, they bond lightly with the positive hydrogen atoms in water (H<sub>2</sub>O), reducing water's natural "stickiness" or surface tension.

In effect, **SoySoap** colloids act as a lubricant to keep water flowing with little resistance.

Thus, nutrient solutions within the crop's xylem and phloem tubules flow readily, with lower osmotic pressure. In turn, this promotes high-efficiency translocation of sugars, minerals and other nutrients.

**SoySoap** is *not* a fertilizer or plant

growth regulator. We call it a nano-surfactant: It helps crops translocate nutrients and water more efficiently. This is why we see higher yields and quality, especially under stress conditions like dry weather.

When **SoySoap** is applied to leaves early in a plant's growth stage, V2 or even earlier, enhanced production and translocation of leaf sugars to the root generates more exudates from roots. Soil microbes and mycorrhizae respond to this stimulus by converting more soil nutrients into plant-available form. The resulting larger roots help crops keep growing through dry periods.

We're also seeing data that shows in-furrow or seed treatment is effective in stimulating root development during pre-emergence, before leaves begin making sugars.

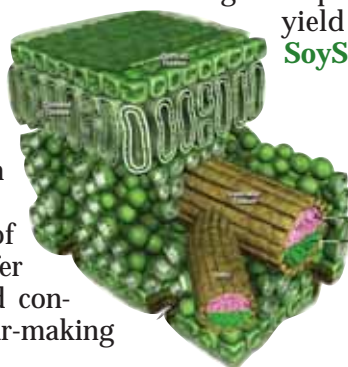
Sodium, which makes up a significant part of **SoySoap**, increases electrical conductivity in nutrient solutions circulating in the crop's xylem and phloem system.

The net result of enhanced nutrient transfer is more fuel, energy and conductivity to boost sugar-making

efficiency of leaf photosynthesis.

Higher nutrient levels in plant cells also boost your crop's "systemic acquired resistance." The crop has a greater *natural* ability to defend itself against attacks by molds and microbes. Many organic growers maintain that when a growing crop shows tissue tests at or above 12 brix (an index of the percentage dissolved sugars and other solids), plant disease pressure is greatly reduced.

In high-organic, high-fertility soils and perfect growing seasons, the yield increase with **SoySoap** may be moderate because large roots aren't critical under ideal conditions. But other benefits such as crop quality and resistance to lodging also help pay for application. In stressful seasons or difficult soils, growers report greater plant health and *substantial* yield benefits by applying **SoySoap** early.



Leaf cross-section

Xylem (nutrients up to leaves)  
Phloem (carries sugars down to roots, seeds and fruit)

## SoySoap also helps clean your personal environment

We also make special **SoySoap** formulas for home cleansers and groundwater remediation, but here's a little secret: You can dilute our regular non-toxic biobased *farm* surfactant to clean vegetables and wash hands, dishes or clothes.

Some farmers keep a 1:64 dilution in a spray bottle in the shower as a body wash to cleanse herbicide or insecticide drift after field spraying.

Juicing enthusiasts cleanse veggies in a similar dilution: One ounce of **SoySoap** in a half-gallon of water.

You can also lace your pressure washer spray with **SoySoap** to power-clean anything from tractor engines to livestock facilities.

**SoySoap** helps "de-skunk" your



dog if it battles a skunk.

For years, a professional equine recovery specialist has used it to help cleanse horses' cuts and bathe their hair to a glossy shine.

For washing clothes, it's especially effective in high-efficiency front loading machines. Items like socks and towels store away with a fresh, clean, crisp aroma.

Washing windows calls for a very dilute mix: no more than a half-ounce in two gallons of water. It's a powerful concentrate: More is *not* better!

As you would for any product, always consult your regional distributor's retail label and MSDS for safe and effective use. So far, we haven't

heard of anyone with an allergic reaction to **SoySoap**'s ingredients, which are on the Food and Drug Administration's list of "Everything Added to Food in the United States."

We mention these common, practical uses of **SoySoap** to make a point that in agricultural and botanical use, **SoySoap** is a *non-toxic* surfactant which greatly reduces water's surface tension and 'chelates' (bonds with) compounds in water solution.

In a crop leaf, that means more nutrient mobility. In your bathroom or kitchen, that means your dishes, skin and hair can become "squeaky clean."





Normally you wouldn't spray a crop covered with heavy dew, but soybean rows on the right of this red line were sprayed to show how rapidly SoySoap is absorbed.

Soybeans on this side of the red line were sprayed with SoySoap at 6:45 a.m. on a cool, cloudy morning June 29, 2009. This photo was taken 20 minutes later. Most of the sprayed beans were already dry, while dew still remained on beans which hadn't been sprayed.



Crop leaves absorb SoySoap and tank-mixed materials in 10 to 20 minutes. The soybean field above in Iowa was sprayed during a heavy dew to show how fast the nano-colloids of SoySoap mixed with water are taken into leaves. SoySoap is "rain-safe" in just a few minutes. **The soybean leaf at left** was photographed a minute after spraying with a 1:256 dilution of SoySoap and water in a humid greenhouse. Note that even on a fuzzy soybean leaf, the solution disperses evenly on the leaf surface. Twelve minutes later (same leaf at right), most of the water/SoySoap solution has been absorbed directly through the leaf cuticle. The surfactant in SoySoap also softens the waxy outer cuticle which some leaves have.



## *Ways you can see and measure SoySoap benefits in your crops this season*

Corn and soybean yields summarized in this report are based on weigh-wagon or yield monitor data. Farmers also phoned and e-mailed us other revealing field observations which result from naturally healthier crops. We encourage you to watch for health indicators like this in 2010:

**Southern Iowa:** "Neighboring soybean fields had lots of white mold. I had almost none."

**Southeast Iowa:** "When I crossed into the soybean strip sprayed with **SoySoap**, the yield monitor always jumped about 5 bu. per acre. And the color of the treated stalks at harvest was a slightly darker brown."

**Virginia:** "My custom combine operator said treated beans were about 4 inches taller and yielded about 10 bu. more than the untreated beans. We had some dry weather stress last summer. I also sprayed **SoySoap** on vegetables and salad greens, which were bigger, with more taste."

**North Central Iowa:** "When I hit the SoySoap-treated part of the beanfield, my yield monitor jumped 4 bushels."

**Northeast Iowa:** "Treated carrots grew more than a foot long, and up to 3-in. diameter at the top. Yet they were crisp and sweet. And just one big potato from our garden was enough for both me and my wife at dinner."

### **SoySoap is *not* an insecticide, fungicide or any "-cide."**

No claims are implied as such. Benefits like those above are from *natural crop health*, not effects of a toxic chemical. For example, we often find 8% to 10% higher average concentrations of sugar in fruit, vegetables and immature seeds, such as corn kernels in milk stage. Brix readings in treated soybean and corn leaves were also higher on average, but by only 5% to 7%. (Healthy leaves quickly move sugars built by photosynthesis *out* of leaves, into roots or seed.)

## *Measure brix levels, dig up roots, watch for signals of crop health in 2010!*

**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 your record of each reading; these have major influence on photosynthesis.

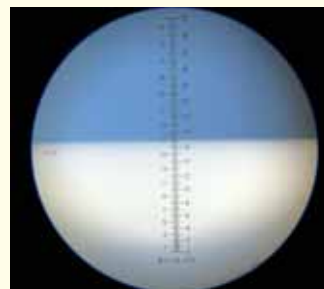
The goal is always to pump maximum photosynthate nutrients into the edible, saleable part of the plant — not just accumulate high sugars in corn or soybean leaves. If leaf sugars reach capacity during a sunny day, photosynthesis slows down. Thus the leaf must pump out its sugars to other parts of the plant quickly. SoySoap helps speed this translocation to seeds, fruit and roots.



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



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



Read brix level through the refractometer lens; record your data.



# Resistant weeds

*SoySoap's powerful "wetting" action helps speed herbicides into weed circulation systems.*

**Soybeans sprayed with glyphosate plus SoySoap: No resistant weed escapes**

**Soybeans sprayed with glyphosate alone: Many resistant pigweeds will go to seed**

Soybeans on both sides of this lane had the same weed pressure in spring 2009: Palmer Amaranth was a problem. Both sides were sprayed with a labeled rate of glyphosate when soybeans were about V3. But before spraying the field on the left, the spray operator added **SoySoap** to the tank mix. In the field on the right, resistant Palmer Amaranth (pigweed) grew above the canopy and made seed after surviving glyphosate alone. When the farmer told us about this side-by-side comparison, we photographed what happened here.

Farmers who mixed **SoySoap** surfactant with glyphosate in 2007 through 2009 tell us this blend did a visibly better job of controlling glyphosate-resistant weeds like: Palmer Amaranth, Pigweed, Milkweed, Lambsquarter, Marestalk, Sicklepod, Waterhemp, Morning Glory, Coffee Bean, Tropical Spiderwort, Carelessweed, Canadian Thistle, Teaweed, Velvetleaf, and Giant Ragweed.

**1 Helps herbicide and foliar fertilizer penetrate leaves** in water solution. When tank-mixed with herbicides, **SoySoap** "chelates" or bonds with the chemicals, increasing absorption into plant leaves.

**2 Spreads water and spray materials smoothly** in close contact with leaves for rapid absorption. Plant scientists tell us **SoySoap** softens the leaf's waxy cuticle, allowing spray solutions to directly enter the leaf palisade cells. By sharply reducing water's surface tension, **SoySoap** colloids move water and nutrients immediately into xylem and phloem tubules.

**3 Speeds translocation** of natural plant nutrients between leaves and roots, just as it helps overcome sluggish internal movement of glyphosate in resistant weeds. The plant solution is "wetter." When **SoySoap** is sprayed on beans at the V2 stage, the beans quickly translocate sugars and other nutrients to roots. The roots respond with vigorous growth. Farmers report this helps overcome temporary growth "drag" from glyphosate.



**SoySoap colloids**, about the size of water atoms, disperse surface dew and penetrate directly into the leaf, carrying tank-mixed chemicals into plant circulation system. This dew-covered soybean leaf was photographed just before spraying, then again a few seconds after spraying. A few minutes later, the water and SoySoap had been absorbed and the leaf was dry. This is an easy demonstration you can do with a spray bottle and a 1:256 mix of SoySoap and water.

## Reports from farmers on beating resistant weeds

We don't claim **SoySoap** is a 100% answer for controlling resistant weeds. It will take a diverse approach including cultivation, rotations and varied herbicides. But until farmers can develop those strategies, they tell us that 8 oz. per acre of **SoySoap** in a spray solution "heats up" effectiveness of herbicides. Here are some typical farmer observations from the 2009 season:

**Leo Perfect of Unadilla, GA:** "After I applied glyphosate with and without **SoySoap**, I could go right to the row and see where almost all kinds of Pigweed had dropped, compared with where I didn't put **SoySoap** in the spray mix."

"And in the past I've usually had to spray twice to kill volunteer peanuts in soybeans. The **SoySoap**-glyphosate mix killed all volunteer peanuts fast — on the first trip."

**Chuck Warner of Lebanon, KS** applied 16 oz. of generic glyphosate and 8 oz. of **SoySoap** per acre as a preplant burndown when weeds were about 5 in. high. He said: "We saw a 48-hour browning of grasses and Shattercane. My custom applicator could hardly believe how fast it worked."

**Tim Disher of Lewisville, NC** reported: "When we spiked glyphosate with 8 oz. of **SoySoap** per acre and sprayed early spring weeds in cool weather, we saw a quick kill, like we do on small weeds in warm summer weather. I've found that 17 oz. of glyphosate plus 8 oz. of **SoySoap** controls Sicklepod and glyphosate-resistant Lambsquarters."

**Jared Lane farms near Meigs, GA.** He says: "Normally I spray soybeans with Roundup three times. This year, I added 8 oz. per acre of **SoySoap** with Roundup for the first application, and didn't have to spray again. My soybeans were so green and vigorous they looked almost black. We have all kinds of Pigweed here, including the resistant ones. And we have tropical spiderwort — the label rate for that is five quarts. I burned it back with 22 oz. of Roundup with 8 oz. of **SoySoap** per acre."

**Brian McClarren farms near Delta, OH:** "I sprayed 32 oz. of glyphosate plus 8 oz. of **SoySoap** on 4-foot Marestalk; it was brown in four days."

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