ProfitProAG

More from Every Acre, Animal & Gallon of Manure

Biological Seed Coatings & Biocontrol System

Big Yields Start with Healthy Seedlings

The key to consistently **bigger yields and better grain** quality starts with healthy soils and plants. To achieve this, biodiversity must be established in the soils and plant foliage with balanced soil mineral nutrition and enhanced soil organic matter levels (bioactive carbon).

Grain yield, quality and seed stability is only derived from increased levels of minerals and carbohydrate structures within the plants. Starting the seeds correctly right from germination and forward is crucial to achieve the end result of high quality seed production. Beneficial organisms that work with the plant throughout all the growth stages deliver the required vital and essential nutrients to produce high quality grains. The application of all the minerals, including both major nutrients (9) as well as the trace elements (70), is also essential and cannot be overlooked. The beneficial biology not only surrounds the plants with required minerals, but also protects the plants from soil pathogens. The trace elements provide the necessary minerals for the plant to adjust its chemistry for the production of high quality plant metabolites (nutrient rich compounds) and allows the plant a defense mechanism that alters its internal chemistry for disease prevention from both the soil and air.

High yield and quality grains are only possible with the correct aerobic biology in the root systems and the right broad spectrum (80) minerals used throughout the growing season. There are no exceptions! Plants provided with less produce lower quality, unstable seeds/kernels, become highly diseased and are prone to increased insecticide and fungicide requirements that contain higher levels of poisons and mycotoxins.

Some of the tools and techniques used to achieve high yield and quality grains include crop rotation (corn, soybeans and a cereal crop in a three-year rotation), cover crops (used in corn/soybeans late summer application and following the cereal crop), **biological seed coatings** and natural organic ores for a base nutrient program with over 75 trace elements (soft rock phosphate, potassium sulfate and elemental sulfur).

For more information, call ProfitProAG at
507-373-2550 or go to
www.profitproag.com
to find a Service Rep in your area.

ProfitPro AG

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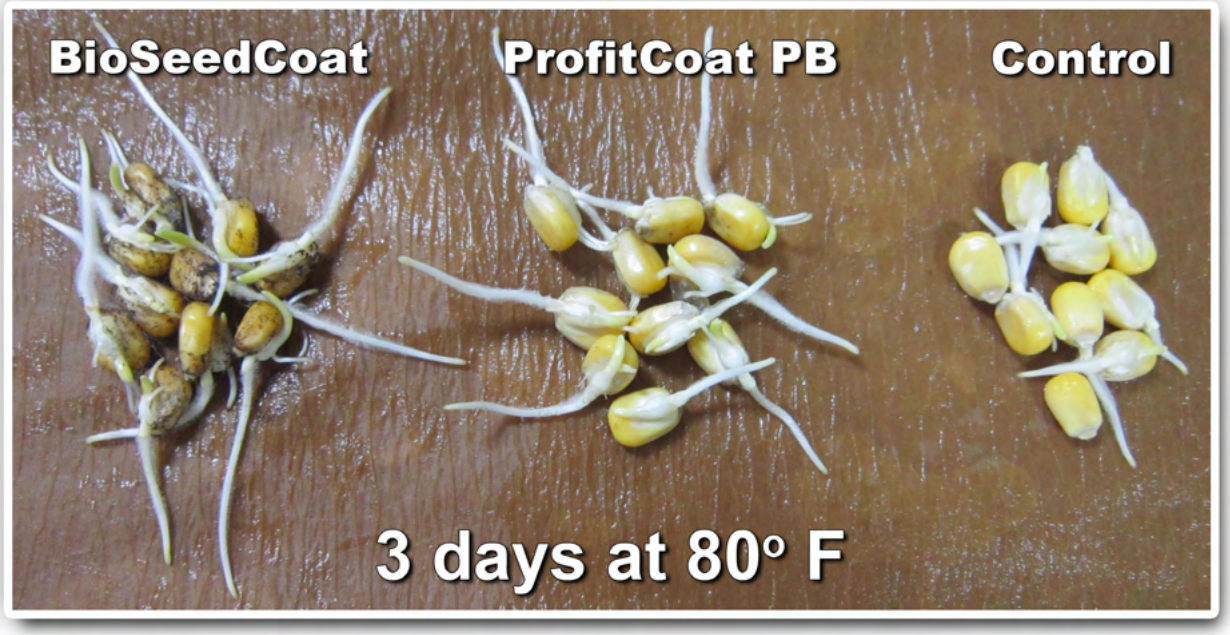
ProfitPro, LLC ◆ 408 S. 1st Ave. ◆ Albert Lea, MN 56007 ◆ 507-373-2550
◆ Email: info@ profitproag.com ◆ SC-5_11-18-21
www.profitproag.com ◆ manuremaster.com

Biological Seed Coating System



Enhanced Advantages & Benefits

- ✓ Germination & Vigor with On-Seed Delivery
- ✓ Microbial Colonization of Seedling Root
- ✓ Early Vigor
- ✓ Root Mass
- ✓ Plant Health
- ✓ Stem Diameter
- ✓ Standability
- ✓ Soil Biology
- ✓ Yield, Quality & Dry Down

"A seedling & season-long health enhancement seed coating system."

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ProfitCoat
Biological Seed Coating

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ProfitProAG's Biological Seed Coating & Biocontrol System

ProfitProAG's seed coatings contain a blend of microbes, including multiple strains of mycorrhizal fungi, Beauveria bassiana, trichoderma, pseudomonas, Azotobacter, Bacillus, Penicilium and streptomyces. In addition, a blend of minerals and nutrients feed the microbes and a biostimulant activates them. The seed coatings are available in liquid and dry and can be applied on-farm. The seed coating produces a more robust root system, larger stalk and an overall healthier plant.

Below is a brief synopsis and function of each microbe strain in ProfitCoat seed coatings.

Mycorrhizal fungi form on the root system of most plants. While most agronomic crops can support mycorrhizae, there are exceptions such as horseradish, which will not support a relationship. The fungi will form small hyphae (like tiny fingers) that are smaller than root hairs, but can extend further than root hairs to obtain moisture and nutrients, especially phosphorus for the plant. The Mycorrhizae also provide beneficial enzymes and proteins to the plant. The plant, in turn, provides the mycorrhizae with carbohydrates and sugars that the fungi use for energy. Mycorrhizal fungi is the main way that trees survive in a forest. While the fungi scavenge for nutrients and water, the tree supplies the mycorrhizae with carbon from sugar for energy. It contributes to the production of a larger and healthier root system.

Beauveria bassiana is an entomopathogenic fungus with an extensive host range of insect pests. Isolates of this fungus can colonize plants endophytically and is linked to its ability to control insect pests. Similar to mycorrhizal fungi, B. bassiana controls disease in plants caused by soil borne pathogens that cause significant economic damage and crop loss in seedlings. In general, plants that receive inoculation of B. Bassiana appear to be healthier than untreated plants. Through inoculation, B. Bassiana grows systemically through the plant is cited to be highly active against more than hundreds of insect pests and highly selective in its parasitisation. B. bassiana has proved effective in controlling troublesome crop pests such as aphids, beetles, mites, thrips, weevils, borers, psyllids, and whitefly – even chemical pesticide-resistant pests.

Beauveria bassiana is a plant symbiont that provides the plant with

- Grows throughout the plant
- Stimulation the immune system
- Physical blockage of pathogenic diseases
- Will help control cyst nematodes
- Beneficial plant biochemical interactions
- Uses pests as a dispersal mechanism
- Will help control insect pests
- Like mycorrhizae, naturally occurs in soil but has been killed off by tillage and pesticides

Trichoderma fungi work as an antagonist, meaning that they infect and attack predator pathogens that are harmful to the plant. In China, they use Trichoderma to control damping off and seedling blight in rice, and they discovered it was just as effective as a regular fungicide without harming the soil biology. In addition, they found that the survival rate of the rice was 80 percent higher than the area treated with a fungicide. Trichoderma will colonize the root and protect it from pathogens. It works similar to Mycorrhizae in that it finds nutrients and moisture and supplies the plant with enzymes and proteins while the plant supplies the Trichoderma with carbon from sugar. It contributes to producing a larger and healthier root system.

Pseudomonas (according to David Weller of the USDA and Washington State University who wrote a paper on Psuedomonas in agriculture and why they work so well as a biocontrol agent of soilborne pathogens).

1. They are well adapted and can handle many different environments and stresses including tight soils without air.
2. They grow rapidly, proliferate and utilize seed and root exudates (aka carbon in the form of sugar).
3. They colonize and multiply in the rhizosphere and the interior of the plant.
4. They produce bioactive metabolites including antibiotics and growth promoting chemicals.
5. They compete aggressively with other pathogens and protect the plant from infection.

In summation, they are similar to Trichoderma in that they attack and prevent infection of pathogens. However, they are a bacteria vs. Trichoderma, which are fungi.

Azotobacter are free-living, nitrogen- fixing bacteria in the soil. Azotobacter harvest nitrogen from the atmosphere (nitrogen fixation) and fix it into plant-usable ammonium ions. The plant and the Azotobacter work symbiotically together. The plant supplies the Azotobacter with sugars and ATP (adenosine triphosphate or the energy that the plant produces) while the Azotobacter supplies the plant with N. Without ATP, nitrogen fixation cannot take place. Azotobacter have several enzymes that allow it to fix nitrogen, but the main one is nitrogenase.
The main nitrogenase enzyme is molybdenum-iron nitrogenase, which demonstrates the importance of molybdenum for nitrogen efficiency due to its presence in the moly-iron nitrogenase enzyme. Similar to Pseudomonas, Azotobacter can tolerate extreme conditions as well as low oxygen conditions.

Bacillus bacteria species is also included in the seed coating. Bacillus is used as a biocontrol agent and can be purchased by itself, for that purpose, in gardening magazines. They produce antibiotics that compete with pathogens by either killing or inhibiting their growth. They colonize the root, compete with other pathogens and even prevent them from attaching to the root system. It is interdependent with the plant and feeds off the plant's exudates and deprives the pathogens of a food source. It will also trigger SAR (systemic acquired resistance), which activates the plant's defense mechanism to kick in and help fend off the pathogen.

Penicillium species are fungi that give off enzymes and organic acids to solubilize tied up soil phosphorus. Many times phosphorus is tied up and bound to calcium and magnesium in high pH soils and by iron and aluminum in low pH soils. It has a mutually beneficial relationship with the plant and provides it with the phosphorus so that it doesn't tie back up again. This is very important because once it's solubilized, it needs to be absorbed immediately or it will bind to Ca and Mg. Penicillium species also increase plant and root growth by providing phosphorus to the plant. Studies have shown an increase in grain yield by up to seven percent.

Streptomyces species is bacteria that promotes growth and acts as a biocontrol of pathogens. Like the other microbes in the coating, it takes up residence in the plant's rhizosphere and works symbiotically in supplying the plant with protection and promoting growth while the plant supplies it with sugars as its food source. Streptomyces species are a form of actinomyces and produce the earthy smell of soil.

What else does the seed coating have?

Other nutrients are also needed to supply the microbes to fully function and thrive. The seed coating also includes a biological solubilizer and stimulant. The solubilizer breaks down the nutrients into a soluble form so that the microbes can use them and the stimulant activates the microbes and boosts them up!

More from Every Acre, Animal & Gallon of Manure

ProfitCoat™ PB

Organic Seed Nutrient and Biological Inoculant

GENERAL INFORMATION:

ProfitCoat PB is a dry organic seed coating that promotes uniform emergence, increased seedling vigor, enhanced root health and standability throughout the growing season. It contains beneficial microorganisms that will colonize the germinating seedling root and boost the biology in the rhizosphere. The consortium of beneficial bacteria and fungi fix nitrogen, improve availability and solubility of plant nutrients in addition to enhancing the plant's health. The coating contains a seed lubricant and up to 75 trace elements to support the microbes and seedlings during initial stages of growth. **ProfitCoat PB** is recommended for use on all plant seeds. **ProfitCoat PB** is a **"seedling and season-long plant health enhancement system."**

INGREDIENTS:

Contains beneficial plant microbes (including mycorrhizae), micronized natural organic ores, plant nutrient solubilizer, a microbial stimulant and seed lubricant.

On-seed delivery system to enhance plant health.
ProfitCoat PB contains
NO Genetically Modified Organisms (GMOs).

APPLICATION RATES:

Apply the following dry ounces of **ProfitCoat PB** per 50 lbs of seed:

- Corn at 2.0 oz (80 K unit)
- Soybeans at 1.0 oz
- Small Grain at 1.0 oz
- Grasses at 2.0 oz
- Alfalfa/Legumes at 2.0 oz
- Cover/other crops at 2.0 oz

KEEP OUT OF REACH OF CHILDREN AND ANIMALS

Soybean Inoculant: Organic Soybean Inoculant (OSI) can be applied in combination with **ProfitCoat PB** at 0.5 oz per 50 lb unit of seed.
Scoop included and holds approximately 1.0 oz. Two scoops (2.0 oz) treats 80,000 (80 K) kernel bags of seed corn.

DIRECTIONS FOR USE:

Preplant application: Seed can be pretreated up to six months prior to planting. **Mix until uniform seed coverage is obtained.**

Planter box application: Measure appropriate amount of **ProfitCoat PB** and sprinkle onto seed in the planter box. It is best to treat in one bag (80 K seeds) increments to insure uniform distribution of **ProfitCoat PB** on the seed. Mix until uniform seed coverage is obtained.

Bulk applications: Apply manually or mechanically by dispersing **ProfitCoat PB** into a flowing stream of seed. Ensure that **ProfitCoat PB** is evenly dispersed in the planter.

Compatibility: ProfitCoat PB is compatible with many common seed fungicides and insecticides.

CAUTION: ProfitCoat PB may be used either on untreated seed, or seed that has been treated with a fungicide or insecticide. Wear appropriate protective gear, avoid skin contact or breathing of dust and follow the caution statements of the other treatments if the seed has been pretreated. Individuals allergic to molds and/or fungi should take precautions to avoid contact with the eyes or skin. To minimize risk of allergic exposure, individuals should wear standard protective clothing and equipment including gloves, safety glasses and a NIKOS approved respirator. In case of allergic contact with eyes or skin, immediately flush the exposed area with water. Seek medical attention if irritation develops or persists.

STORAGE AND HANDLING:

Keep product dry. Store out of direct sunlight. Store below 90° F.

Made in the U.S.A.

ProfitCoat PB is made with organic compliant materials and can be approved by organic certifying agencies for USDA-NOP programs. As with any organic crop input, growers must contact their organic certifier and get pre-approval of any seed coating additive to be used in their organic cropping system. Because of differences among the various certifying agencies and differences between NOP/EU/JAS/COR ingredient lists, we cannot guarantee that our products will be allowed by your certifier on your farm.

ProfitPro, LLC ◆ 408 S. 1st Ave. ◆ Albert Lea, MN 56007 ◆ 507-373-2550 ◆ Email: info@ profitproag.com ◆ TS-3_11-18-21
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More from Every Acre, Animal & Gallon of Manure

ProfitCoat™ PB + OSI

Organic Seed Nutrient and Biological Inoculant

GENERAL INFORMATION:

ProfitCoat PB + OSI is a dry organic seed coating that promotes uniform emergence, increased seedling vigor, enhanced root health and standability throughout the growing season. It contains beneficial microorganisms that will colonize the germinating seedling root and boost the biology in the rhizosphere. The consortium of beneficial bacteria and fungi fix nitrogen, improve availability and solubility of plant nutrients in addition to enhancing the plant's health. Also present in the coating are up to 75 trace elements to support the microbes and seedlings during initial stages of growth. **OSI** stands for **Organic Soybean Inoculant** that contains a proprietary blend of three strains of yield-enhancing Bradyrhizobia bacteria. **ProfitCoat PB + OSI** is a **"seedling and season-long plant health enhancement system."**

INGREDIENTS:

Contains beneficial plant microbes (including mycorrhizae), micronized natural organic ores, plant nutrient solubilizer, a microbial stimulant, seed lubricant, natural graphite, silica (crystalline quartz), micronized powder cellulose and rhizobia bacteria.

On-seed delivery system to enhance plant health.
ProfitCoat PB + OSI contains
NO Genetically Modified Organisms (GMOs).

KEEP OUT OF REACH OF CHILDREN AND ANIMALS

APPLICATION RATES:

Apply one (1) ounce of **ProfitCoat PB + OSI** per 50 lb unit of soybean seed.
Scoop included and holds approximately 1.0 oz.

DIRECTIONS FOR USE:

Preplant application: Seed can be pretreated up to six months prior to planting. Mix until uniform seed coverage is obtained.

Planter box application: Measure appropriate amount of **ProfitCoat PB + OSI** and sprinkle onto seed in the planter box. It is best to treat in one bag increments to insure uniform distribution of **ProfitCoat PB + OSI** on the seed. Mix until uniform seed coverage is obtained.

Bulk applications: Apply manually or mechanically by dispersing **ProfitCoat PB + OSI** into a flowing stream of seed. Ensure that ProfitCoat PB + OSI is evenly dispersed in the planter.

Compatibility: ProfitCoat PB + OSI is compatible with many common seed fungicides and insecticides.

CAUTION: ProfitCoat PB + OSI may be used either on untreated seed, or seed that has been treated with a fungicide or insecticide. Wear appropriate protective gear, avoid skin contact or breathing of dust and follow the caution statements of the other treatments if the seed has been pretreated. Individuals allergic to molds and/or fungi should take precautions to avoid contact with the eyes or skin. To minimize risk of allergic exposure, individuals should wear standard protective clothing and equipment including gloves, safety glasses and a NIKOS approved respirator. In case of allergic contact with eyes or skin, immediately flush the exposed area with water. Seek medical attention if irritation develops or persists.

STORAGE AND HANDLING:

Keep product dry. Store out of direct sunlight.
Store below 90° F.

Made in the U.S.A.

ProfitCoat PB + OSI is made with organic compliant materials and can be approved by organic certifying agencies for USDA-NOP programs. As with any organic crop input, growers must contact their organic certifier and get pre-approval of any seed coating additive to be used in their organic cropping system. Because of differences among the various certifying agencies and differences between NOP/EU/JAS/COR ingredient lists, we cannot guarantee that our products will be allowed by your certifier on your farm.

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More from Every Acre, Animal & Gallon of Manure

ProfitCoat™ PB and ProfitCoat™ PB + OSI Dry Powder Applicator

ProfitCoat PB is a dry biological and nutritional seed coating system. ProfitCoat PB + OSI (Organic Soybean Inoculant) contains an additional proprietary blend of three strains of yield-enhancing Bradyrhizobia bacteria. ProfitCoat PB and ProfitCoat PB + OSI are a ***"seedling and season-long plant health enhancement system."***

Dry powder seed coating applicator advantages include:

- Accurate and convenient on-farm preplant or at-plant application
- Above an auger, conveyor or a seed tender

The ChangingTimes Stainless Steel model dry powder applicator offers the following features:

- 12-volt, hands-free system
- Stainless steel cone
- Easy to calibrate
- Waterproof variable seed controller
- Can be used with any seed delivery system

Dennis Klockenga
ProfitProAG Consultant
– all states
Ph: 320-333-1608
dklockenga@profitproag.com

Chris Chodur
ProfitProAG Consultant
– Northern IA/MN
Ph: 507-402-4195
cchodur@profitproag.com

Remote Control

Portable Auger Stand

If you are interested in a dry powder seed coating applicator for applying ProfitCoat PB or ProfitCoat PB + OSI, please contact a ProfitProAG Sales Rep (see below).

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More from Every Acre, Animal & Gallon of Manure

2007 Independent
ProfitCoat™ Seed Coating Study*
(3 locations, 3 hybrids and 3 replications/locations)

Hybrid	Treatment	Yield (bu/A)	Population
7292	Untreated Check	148.0	31,840
7292	ProfitCoat	155.5 (+7.5)	34,240 (+2,400)
5740	Untreated Check	172.9	33,120
5740	ProfitCoat	181.8 (+8.9)	34,453 (+1,333)
5305	Untreated Check	163.9	34,187
5305	ProfitCoat	170.7 (+6.8)	34,827 (+640)

*Independent study conducted by Albert Lea Seed House, Albert Lea, MN

2011 ProfitCoat™ + NB
Seed Coating Field Results on Grain Corn
Byron Seeds, LLC, Rockville, IN

Variety	Treatment	Yield (bu/A)	Advantage (bu/A)
Master Choice 590	Control	175.07	
	ProfitCoat + NB	232.90	+57.83 bu/A
Master Choice 573	Control	201.54	
	ProfitCoat + NB	219.90	+18.36 bu/A
Master Choice 534	Control	189.01	
	ProfitCoat + NB	238.96	+49.95 bu/A
Master Choice 615	Control	167.53	
	ProfitCoat + NB	165.63	-1.9 bu/A Less

31.06 bu/A average **Advantage** across 4 corn varieties

Return on Investment = $175.46/A
(31.06 bu/A advantage x $6.00/bu corn = $186.36/A - $10.90/A for ProfitCoat + NB = $175.46/A)

Note: NB is a Nitrifying Bacteria that can be coated on the seed to enhance nitrogen synthesis for the crops use.

2008 ProfitCoat™ Seed Coating
Research Field Results

Corn

Location	Study No.	Yield Advantages (bu/A)	Cost/A	ROI/A
Brechon Farm Services, Dixon, IL Independent Study	ProfitCoat + NB Ind-08-100C	+15.0	$10.90	$49.10
Midstate Agronomy, Iroquois, SD Independent Study	ProfitCoat + NB Ind-08-101C	+7.0	$10.90	$17.10
ProfitPro Research Farm, Hollandale, MN	ProfitCoat + NB 08-03C	+8.2	$10.90	$21.90
Hernke, Inc, Cannon Falls, MN Independent Study	ProfitCoat Ind-08-102C	+9.0	$8.40	$27.60

- ProfitCoat = $8.40
- ProfitCoat + NB = $10.90/A
- Corn = $4.00/bu

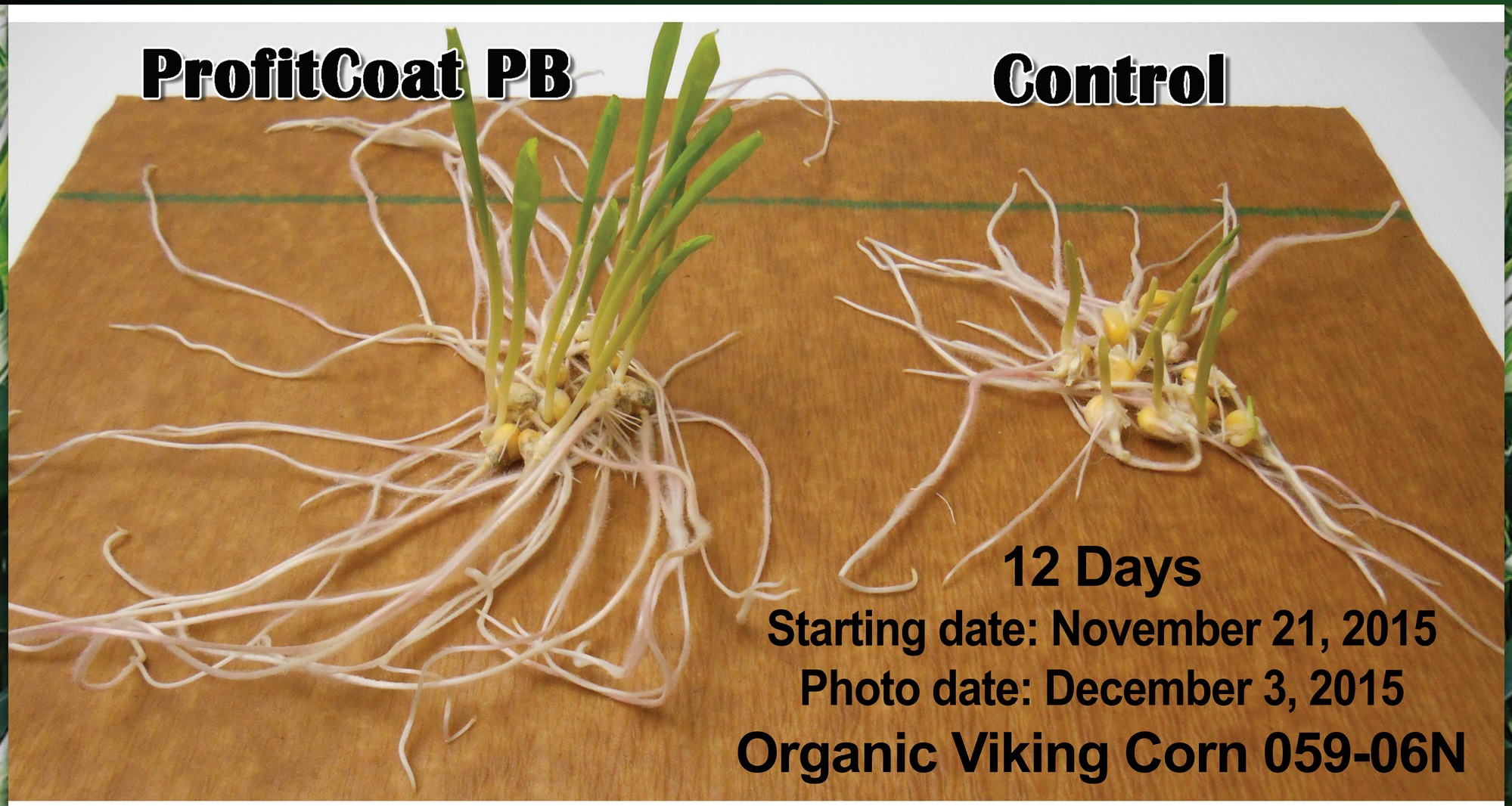
Soybeans

Welters Seed Co., Onslow, IA Independent Study	ProfitCoat + NB Ind-08-60S	+4.1	$10.00	$22.80
Midstate Agronomy, Iroquois, SD Independent Study	ProfitCoat + NB Ind-08-61S	+3.5	$10.00	$18.00
Seinholtz (Hollandale, MN)	ProfitCoat + NB + Excalibre 08-01S	+7.8	$12.50	$53.80
ProfitPro Research Farm, Hollandale, MN	ProfitCoat + NB + Excalibre 08-03S	+7.6	$12.50	$52.10
ProfitPro Research Farm, Hollandale, MN	ProfitCoat + NB + Excalibre 08-05S	+7.3	$12.50	$49.55

- ProfitCoat + NB = $10.00/A
- ProfitCoat + NB+ Excalibre (soybean inoculant) = $12.50/A
- Soybeans = $8.00/bu

Biological Seed Coating System

"A seedling and season-long plant health enhancement system."



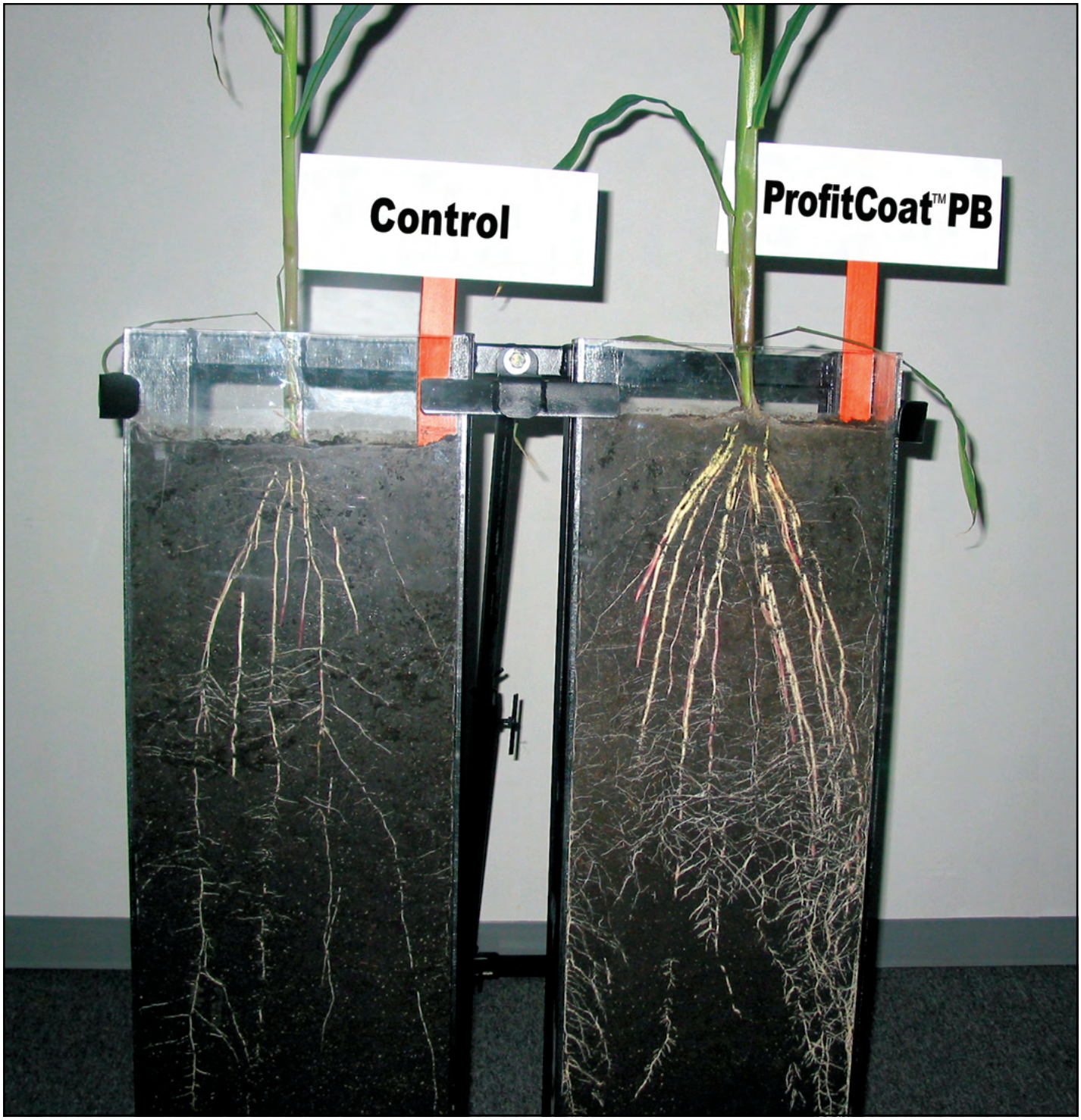
ProfitCoat PB increased top growth 37% and root growth 42% at 12 days!

ProfitPro® AG

Made in the U.S.A.

ProfitCoat™ PB

Organic Seed Nutrient and Biological Inoculant



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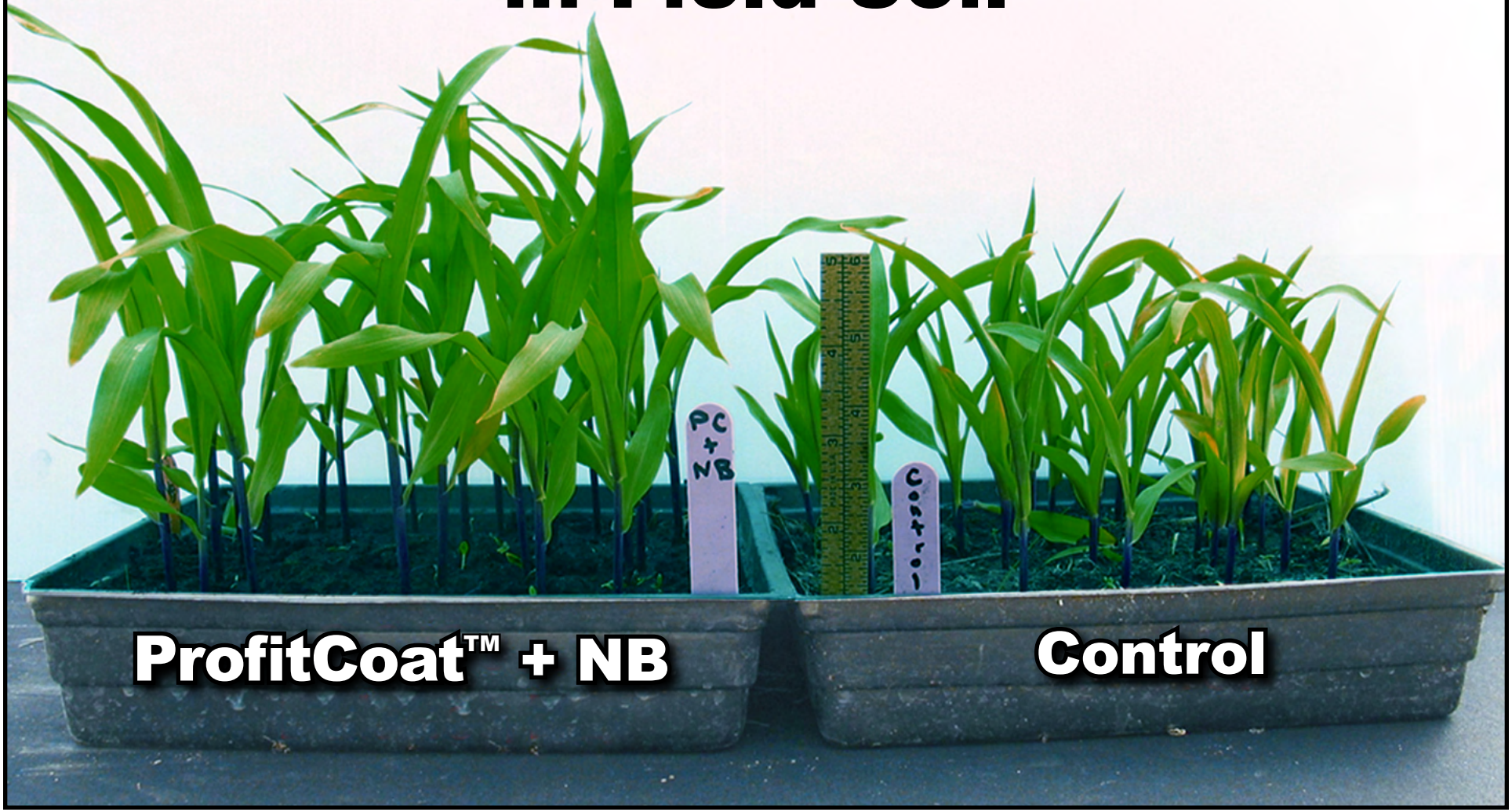
Early Vigor

Corn with ProfitCoat™ + NB in Field Soil



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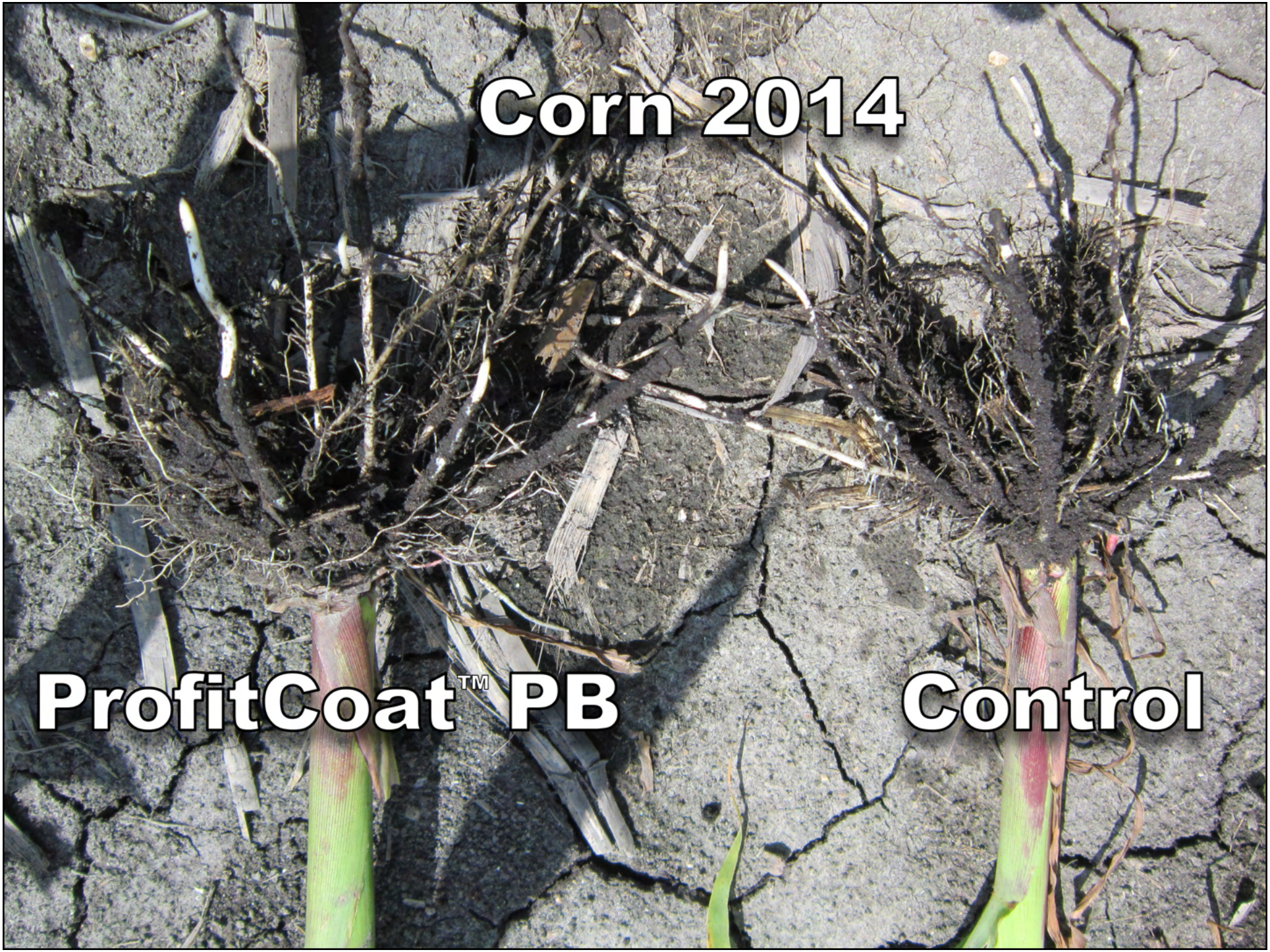
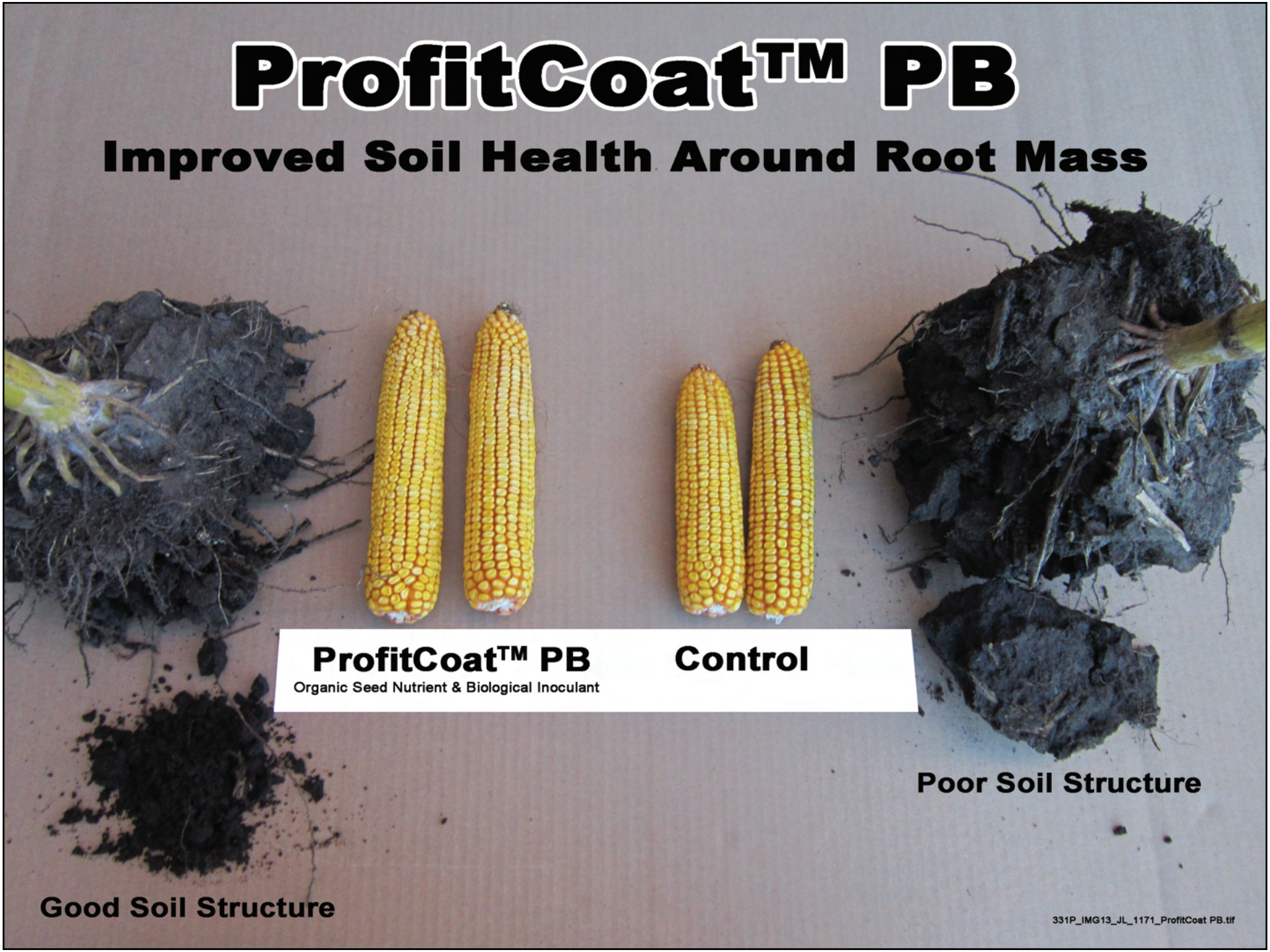
ProfitCoat™ PB
Control


Corn 2014
ProfitCoat™ PB
Control


ProfitCoat™ PB
Improved Soil Health Around Root Mass
ProfitCoat™ PB
Organic Seed Nutrient & Biological Inoculant
Control
Poor Soil Structure
Good Soil Structure
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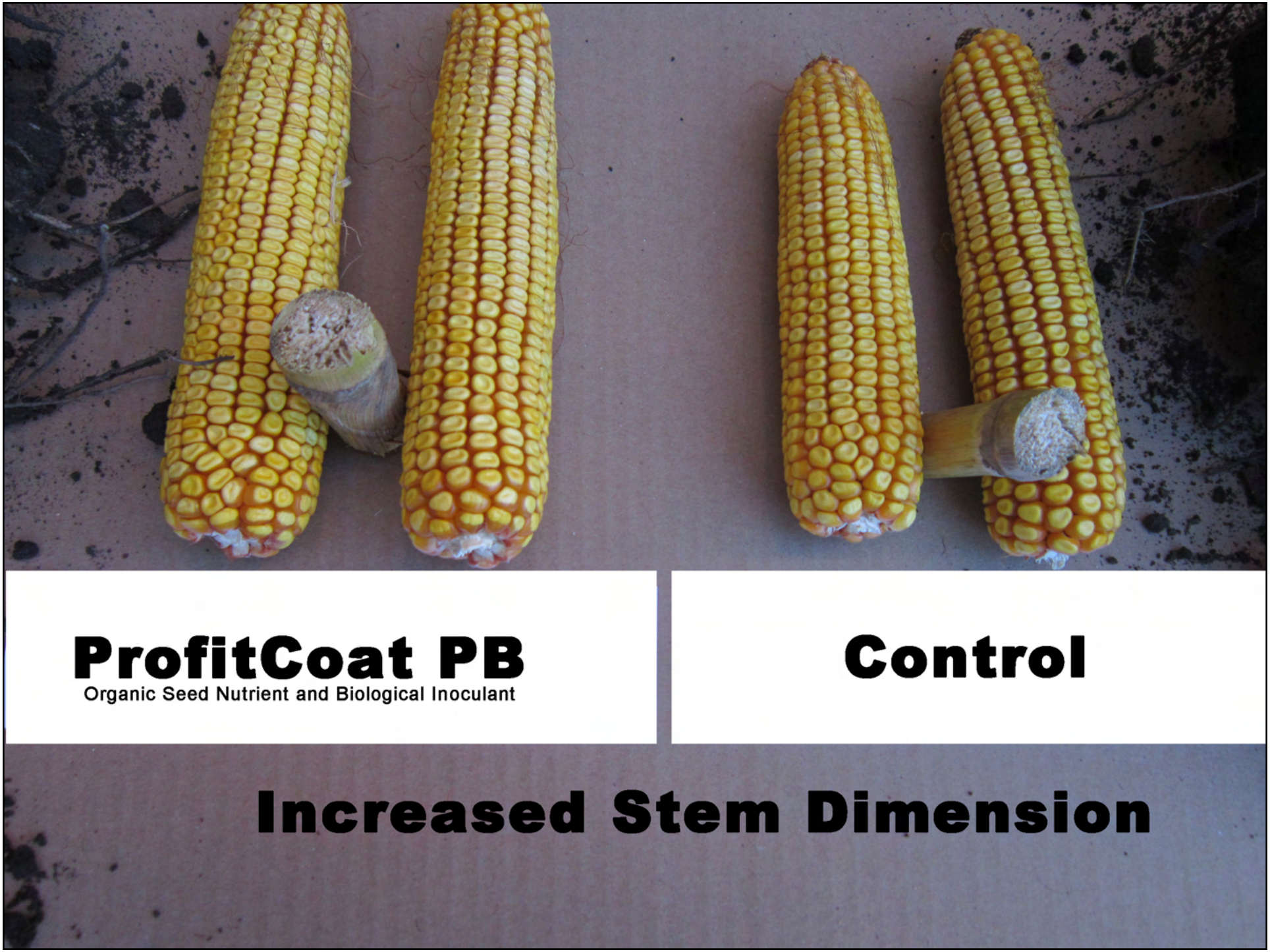
ProfitCoat PB
Organic Seed Nutrient and Biological Inoculant
Control
Increased Stem Dimension


ProfitCoat™ + NB
Seed Coating
Control
(No ProfitCoat™)

SC-30F_ProfitCoat

Plant Health

ProfitCoat™ promotes in-season stay green, stress mitigation and reduction of foliar diseases.

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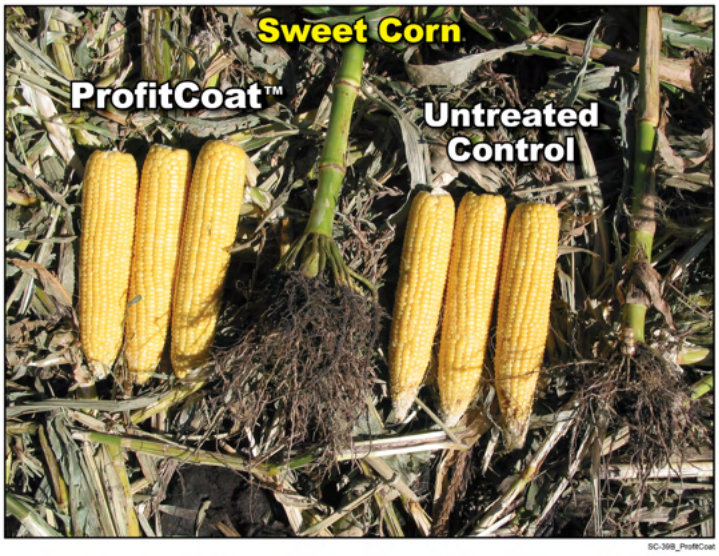
Impact of Biological Seed Coating on SWEET CORN

ProfitCoat™

Organic Seed Nutrient and Biological Inoculant

SC-39D_ProfitCoat



SC-39B_ProfitCoat

SC-39E_ProfitCoat

SC-39C_ProfitCoat

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ProfitCoat™ Trials

Planted 6-6-19
J. Olson
Cottonwood, MN

ProfitCoat
Biological Seed Coating

Plot 1	Moisture	T.W.	Pounds	Length	Row Width	Rows	Yield
95 day no seed treatment	24	49	1,580	465	22	8	161.13
95 day treated with ProfitCoat	24.5	48.6	1,660	465	22	8	168.17
					ProfitCoat Advantage		7.04

Plot 2	Moisture	T.W.	Pounds	Length	Row Width	Rows	Yield
95 day no seed treatment	24	49	3,431	945	22	8	172.17
95 day treated with ProfitCoat	24.5	48.6	3,524	945	22	8	175.67
					ProfitCoat Advantage		3.5

ProfitCoat Average Advantage: 5.27

Control (2019) **ProfitCoat** (Organic)

Plot 1

Control (2019) **ProfitCoat** (Organic)

Plot 2

ProfitPro AG

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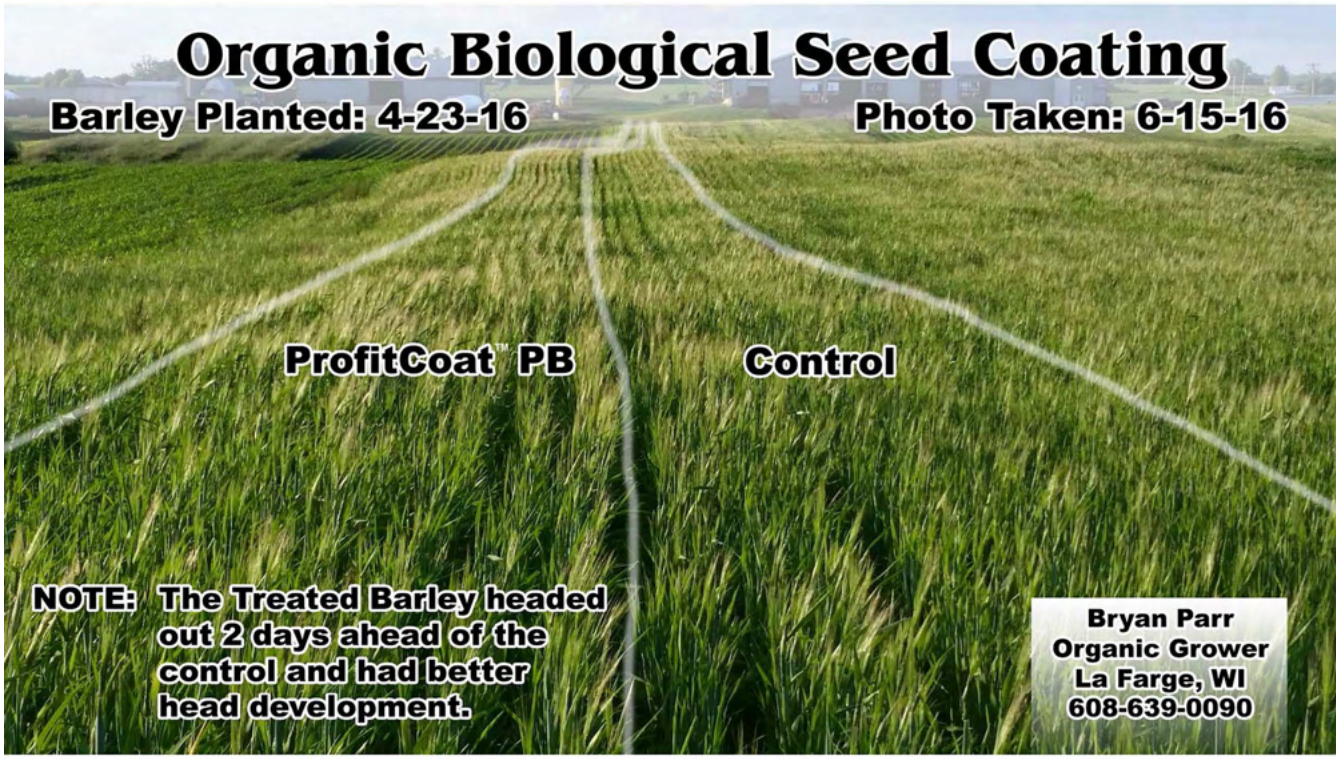

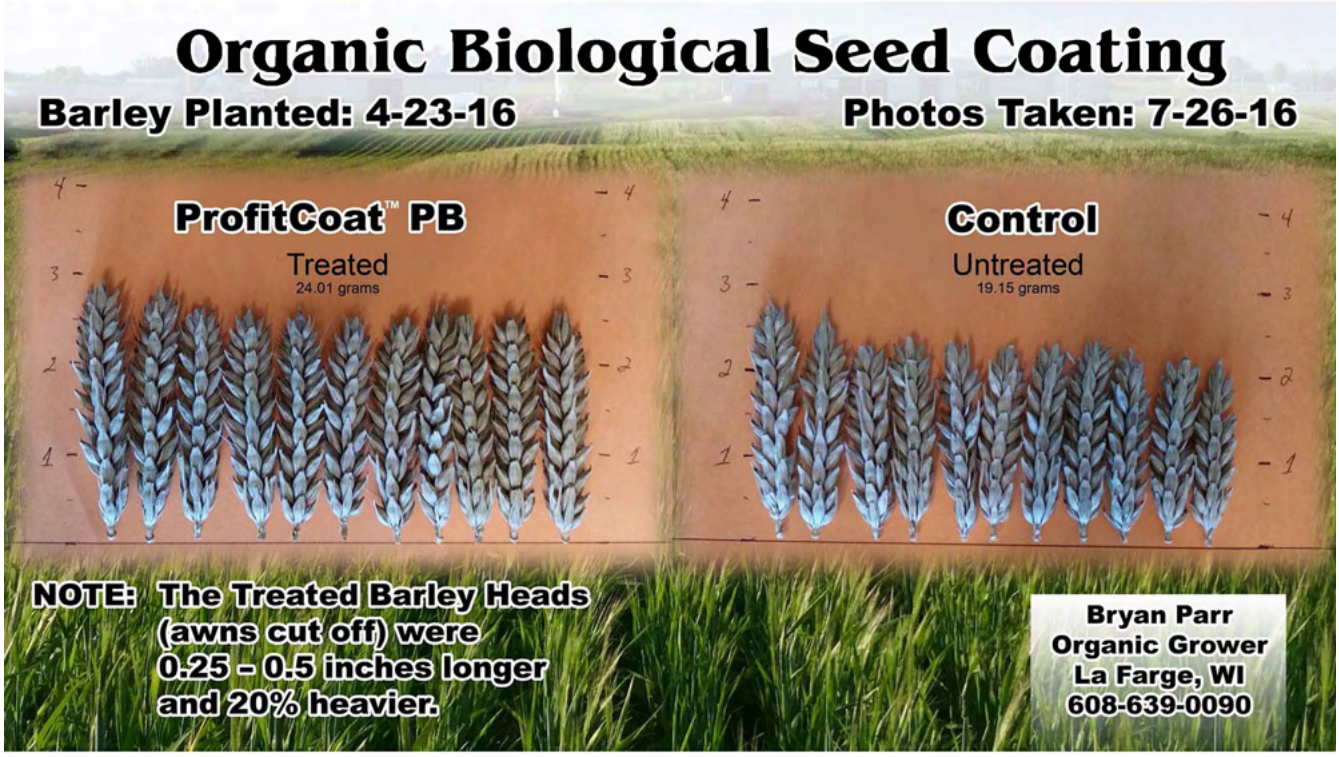

ProfitCoat
Biological Seed Coating

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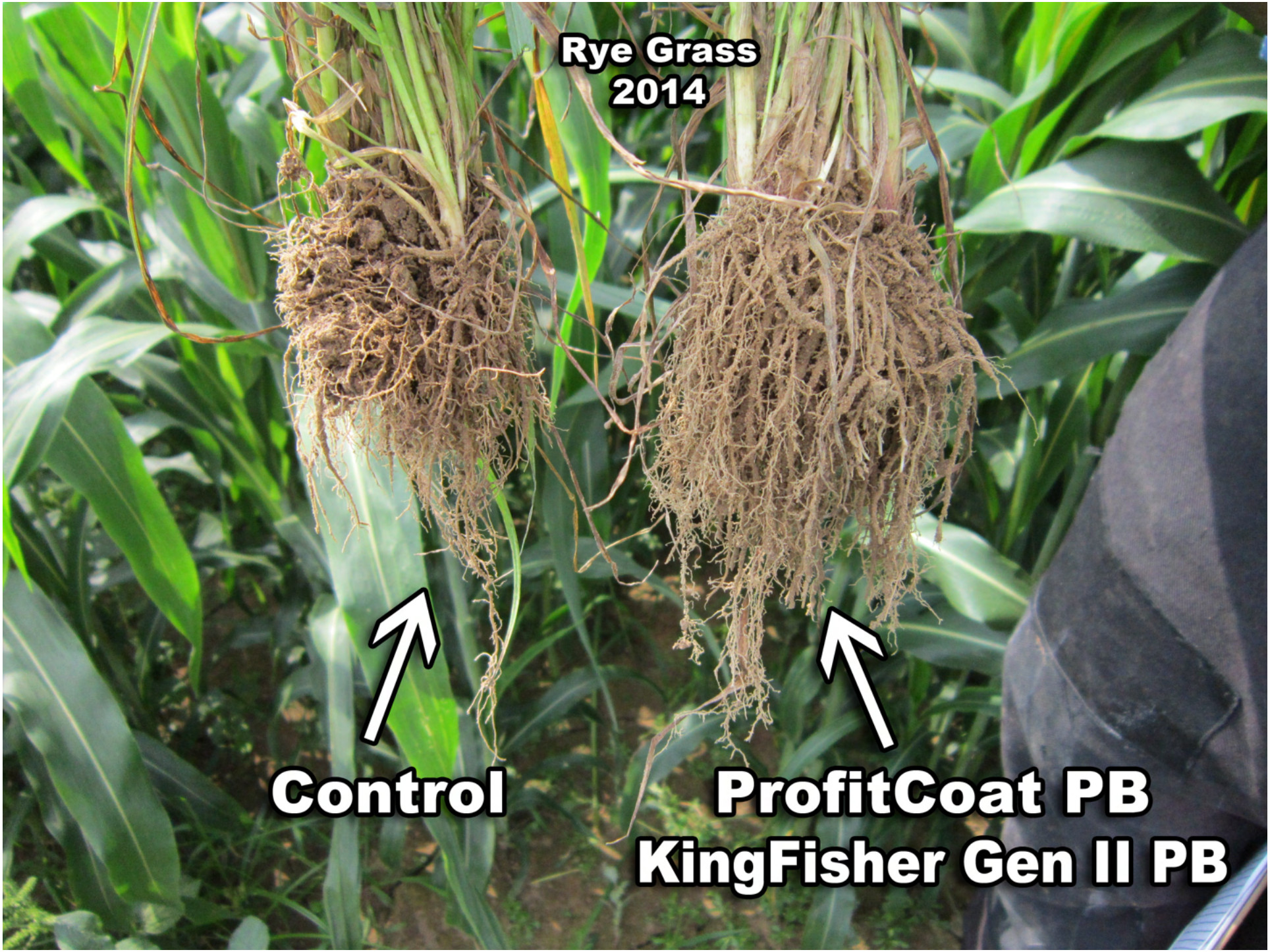

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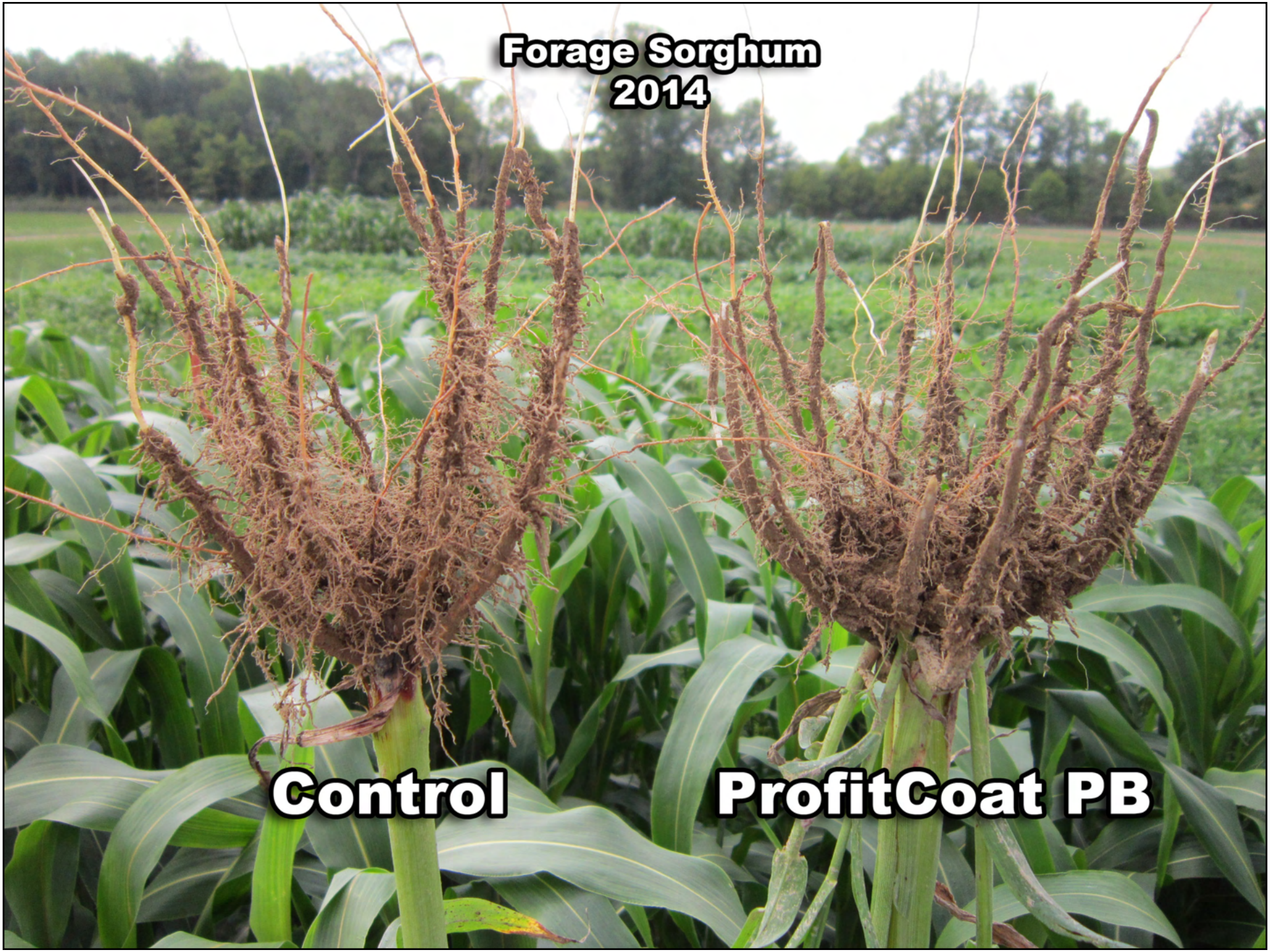
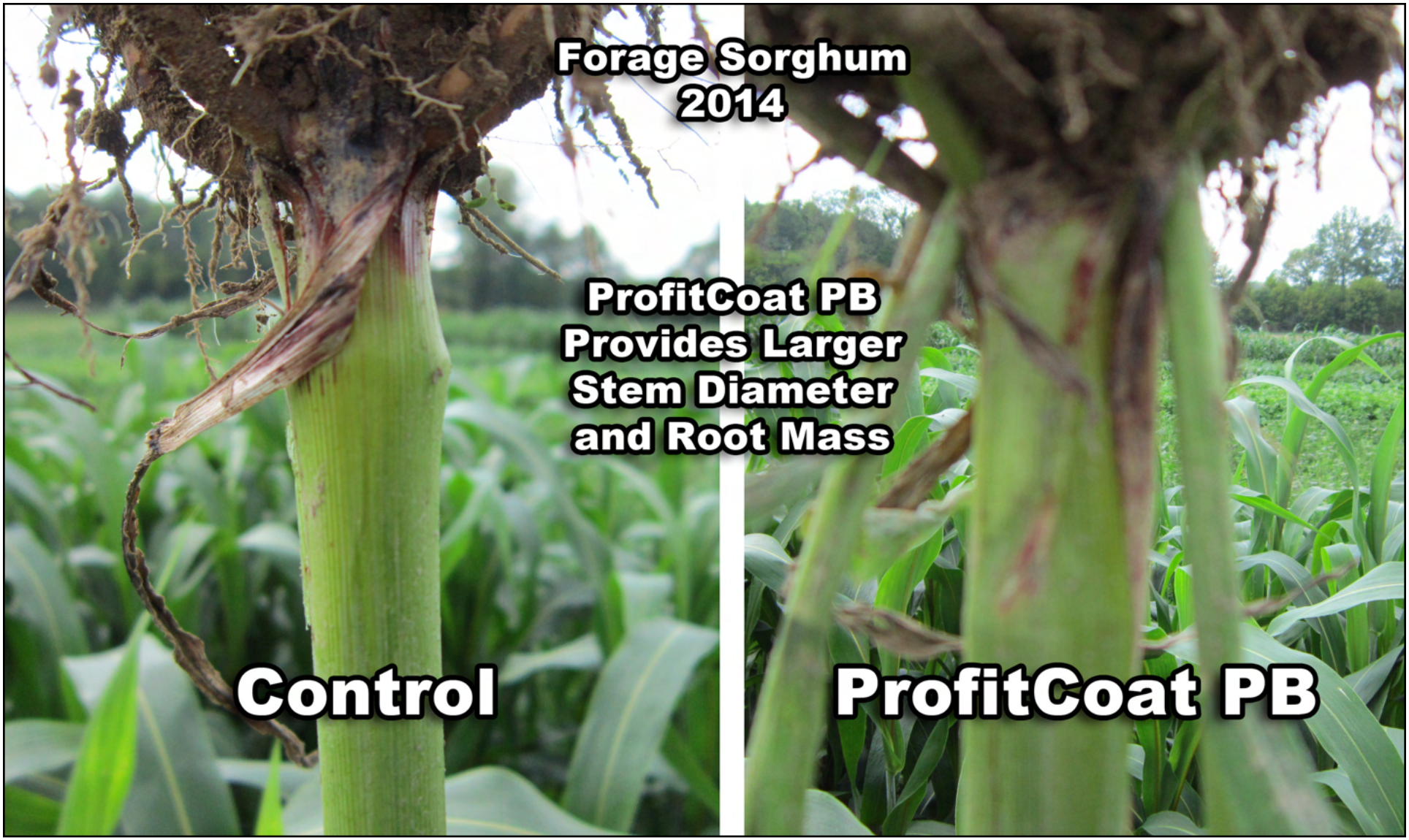
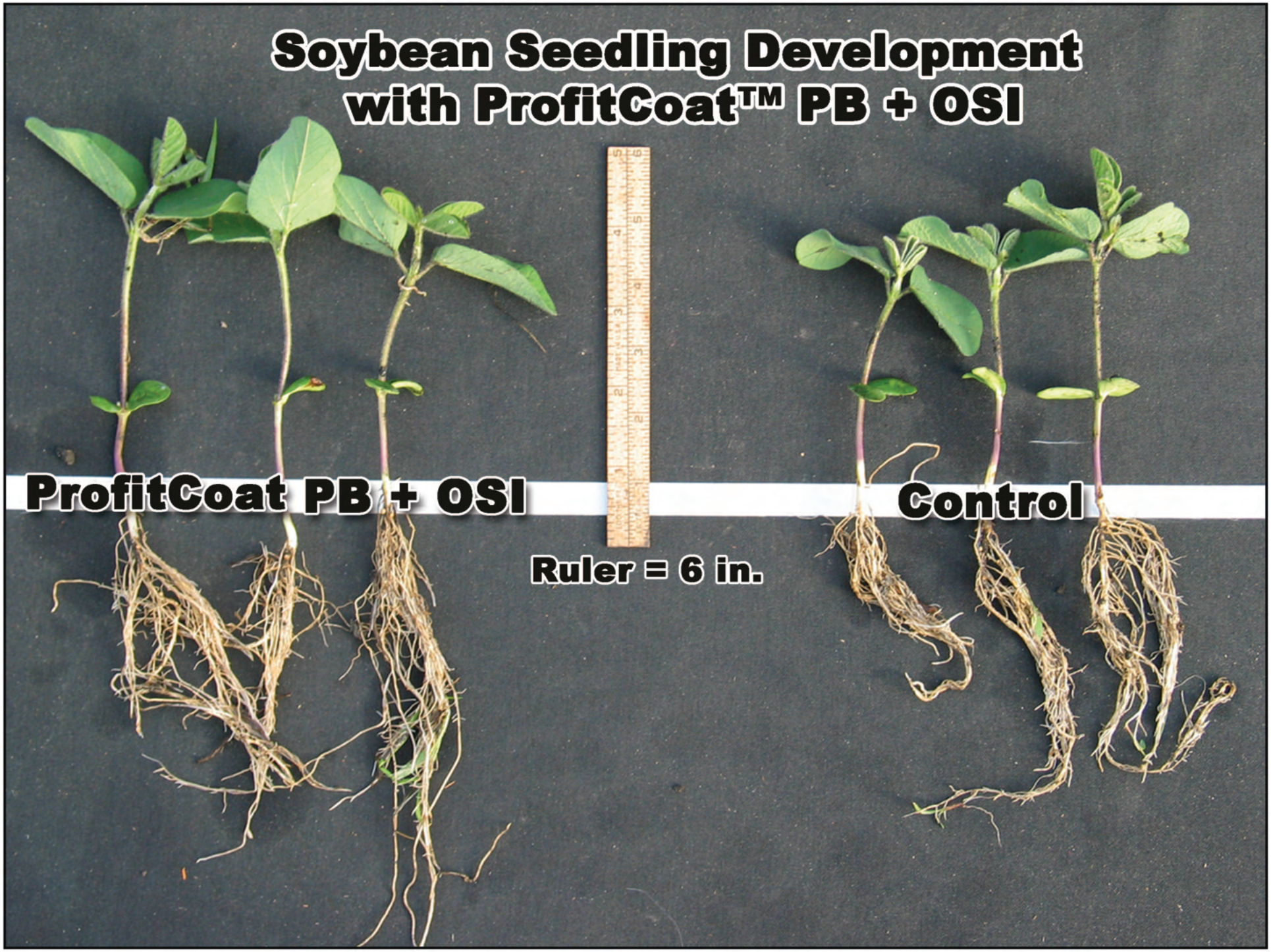

Forage Sorghum
2014
Control
ProfitCoat PB


Forage Sorghum
2014
ProfitCoat PB
Provides Larger
Stem Diameter
and Root Mass
Control
ProfitCoat PB


Soybean Seedling Development
with ProfitCoat™ PB + OSI
ProfitCoat PB + OSI
Control
Ruler = 6 in.

SC-23_8-30-16

SC-30_ProfitCoat