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# **LOCALLY GROWN INITIATIVE: FARM FRESH RI PROGRAM EXPANSIONS**

## ***PROJECT SUMMARY***

This project ran September 2008 to August 2009 and entailed:

1. Expansion of the Wintertime Farmers' Market in Pawtucket
2. Creation of a Market Mobile farm-to-business distribution system (January 2009 to August 2009)
3. Launch of a RI Royal Potato cooperative and brand (September 2008 to August 2009)

### **Expansion of the Wintertime Farmers' Market in Pawtucket**

The Wintertime Farmers Market began in Providence in 2007 as the only weekly off-season market in Southern New England. Twelve vendors and a few hundred customers participated each week. Due to the market's success, a larger space with accommodations for more farmers and customers was necessary. The new space at Hope Artiste Village in Pawtucket allowed for the expansion of the market to include over 30 vendors and 1,000-2,000 customers each week. This project period was December 2008 to May 2009.

### **Creation of a Market Mobile Farm-To-Business Distribution System**

Market Mobile is a pooled farm-to-business delivery system that is driven by the needs of farmers and buyers. Each week farmers post pricelists online. Then chefs, grocers and schools order. Farmers receive the order and drop off at a central warehouse where food is then pooled onto a shared truck for delivery to customers. Farmers get paid a single check and customers receive a single invoice. For the first six months, over 30 farmers and 45 customers participated. This project period was January 2009 to August 2009.

### **Launch of a RI Royal Potato Cooperative and Brand**

Rhode Island potato farmers needed a way to promote their potatoes to sell out sooner and avoid quality concerns and additional costs incurred with long-term storage. So the RI Royal Potato Cooperative was launched with good media coverage and new visual branding at grocery stores. The new marketing allowed growers to sell out by January, weeks earlier than the previous year. This project period was September 2008 to August 2009.

## ***PROJECT APPROACH***

### **Expansion of the Wintertime Farmers' Market in Pawtucket**

Due to the success of the first season, it was necessary for Farm Fresh Rhode Island to seek out a larger space for the second season. Many of the first year's farmers and food producers were committed to continuing the second season, and many more vendors had taken interest in participating as well. After touring over 20 spaces around Providence,

Farm Fresh Rhode Island decided to place the Wintertime Farmers' Market at Hope Artiste Village, a renovated mill building in Pawtucket, RI.

Wintertime Farmers' Market moved to its new location just over the Providence line in Pawtucket, with more space for vendors and more accessible parking. Promotion of the market among farmers began in January 2008, as they began crop planning. New farmers committed early to participating; some having created or improved greenhouse facilities to grow in the winter. Additional vegetable growers also joined the market. The new location met most of the criteria necessary to make the market a success. The space at Hope Artiste Village has considerably more space, has free and plentiful parking and is located right off of I-95. It is even accessible by public transportation.

### **Creation of a Market Mobile Farm-To-Business Distribution System**

This past winter, Farm Fresh Rhode Island introduced a trial program, Market Mobile, to facilitate direct buying relationships between RI farmers and chefs. Farm Fresh RI coordinated weekly orders between farmers and chefs in the Providence area. Farmers dropped off orders at a central location (the Wintertime Farmers' Market) and Farm Fresh coordinated the delivery of the produce directly to the restaurants, hotels and schools. Market Mobile increased sales and consumption of locally grown products, as well as created efficient distribution, saving farmers time, gas and money. Since the Market Mobile model was successful this past winter, it has continued into this Summer 2009 season and expanded to other cities in Rhode Island.

Logistically, Farm Fresh Rhode Island supports the ordering system through monitoring and communication. Farm to chef models in other areas such as Oklahoma and New York have been researched and their best practices incorporated into Farm Fresh's already developed Fresh Link online ordering system. Orders were collated at the Wintertime Market site, and delivered during the market hours.

### **Launch of a RI Royal Potato Cooperative and Brand**

The Rhode Island Royal Potato Growers Association—organized and supported by RI DEM Division of Ag and distributor Wm. J. Canaan— debuted in Fall 2008. Farm Fresh Rhode Island supported this exciting effort with a coordinated publicity and media outreach campaign. Farm Fresh worked with both farmers and markets to create a communications program, designed to attract interest and create buyer loyalty. Farm Fresh utilized its existing outreach vehicles to promote the purchase of the local potatoes, including our weekly/monthly email newsletters, sent to over 1,800 addresses; a post on our homepage at [www.farmfreshri.org](http://www.farmfreshri.org) (receiving over 2,000 hits daily) and contact with an array of local restaurants and institutional buyers, including Brown University dining services and Rhode Island School of Design dining services.

## ***GOALS AND OUTCOMES ACHIEVED***

### **Expansion of the Wintertime Farmers' Market in Pawtucket**

Customers came out right away in strong numbers. A typical Saturday saw 1,000+ come through the doors to purchase fruits, vegetables and more from 37 vendors. That compares

with 200+ customers and 12 vendors in 2007-8. The market became a community hub, where neighbors and friends from across RI would see each other and chat over a croissant and a cup of coffee. Vendors gained new customers. The market was so busy we needed to increase the number of vendors. But all of the farms developed a strong following and found success at the market immediately. Word soon spread to other farmers throughout Rhode Island and South Eastern Massachusetts that this was the market to sell at. By January 2009, we received so many additional applications we ended up with a waiting list 5-7 deep in every food category. (There was no waiting list the previous year.) We are proud that we were able to accept every vegetable, fruit and herb grower who applied for the season.

### **Creation of a Market Mobile Farm-To-Business Distribution System**

Outreach to farmers, chefs and schools about this new opportunity began in July 2008 continued through the Fall and Winter. Area schools, including RISD The Wheeler School expressed interest early on in joining the Market Mobile. Area restaurants interested included Local 121, Blue State Coffee, Napa Valley Grille with more inquiries occurring weekly.

is past spring we started to take Chefs and Buyers on Farm To Chef tours to visit the hard working farmers and food artisans that have been participating in our pilot Farm to Chef Project, Market Mobile. This was a great way to see first-hand how to grow the perfect pea green and healthy herbs and why Aquidneck Farms is a model for protecting working agricultural land through sustainable agriculture and land conservation. Over the course of the spring and early summer we visited 10 farms/producers and were joined by 5-32 Chefs and Buyers at a time.

### **Launch of a RI Royal Potato Cooperative and Brand**

Farm Fresh teamed up with 5 potato growers to ensure the fresh crop of RI potatoes stay in RI (and So. Eastern MA) and gets enjoyed by RI & MA eaters, and is also re-building relationships between local grocers and local potato farmers.

The first RI Royal Press release went out at the end of September 2008. Letting consumers and press know that our RI variety is ideal for making baked potatoes, potato chips and more! The history of the farmers was relayed and the importance of buying this local seasonal potato: NOW. Signs were made and delivered to and displayed at the grocery stores that carry the potatoes. Grocers were very enthusiastic and more than willing to prominently display the potatoes and signs. They are looking forward to doing as much as they can this year, to help promote these local spuds.

The Association met in February and formed an association and elected a President, Vice President, Secretary and Treasurer. The group met again in April and started to talk about and develop a new logo design and a new bag. The association hired James Corbin of J5 Design to take on the design and implementation. Nate Canaan, the growers and Jim Corbin stayed in contact over the next few months while developing the new logo and bag design.

## ***BENEFICIARIES***

### **Expansion of the Wintertime Farmers' Market in Pawtucket**

This Wintertime Farmer's Market surpassed our goals. The outcome was a resounding success with farmers, not just sustaining their businesses but making enough of a profit to add on, grow more, expand. The outcome is positive, with Hope Artiste Village asking us to come back for another year. Last year's vendors making sure to let us know they would be back and new potential vendors handing in their applications over the summer. This market proved, that fresh and local food is available in the middle of winter and that customers want it and demand it. This market was a model that showed a weekly market in the middle of winter can be sustained. It set an example and served as a model. Representatives from State and non-profit organizations from CT, and MA visited the market and met with FFRI to see how they could bring such a market to their communities.

### **Creation of a Market Mobile Farm-To-Business Distribution System**

This program has grown exponentially since the launch 8 months ago. We now have restaurants and caterers (Castle Hill and Blackstone Caterers) occasionally placing record orders totaling over \$1,000ea. A record order week (August 13, 2009) recently saw us delivering to 34 customers with sales of fresh and local food totaling: \$9,865.22. Overall, there were a few additional customers almost every week, especially when the growing season truly began in June. On average 20-25 customers placed an order on any given week. In all, about 45 customers participated during the project period. This was a great benefit to Rhode Island Farmers.

### **Launch of a RI Royal Potato Cooperative and Brand**

Revitalized farm-to-grocer connections will be a foundation for more secure farms and more secure food that will benefit Rhode Island's farmers and eaters for generations to come. Last fall's pilot collaboration for selling RI potatoes under the purple Narragansett label worked. This year saw the start of a RI potato growers association (with a new logo) – not unlike what [Rhody Fresh](#) is doing for local dairies and hopefully with all the same success!

Farm Fresh Rhode Island thinks revitalized farm-to-grocer & farm-to-chef connections will be a foundation for more secure farms and more secure food that will benefit Rhode Island's farmers and eaters for generations to come.

## ***LESSONED LEARNED***

### **Expansion of the Wintertime Farmers' Market in Pawtucket**

This market was not an easy one to carry out every week. It required almost every FFRI staff member and many volunteers to help out weekly. More vendors have resulted in a need for more carefully defined market standards.

## **Creation of a Market Mobile Farm-To-Business Distribution System**

This pilot program has been a success and a learning process at the same time. Some questions we ask ourselves:

- Does Farm Fresh RI want to become a produce distributor?
- How do we and should we deliver to all of the customers in Rhode Island who want to order?
- Do we continue to rent 2 trucks once a week or do we buy a truck and increase delivery days and expand to all areas of Rhode Island?

Every week we tweak the logistics and increase the efficiency of this Market Mobile system. To effectively measure the success of this pilot program, we will need to give it a full year and then reassess.

## **Launch of a RI Royal Potato Cooperative and Brand**

It is difficult to know what level of organization a group like the RI Potato Growers need, and how many growers is a good amount to join the association. Costs connected with a standing organization are difficult to fund, but it's also difficult to ask people with existing jobs to take on new responsibilities for organization the project. The group of farmers is working to ascertain the number of vendors and the amount of organization desired.

## ***CONTACT PERSON***

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### **Creation of a Market Mobile Farm-To-Business Distribution System**

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### **Launch of a RI Royal Potato Cooperative and Brand**

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## ***ADDITIONAL INFORMATION***

### **Expansion of the Wintertime Farmers' Market in Pawtucket**

The Wintertime Market received earned income via vendor table fees. This income helped offset the costs of site rental and staff support. Farm Fresh utilized \$2,000 in funding from the Farmers Market Promotion Program to advertize that EBT cards could be used at the market. Funding from the Specialty Crops Block Grant paid the salary of the Market Manager.

### **Creation of a Market Mobile Farm-To-Business Distribution System**

Farm Fresh Rhode Island receives earned income from a 10% on Market Mobile sales. Income from this source helped underwrite the costs of delivery, truck rental and staff.

Specialty Crop Block Grant funds were used to support the cost of the Program Coordinator's salary and supplies for the program.

## Project Title

### **The Use of Wetting Agents to Reduce Irrigation Requirements for Turfgrass Sod Farms**

#### Project Summary

RITF initiated a two-year study evaluating wetting agents applied on sod farms and sportsfields which typically consume high amounts of irrigation water. The investigators hypothesized wetting agent applications on sod farms may lead to increased soil water retention, and therefore extend irrigation intervals to reduce water consumption. Previous studies examining wetting agents, primarily on golf course greens, have shown increased soil moisture retention following wetting agent application. This study aims to repeat a similar examination of soil moisture retention using wetting agents; however, the analysis will be applied to a sod farming operation. Rhode Island sod farms account for a significant portion of the state's farming industry, and support hundreds of ancillary services and "green" businesses in the state. However, sod farms are clear targets for water use regulation with conservation issues becoming more high priority. To produce a saleable product, sod farmers must irrigate their crop to produce a desirable product that customers demand. Wetting agent products might help sod farmers reduce irrigation frequency, especially when temperatures are elevated in the summer months. Sunny days and high summer temperatures induce drought and physiological stress on the turfgrasses. This is when peak water consumption occurs on sod farms. We hope to use the data collected in this study to develop recommendations for sod farmers and provide insight for future studies related to water consumption on turfgrasses. The main question for this study is to determine if wetting agent products could provide evidence to prolong the quality and survivability of a sod crop in place of irrigation.

#### Project Approach

Five unique wetting agent products were chosen for the study. The hydrophilic mode of action of these products varies as shown in Table 1. Chemically, these products are designed to increase water retention or water penetration in the soil. Product application rates were chosen based on vendor recommendation and feasibility to a sod farm operation. The study was performed over two growing seasons (2009 & 2010, primarily during the summer months) in Kingston, Rhode Island. In 2009, the study examined wetting agent affects between Mature (one year old) and Young (6 month old) sod. The purpose of this experiment was to determine if sod age is a factor that affects sod quality or moisture status of the soil. In 2010, the study examined wetting agent affects between irrigated sports field turf and sod farm turf<sup>1</sup>. This experiment used a highly maintained and irrigated sportsfield as a control compared against a relatively less irrigated sod field. Treatment plots on the sod fields measured 30 feet wide by 50 feet long and were repeated in triplicate for each wetting agent treatment. Sod maturity and irrigation status (sportsfield vs. sod farm) were unrepeated factors. Products were applied using a

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<sup>1</sup> Seldom irrigated sod was watered at the discretion of the sod farmer. These irrigation events occurred irregularly (typically on very hot days) and were only intended to avoid crop loss due to drought.

Cushman® Turfgrass Sprayer vehicle using Delevan® 1.5 nozzles calibrated to a spray volume of 2.6 gallons per 1,000 square feet. The wetting agent products were generously donated for the study by the source vendors. The products shown in table 1 were applied once per month in the first weeks of July, August and September.

**Table 1. Wetting agent products, source vendor, application rate, application frequency and mode of action are shown.**

<b>Product</b>	<b>Source</b>	<b>Rate</b> (oz / M)	<b>Vol</b> <b>water</b> (gal / M)	<b>Frequency</b>	<b>Action</b>
Attain	Loveland	4.00	2.60	monthly	water absorbent
Dispatch Sprayable	Aquatrols	0.55	2.60	monthly	water penetrant
Tournament Ready Fairway	KALO	4.00	2.60	monthly	water penetrant
Symphony	Harrell's	5.00	2.60	monthly	water retention
TPA - K	Davey	4.40	2.60	monthly	amino acid - unknown

Percent soil moisture and soil temperatures were measured using a portable soil sensor, Stevens® POGO System with Hydra Probe and HydraMon PDA software. The device was calibrated for Loam soil textures. Turf quality was rated visually on a 1-9 rating scale, where 1 equals dead or brown turf, and 9 equals excellent quality dark green turf. All ratings were recorded once per week beginning in July through the last week of September. Student interns assisted with data collection. Rainfall and irrigation amounts also were recorded each day throughout the study. Daily irrigation amounts were obtained from a USDA weather station on the campus of the University of Rhode Island in Kingston, RI, which is approximately one quarter mile from the study trials. Irrigation amounts were collected on site at the study trials using portable rain gauges. SPSS® statistical software was used for data analysis and statistical interpretations of the data.

There is a missing data set for all the New Sod treatment plots on the July 23, 2009 rating date due to a thunder/lightning rainstorm occurring halfway through data collection. The 2009 data was analyzed for statistical differences between means of percent soil moisture, turfgrass quality and soil temperature across the differing treatments of wetting agent product and sod maturity at each rating date. The 2010 data was analyzed similarly, except the sod maturity factor was substituted by field type (sod farm vs. sportsfield). Tables 2 and 3 show matrices of mean results for each of the dependent variables (percent soil moisture, turfgrass quality, and soil temperature). Statistical comparisons of the data are only relevant between means of the different wetting agent products on each rating date.

### *Soil Moisture*

In June - July 2009, Kingston, RI experienced above average rainfall. There was approximately 4.5 inches total rainfall in June, and 11 inches in July). As result, soil moisture was relatively high at the onset of the trials and differences in soil moisture between wetting agent treatments were insignificant. As conditions became drier and hotter by August 2009, soil moisture levels declined, and differences between wetting agent treatments were slightly more pronounced. Table 2 illustrates statistical differences between wetting agent treatments in 2009 for each dependent variable: soil moisture, soil temperature and turfgrass quality. The most interesting data shows soil moisture within the control plots on the Young Sod treatments in August 2009 appeared significantly less than wetting agent treated plots. Some statistical differences appeared between the different products on various dates, however, in most cases actual mean differences were minor and there are no consistent trends between the differences. In general, percent soil moisture values among different products followed similar weekly trends on Mature Sod and Young Sod treatments. High amounts of rainfall and prolonged wet weather in the early weeks of the study period in 2009 affected soil moisture data, and probably overshadowed any water saving benefits that wetting agents might provide. It also was not clear if different wetting agent products were more effective than others in conserving soil moisture. In 2010, the experiment was altered to test the same wetting agent products on sod receiving regular irrigation versus sod irrigated just prior to wilt to prevent dormancy and damage. The rationale for this experiment was to check if high amounts of rainfall or irrigation applied to wetting agent treated soils display differences in soil moisture trends compared to non wetting agent treated soils. Based on the results, it appears wetting agent treated soils may help soils retain moisture better than infrequently irrigated soils. The 2010 data shows elevated soil moistures in the wetting agent treated plots on the sports field (frequent irrigation) compared to the sod farm (infrequent irrigation). We would like to note this trend was not statistically significant through each week of the trial, but it is an interesting observation nonetheless. 2010 also was a drier year in terms of rainfall compared to 2009. As in 2009, soil moisture differences between wetting agent products were not much different, indicating performance differences between products were not significant or pronounced under the conditions of this study. The chart index following Table 3 below illustrates the soil moisture trends between products.

### *Soil Temperature*

Data from 2009 and 2010 each indicate wetting agent treatments do not influence soil temperature, which is expected. However, it was not surprising that soil temperature trends generally followed an inverse relationship to soil moisture. Increases in average temperatures correlated with overall decreases in observed percent soil moisture values. Higher temperatures generally lead to drought conditions.

### *Turfgrass Quality*

There were almost no differences in turfgrass quality between wetting agent treatments in 2009. Turfgrass quality across each of the mature sod plots and young sod plots in 2009 was very uniform. The mature sod treatment plots had slightly higher quality scores, most likely because it is older sod with better density and color characteristics. However, turfgrass quality on both mature and young sod treatments declined in August 2009 as

conditions became warmer and drier. Overall turf quality declined less on the mature sod treatments. During hot and dry periods, wilting patches of grass were observed across the sod farm, but none occurred within the study treatment areas. In 2010, similar quality trends were observed across the sportsfield treated plots. However, the sod farm plots contained some uneven high and low areas which led to random wilting patches in drought conditions. These brown patches affected turf quality scores on the plots where they appeared. Some of the wetting agent treatments displayed statistically lower quality scores than control plots, but these results are more likely attributable to drought and wilt damage rather than treatment alone. The authors also believe turf fertilization may have affected quality scores to a higher degree than wetting agent treatment.

### Goals and Outcomes Achieved

The primary objective of this study was to monitor soil moisture status across wetting agent applied soils to determine if these products could help reduce irrigation needs. Based on the data we collected over two growing seasons, it is unclear if wetting agent applications alone can help conserve water. It was observed that wetting agent applied soils held more moisture than control plots following periods of rain or moisture. However, on relatively dry sites which do not receive regular irrigation, such as a sod farm, it was not apparent that wetting agents led to any increase in soil moisture content. In addition, we could not determine if turfgrass quality was improved by wetting agent application, since this factor seemed to be overshadowed more by fertilization and drought status. Previous studies on golf course putting greens have shown wetting agents to prolong soil moisture content in between wetting periods. In our study, the wetting agents were applied with a relatively higher than normal spray volume (2.6 gallons / 1,000 square feet), but were not always directly watered into the turf. In a realistic sod farm application, direct watering following application should be the protocol, but may not always be feasible. In addition, sod farm turf typically will have deeper root systems than putting green turf, and should be more drought tolerant as result. Although the results from this experiment did not conclusively show that wetting agents can help sod farms conserve water, it has provided a basis for further analysis to specifically isolate factors which may confound our data, such as soil type, topography and rain/irrigation timing to name a few. The next step in this analysis would be to perform an experiment to compare soil moisture content on wetting agent applied vs. non applied sites on a time interval basis.

Our goal is to collect more data on how effective wetting agents can be to help reduce irrigation water consumption. Landscapers, homeowners and parks/recreation, and athletic facilities also consume valuable water resources to manage their properties. Funding permitted, we will continue to investigate this topic, and expand to look at sod survivability following transplantation for wetting agent applied versus non applied sod.

### Beneficiaries

The Rhode Islands sod farmers, turfgrass industry, and wetting agent manufacturers have shown considerable support and appreciation for this research. Although the project is incomplete at this point, these stakeholders are eager to receive the valuable information this report has to offer. Sod farmers are interested to learn if wetting agent application will

extend irrigation intervals and improve turfgrass quality. Wetting agent manufacturers are eager to learn how their product performed in this trial. At this point, an economic analysis of the Rhode Island turfgrass and sod industry is underway, but critical to this project's success is understanding if wetting agent applications will increase profitability for the sod farmer. At this time, considering costs, it seems unlikely wetting agent applications will provide positive benefits compared to costs. However, future production (farming) costs and environmental regulations may change that picture. For these reasons, it is important we begin understanding the potential agronomic benefits of these wetting agents to forecast economic implications in the future.

### Lessons Learned

In this study, the experimenters chose large sample plots for treatments and data collection. This design was intended to account for broad variability of surface and soil conditions that are encountered across sod farms. Although by design, this method is justifiable, the experimenters found data collection to be daunting.

### Contact Person(s)

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### Additional Information

There is no additional information at this time.

See data tables and charts below.

**Table 2. Average scores for Percent Soil Moisture, Turf Quality and Soil temperature for each product and sod maturity on each rating date in 2009. Treatment factors are wetting agent product and sod age. \*Statistical differences are compared between wetting agent treatments on individual dates only; values suffixed by the same letter(s) are not statistically different.**

**Percent Soil Moisture Values**

<b>Young Sod</b>	<b>6/30/2009</b>	<b>7/3/2009</b>	<b>7/9/2009</b>	<b>7/20/2009</b>	<b>7/23/2009</b>	<b>7/30/2009</b>	<b>8/7/2009</b>	<b>8/20/2009</b>	<b>8/25/2009</b>	<b>9/9/2009</b>	<b>9/25/2009</b>
Attain	29.6 b	32.9 a*	28.8 a	22.5 a		24.3 b	23.0 a	21.2 b	15.9 b	21.1 ab	26.2 a
Dispatch	30.1 b	32.3 a	30.4 a	24.7 a		27.2 c	23.0 b	21.8 bc	19.3 c	24.6 b	29.3 b
TRF	27.3 ab	32.0 a	28.4 a	22.5 a		24.7 bc	22.0 b	21.7 bc	15.7 b	22.2 ab	25.6 a
Symphon	28.4 ab	33.8 a	27.4 a	22.0 a		24.8 bc	23.8 b	19.8 a	15.6 b	20.4 ab	26.9 ab
TPA-K	26.5 a	32.4 a	29.9 a	23.1 a		25.1 bc	22.9 b	24.3 c	17.2 c	21.2 ab	27.9 ab
Control	29.7 b	33.4 a	29.6 a	24.6 a		18.4 a	12.3 b	18.1 a	10.9 a	19.1 a	25.6 a

<b>Mature Sod</b>	<b>6/30/2009</b>	<b>7/3/2009</b>	<b>7/9/2009</b>	<b>7/20/2009</b>	<b>7/23/2009</b>	<b>7/30/2009</b>	<b>8/7/2009</b>	<b>8/20/2009</b>	<b>8/25/2009</b>	<b>9/9/2009</b>	<b>9/25/2009</b>
Attain	29.9 ab	32.7 ab	32.3 a	26.4 a	30.4 a	27.6 b	24.6 a	21.5 a	17.0 ab	23.9 abc	28.5 ab
Dispatch	30.3 b	31.6 a	31.9 a	26.4 a	33.5 a	27.8 b	23.4 a	20.4 a	16.4 ab	21.2 a	29.1 ab
TRF	28.4 ab	33.5 ab	33.0 a	29.5 a	31.2 a	27.3 b	25.4 a	23.1 ab	17.2 ab	26.7 c	30.7 b
Symphon	30.0 ab	32.9 ab	32.8 a	26.2 a	29.4 a	27.0 b	25.8 a	22.5 ab	17.9 b	23.0 ab	29.0 ab
TPA-K	28.2 ab	32.3 ab	33.1 a	26.5 a	31.2 a	28.0 b	23.8 a	24.7 b	15.8 a	23.1 ab	28.3 a
Control	27.8 a	34.1 b	31.0 a	25.4 a	31.3 a	24.1 a	23.9 a	22.9 ab	20.3 c	25.1 bc	29.9 ab

**Turf Quality Scores**

<b>Young Sod</b>	<b>6/30/2009</b>	<b>7/3/2009</b>	<b>7/9/2009</b>	<b>7/20/2009</b>	<b>7/23/2009</b>	<b>7/30/2009</b>	<b>8/7/2009</b>	<b>8/20/2009</b>	<b>8/25/2009</b>	<b>9/9/2009</b>	<b>9/25/2009</b>
Attain	6.5 a	6.5 a	6.5 a	6.5 a		6.5 a	5.5 a	5.0 a	5.0 a	5.0 a	5.5 a
Dispatch	6.5 a	6.5 a	6.5 a	6.5 a		6.5 a	5.5 a	5.0 a	5.0 a	5.0 a	5.5 a
TRF	6.5 a	6.5 a	6.5 a	6.5 a		6.5 a	5.5 a	5.0 a	5.0 a	5.0 a	5.3 a
Symphon	6.5 a	6.5 a	6.5 a	6.5 a		6.5 a	5.5 a	5.0 a	5.0 a	5.0 a	5.5 a
TPA-K	6.5 a	6.5 a	6.5 a	6.5 a		6.5 a	5.5 a	5.2 a	5.2 a	5.2 a	5.5 a
Control	6.5 a	6.5 a	6.5 a	6.5 a		6.5 a	5.5 a	5.2 a	5.2 a	5.2 a	6.0 a

<b>Mature Sod</b>	<b>6/30/2009</b>	<b>7/3/2009</b>	<b>7/9/2009</b>	<b>7/20/2009</b>	<b>7/23/2009</b>	<b>7/30/2009</b>	<b>8/7/2009</b>	<b>8/20/2009</b>	<b>8/25/2009</b>	<b>9/9/2009</b>	<b>9/25/2009</b>
Attain	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.0 a	6.0 a	6.0 a	6.0 a	7.0 a
Dispatch	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.0 a	6.0 a	6.0 a	6.0 a	7.0 a
TRF	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.0 a	6.0 a	6.0 a	6.0 a	7.0 a
Symphon	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.0 a	6.0 a	6.0 a	6.0 a	7.0 a
TPA-K	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.0 a	6.0 a	6.0 a	6.0 a	7.0 a
Control	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.5 a	6.0 a	6.0 a	6.0 a	6.0 a	7.0 a

**Soil Temperatures**

<b>Young Sod</b>	<b>6/30/2009</b>	<b>7/3/2009</b>	<b>7/9/2009</b>	<b>7/20/2009</b>	<b>7/23/2009</b>	<b>7/30/2009</b>	<b>8/7/2009</b>	<b>8/20/2009</b>	<b>8/25/2009</b>	<b>9/9/2009</b>	<b>9/25/2009</b>
Attain	75.3 a	83.2 a	76.9 a	82.3 a		79.4 a	83.0 a	87.7 a	92.2 a	66.9 a	67.0 ab
Dispatch	75.6 b	83.5 ab	76.8 a	82.2 a		79.5 a	83.0 a	87.4 a	92.2 a	66.6 a	67.2 c
TRF	75.3 ab	83.5 ab	76.6 a	82.3 a		79.2 a	83.5 a	87.7 a	92.6 a	66.7 a	67.0 ab
Symphon	75.4 ab	83.3 a	76.9 a	82.0 a		79.5 a	83.0 a	87.4 a	92.9 a	66.7 a	67.2 bc
TPA-K	75.3 ab	83.7 b	77.1 a	82.2 a		79.2 a	83.4 a	87.7 a	93.0 a	67.0 a	67.0 a
Control	75.2 a	83.4 ab	76.8 a	82.0 a		81.2 b	85.2 a	88.7 b	92.3 a	66.8 a	66.9 a

<b>Mature Sod</b>	<b>6/30/2009</b>	<b>7/3/2009</b>	<b>7/9/2009</b>	<b>7/20/2009</b>	<b>7/23/2009</b>	<b>7/30/2009</b>	<b>8/7/2009</b>	<b>8/20/2009</b>	<b>8/25/2009</b>	<b>9/9/2009</b>	<b>9/25/2009</b>
Attain	75.2 b	84.8 ab	76.6 ab	80.7 ab	76.9 a	78.0 a	80.6 ab	89.3 ab	88.8 a	67.3 a	68.9 a
Dispatch	75.0 b	84.8 ab	77.4 c	80.7 ab	76.9 a	78.2 a	81.1 ab	89.6 ab	89.5 a	67.5 a	68.8 a
TRF	74.6 ab	84.3 bc	77.0 a	81.6 a	76.9 a	79.2 a	81.7 ab	90.1 ab	92.0 a	68.0 ab	69.3 a
Symphon	75.1 b	85.0 bc	77.3 bc	80.5 a	77.1 a	77.6 a	80.3 ab	88.9 ab	88.9 a	67.7 a	68.5 a
TPA-K	74.9 ab	85.4 c	76.7 abc	80.0 a	77.0 a	77.9 a	79.6 a	88.2 a	87.4 a	68.4 b	69.0 a
Control	74.9 a	85.0 a	76.4 abc	80.4b	76.9 a	78.0 a	80.4 b	89.0 b	88.3 b	68.0 ab	69.4 a

**Table 3. Average scores for Percent Soil Moisture, Turf Quality and Soil temperature for each product and sod maturity on each rating date in 2010. Treatment factors are wetting agent product and sod area (sod farm vs. sports field). \*Statistical differences are compared between wetting agent treatments on individual dates only; values suffixed by the same letter(s) are not statistically different.**

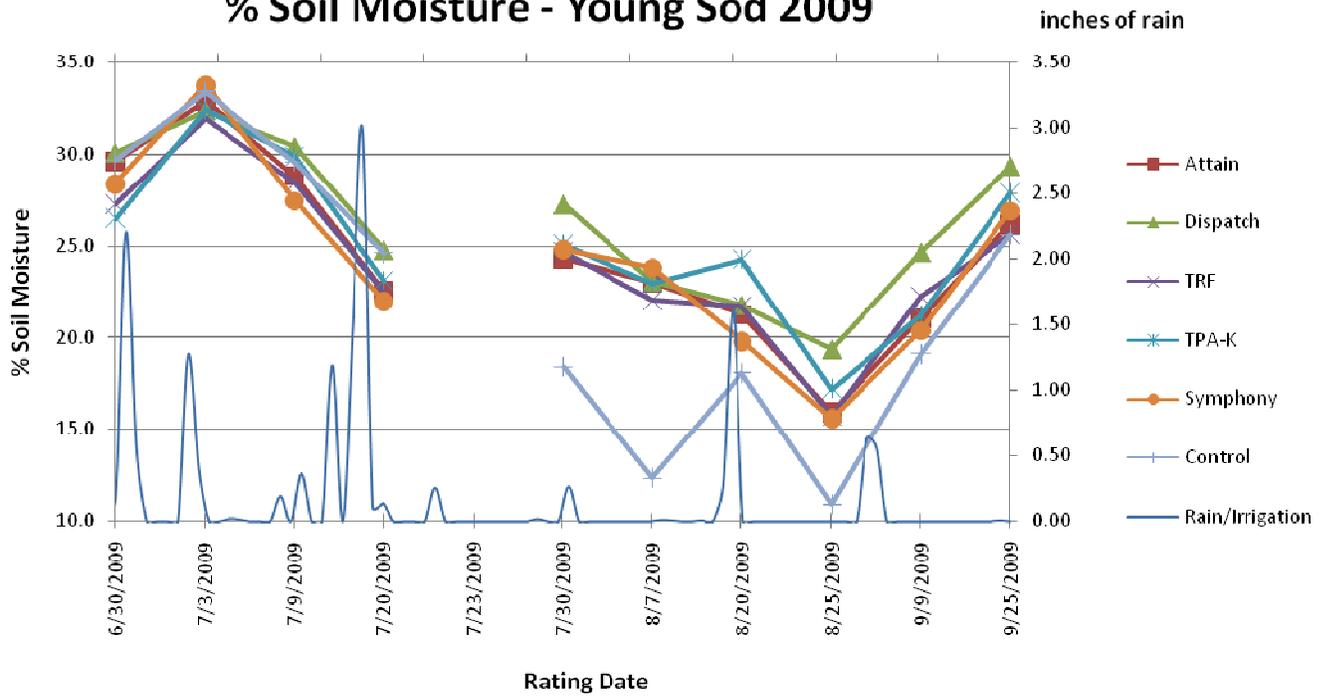
<b>Percent Soil Moisture</b>												
<b>Sport</b>	<b>7/8/2010</b>	<b>7/16/201</b>	<b>7/23/201</b>	<b>7/28/201</b>	<b>8/2/2010</b>	<b>9/9/2010</b>	<b>8/18/201</b>	<b>8/26/201</b>	<b>9/2/2010</b>	<b>9/9/2010</b>	<b>9/16/201</b>	<b>9/23/201</b>
Attain	31.4 a	35.4 a	33.3 a	31.0 a	26.7 ab	31.2 a	33.6 a	32.3 ab	32.0 a	30.6 a	33.8 a	25.1 ab
Dispatch	32.0 a	33.9 ab	31.5 a	29.3 ab	25.8 ab	30.5 a	33.4 a	37.4 a	31.9 a	31.3 a	34.0 a	27.0 ab
TRF	31.8 a	34.5 ab	32.4 a	28.2 ab	23.9 a	29.8 a	32.7 a	32.4 ab	33.2 a	31.0 a	33.8 a	25.1 ab
Symphon	31.6 a	33.7 ab	32.5 a	31.0 a	27.7 b	31.0 a	32.0 a	31.0 ab	31.3 a	30.9 a	34.4 a	27.5 a
TPA - K	30.1 a	32.4 b	30.4 ab	28.1 ab	23.9 a	31.5 a	32.9 a	34.0 a	32.3 a	31.4 a	34.0 a	24.9 ab
Control	26.8 b	29.0 c	28.0 b	27.4 b	26.6 ab	30.5 a	33.8 a	26.3 b	31.4 a	31.2 a	33.8 a	24.4 b
<b>Sod</b>	<b>7/8/2010</b>	<b>7/16/201</b>	<b>7/23/201</b>	<b>7/28/201</b>	<b>8/2/2010</b>	<b>9/9/2010</b>	<b>8/18/201</b>	<b>8/26/201</b>	<b>9/2/2010</b>	<b>9/9/2010</b>	<b>9/16/201</b>	<b>9/23/201</b>
Attain	23.4 a	26.3 a	24.4 a	18.4 a	11.5 a	11.7 ab	10.0 ab	22.8 a	20.9 a	17.1 a	23.0 a	23.4 a
Dispatch	15.8 b	18.9 b	18.2 b	14.8 b	10.9 a	9.8 a	8.0 a	17.3 c	21.1 a	16.6 a	24.0 a	23.0 a
TRF	22.4 a	26.3 a	24.4 a	19.3 a	11.9 a	11.1 ab	12.9 bc	21.2 ab	21.7 a	17.2 a	24.2 a	24.0 a
Symphon	23.8 a	24.9 a	24.6 a	19.5 a	12.5 a	11.0 ab	12.9 bc	23.0 a	21.0 a	16.5 a	23.7 a	24.6 a
TPA - K	23.1 a	25.6 a	23.1 a	19.8 a	12.6 a	12.4 b	10.0 ab	19.3 bc	21.6 a	16.8 a	23.8 a	24.6 a
Control	23.4 a	26.9 a	26.2 a	20.7 a	14.5 b	12.0 b	14.4 c	21.9 ab	20.6 a	16.6 a	24.0 a	23.6 a

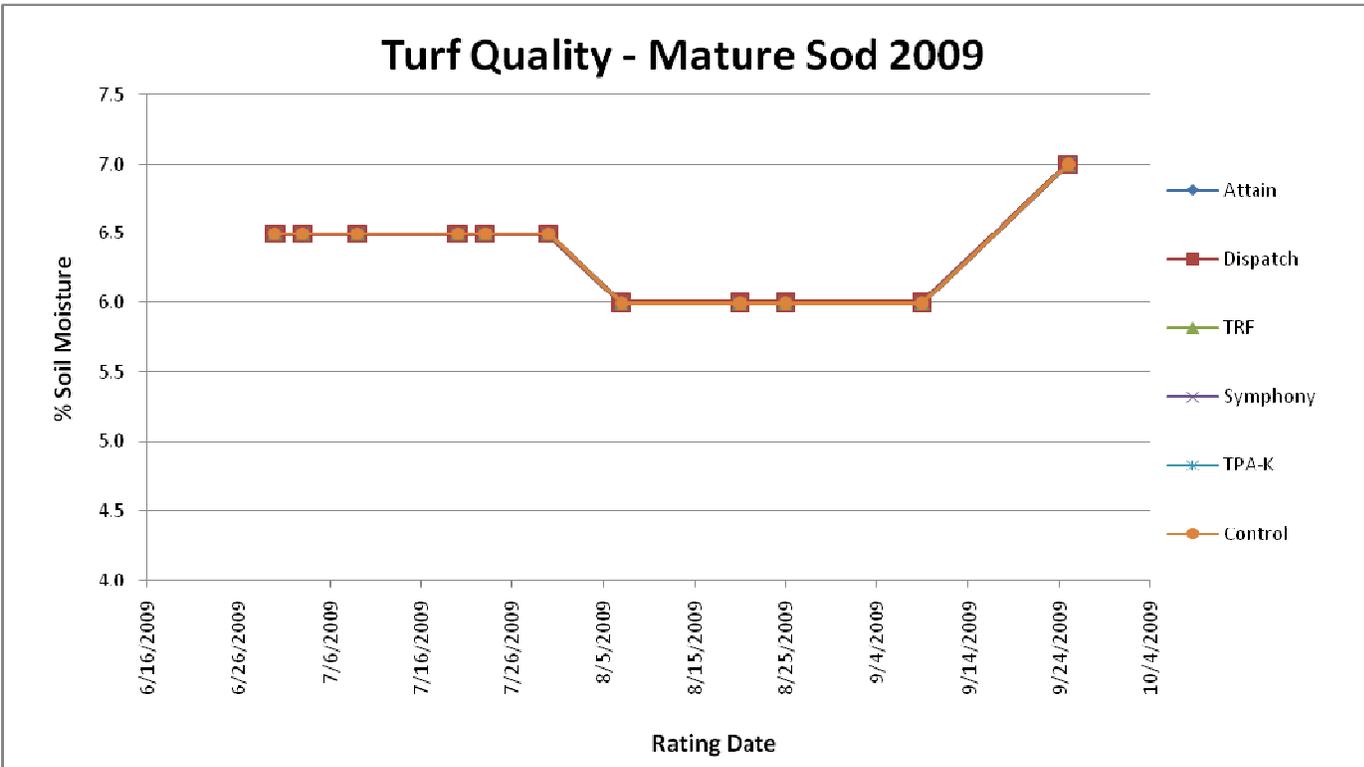
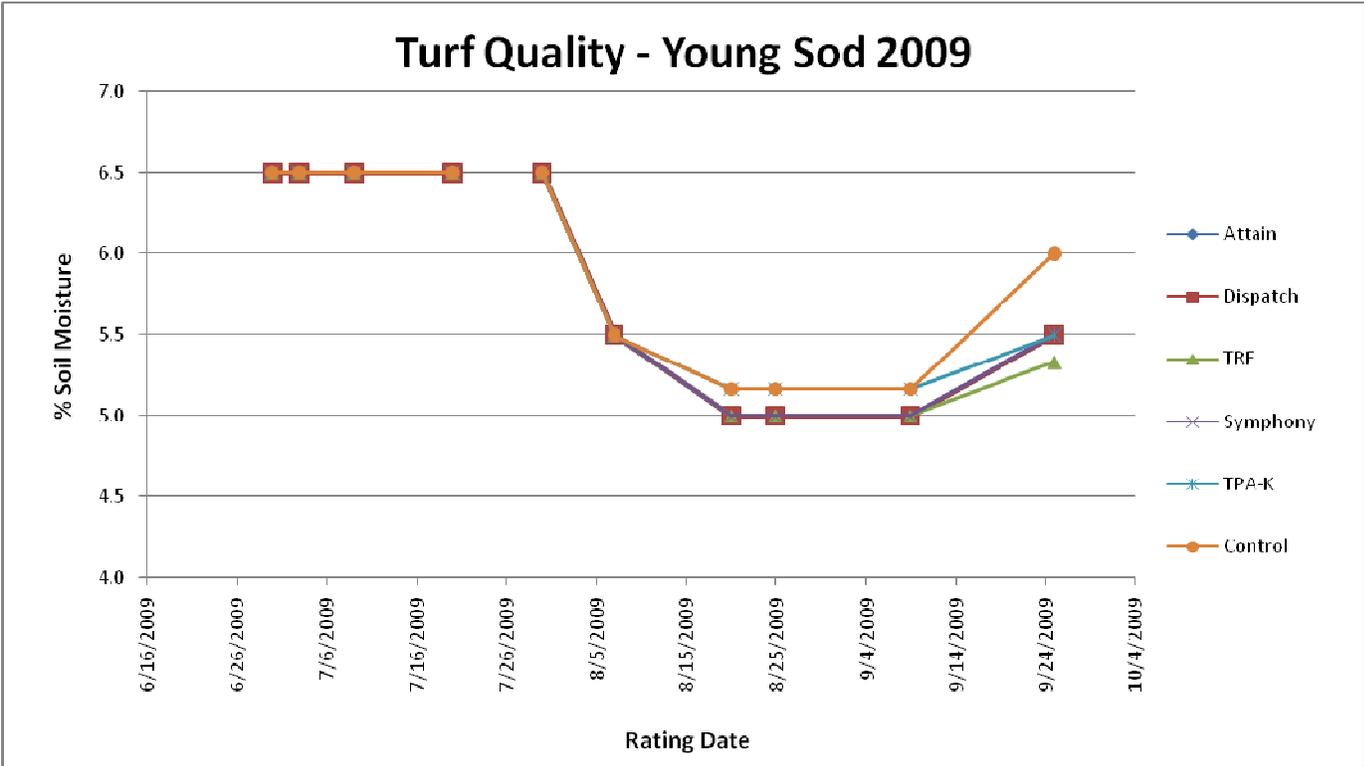
<b>Soil Temperature</b>												
<b>Sport</b>	<b>7/8/2010</b>	<b>7/16/201</b>	<b>7/23/201</b>	<b>7/28/201</b>	<b>8/2/2010</b>	<b>9/9/2010</b>	<b>8/18/201</b>	<b>8/26/201</b>	<b>9/2/2010</b>	<b>9/9/2010</b>	<b>9/16/201</b>	<b>9/23/201</b>
Attain	88.1 a	85.6 a	71.8 a	80.5 a	85.5 a	87.4 ab	75.4 a	82.0 a	82.6 a	79.7 a	71.7 ab	67.5 a
Dispatch	87.8 ab	85.6 a	71.7 a	80.5 a	85.2 a	88.0 a	75.6 a	82.1 a	82.5 a	79.6 a	71.7 ab	67.5 a
TRF	88.2 a	85.6 a	71.8 a	80.6 a	84.8 a	85.3 b	75.7 a	82.1 a	82.6 a	79.7 a	71.7 ab	67.6 a
Symphon	86.7 ab	85.5 a	71.9 ab	80.5 a	84.4 a	86.3 ab	75.7 a	82.3 a	82.6 a	79.7 a	71.7 a	67.5 a
TPA - K	87.7 ab	85.5 a	71.9 a	80.4 a	84.5 a	86.8 ab	75.5 a	82.7 a	82.5 a	79.6 a	71.8 ab	67.4 a
Control	86.1 b	85.7 a	72.0 b	80.5 a	84.9 a	86.7 ab	75.8 a	83.0 a	82.5 a	79.7 a	71.8 b	67.4 a
<b>Sod</b>	<b>7/8/2010</b>	<b>7/16/201</b>	<b>7/23/201</b>	<b>7/28/201</b>	<b>8/2/2010</b>	<b>9/9/2010</b>	<b>8/18/201</b>	<b>8/26/201</b>	<b>9/2/2010</b>	<b>9/9/2010</b>	<b>9/16/201</b>	<b>9/23/201</b>
Attain	92.3 a	81.7 a	76.0 ab	83.6 a	89.0 a	90.2 a	80.8 a	82.0 ab	80.5 a	78.3 a	74.1 a	67.5 a
Dispatch	91.9 ab	81.8 a	76.0 ab	83.4 a	89.0 a	89.5 a	80.6 ab	81.9 a	80.4 a	78.4 a	74.0 a	67.2 a
TRF	93.1 a	81.8 a	75.9 ab	83.5 a	88.5 a	90.0 a	79.8 ab	82.2 ab	80.4 a	78.3 a	74.1 a	67.5 a
Symphon	91.8 ab	81.0 b	75.8 a	83.5 a	89.2 a	89.5 a	80.9 a	82.1 ab	80.3 a	78.3 a	74.1 a	67.5 a
TPA - K	92.8 a	81.6 a	76.1 ab	83.5 a	88.6 a	90.0 a	80.1 ab	83.3 c	80.4 a	78.3 a	74.1 a	67.4 a
Control	90.4 b	81.7 a	76.2 b	83.5 a	88.5 a	89.7 a	78.6 b	82.9 bc	80.4 a	78.3 a	74.0 a	67.6 a

<b>Turf Quality Scores</b>												
<b>Sport</b>	<b>7/8/2010</b>	<b>7/16/201</b>	<b>7/23/201</b>	<b>7/28/201</b>	<b>8/2/2010</b>	<b>9/9/2010</b>	<b>8/18/201</b>	<b>8/26/201</b>	<b>9/2/2010</b>	<b>9/9/2010</b>	<b>9/16/201</b>	<b>9/23/201</b>
Attain	4.3 a	4.8 a	5.0 b	5.0 a	5.3 b	5.5 a	6.0 a	6.0 a	6.5 a	6.5 a	7.0 a	7.0 a
Dispatch	4.3 a	4.5 a	4.8 a	5.0 a	5.2 ab	5.7 ab	6.0 a	6.0 a	6.5 a	6.5 a	7.0 a	7.0 a
TRF	4.2 ab	4.2 b	4.8 a	5.0 a	5.0 a	5.5 a	6.0 a	6.0 a	6.5 a	6.5 a	7.0 a	7.0 a
Symphon	4.0 b	4.5 a	5.0 b	5.0 a	5.2 a	5.8 b	6.0 a	6.0 a	6.5 a	6.5 a	7.0 a	7.0 a
TPA - K	4.2 ab	4.7 a	5.0 b	5.0 a	5.0 ab	5.7 ab	6.0 a	6.0 a	6.5 a	6.5 a	7.0 a	7.0 a
Control	4.0 b	4.0 b	5.0 b	5.3 b	5.7 c	5.5 a	6.0 a	6.0 a	6.5 a	6.5 a	7.0 a	7.0 a
<b>Sod</b>	<b>7/8/2010</b>	<b>7/16/201</b>	<b>7/23/201</b>	<b>7/28/201</b>	<b>8/2/2010</b>	<b>9/9/2010</b>	<b>8/18/201</b>	<b>8/26/201</b>	<b>9/2/2010</b>	<b>9/9/2010</b>	<b>9/16/201</b>	<b>9/23/201</b>
Attain	3.7 ab	4.0 ab	4.3 a	4.3 ab	4.0 a	3.8 a	4.7 ab	5.3 a	5.8 a	6.2 a	6.5 b	6.5 a
Dispatch	3.3 a	3.3 a	4.2 a	4.0 a	4.0 a	4.2 ab	4.0 a	3.8 b	4.7 b	5.3 b	5.8 a	6.5 a
TRF	4.0 ab	4.3 bc	5.2 b	4.8 bc	4.7 ab	4.8 c	5.3 b	5.7 a	6.0 a	6.3 a	6.8 bc	7.0 b



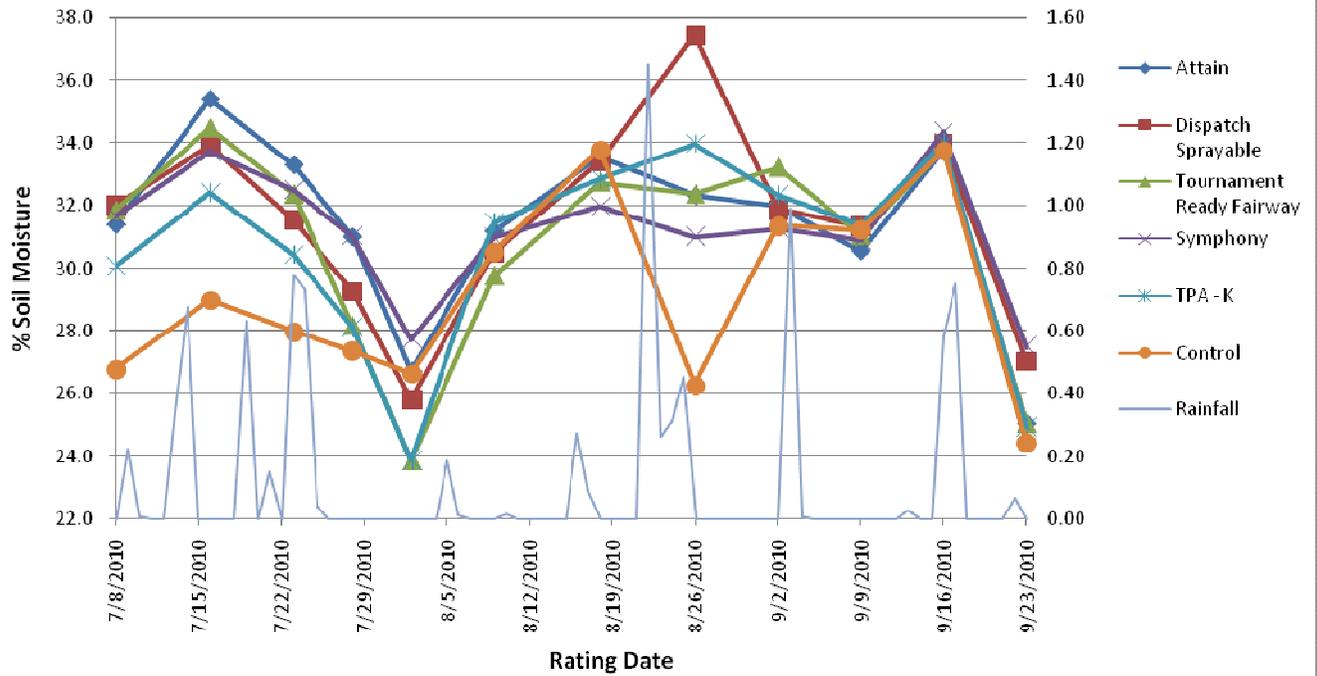
# % Soil Moisture - Young Sod 2009



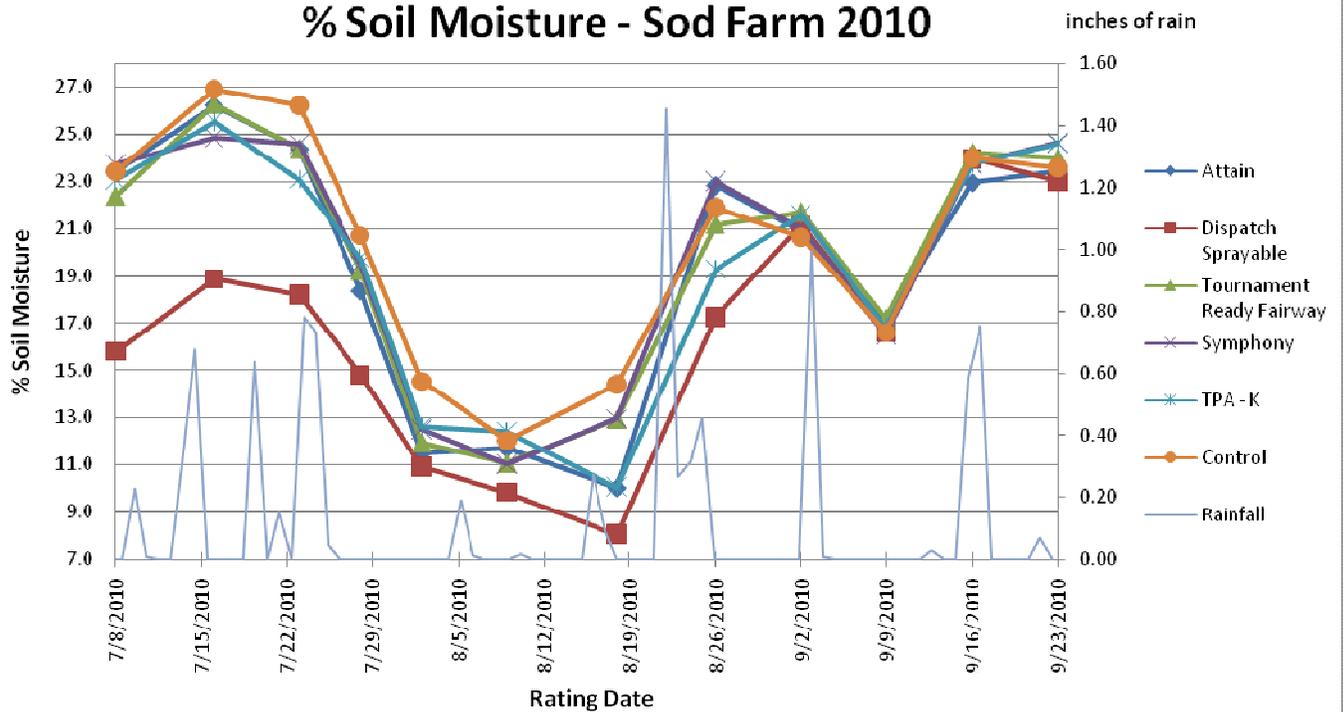




### % Soil Moisture - Sportsfield 2010

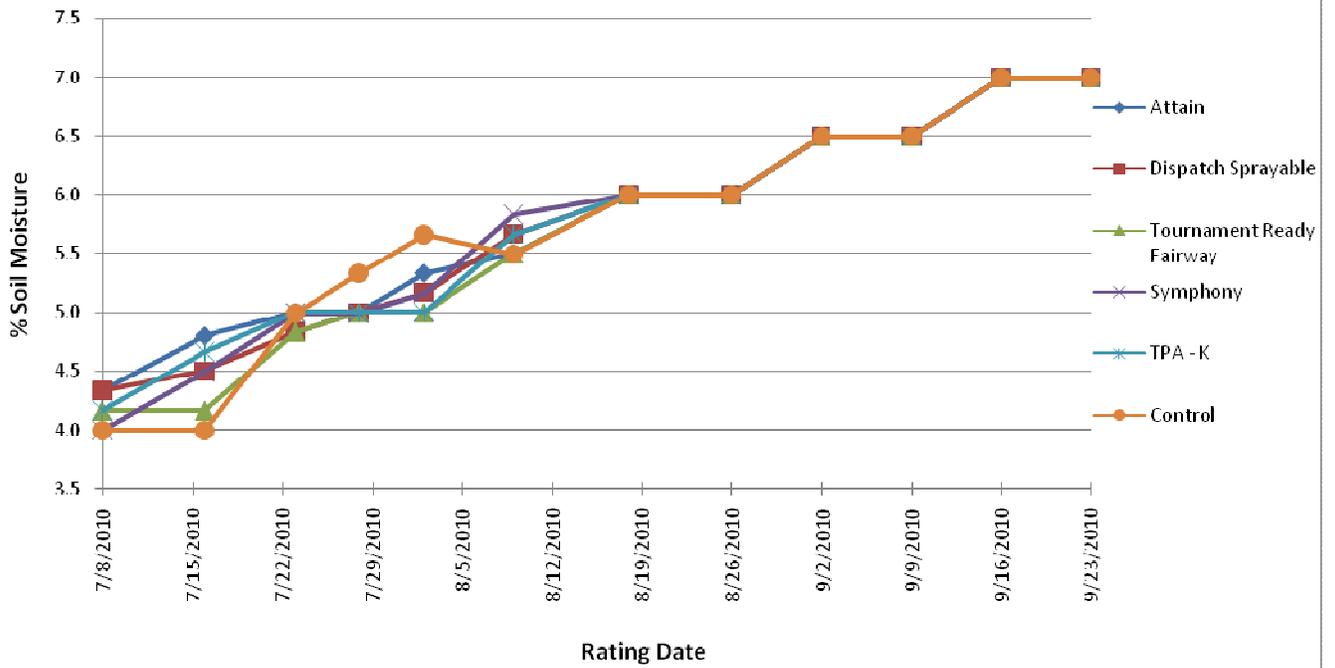


### % Soil Moisture - Sod Farm 2010





### Turf Quality - Sportsfield 2010



### Turf Quality - Sod Farm 2010

