

# Project Photos

U.S. Department of Agriculture,  
Sustainable Agriculture Research and Education  
(SARE) Program Farmer Grant

To

Brookfield Farm, Amherst MA

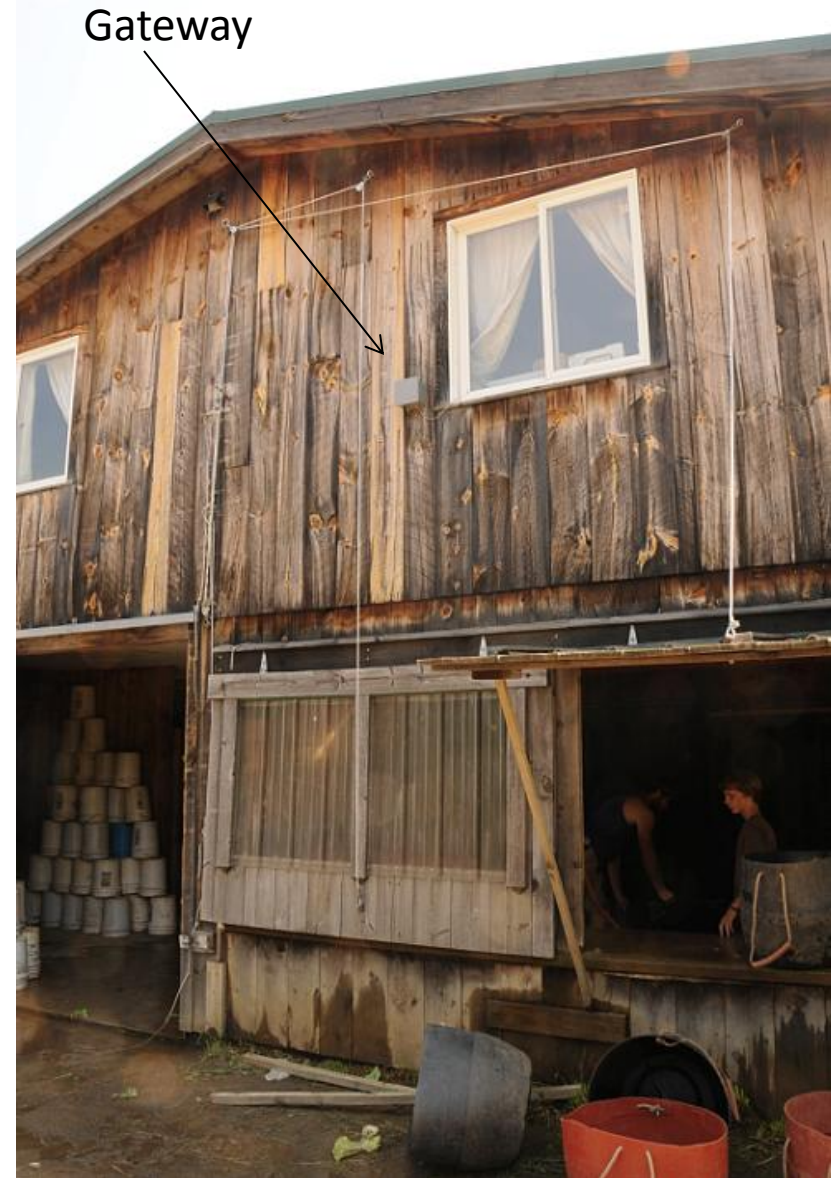
Title: Evaluation of Inexpensive, Wireless Sensor  
Networks for Managing Small Vegetable Farms

February, 2013

# Gateway Plugs into Computer

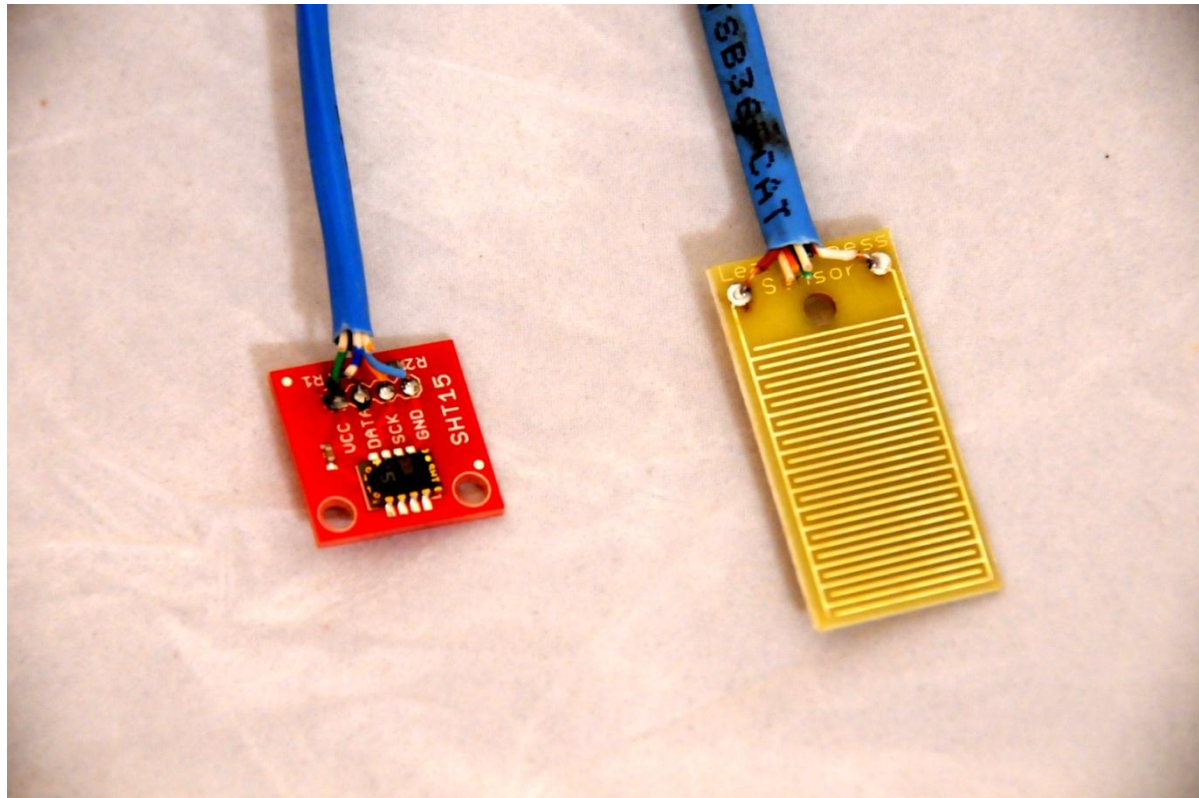


# USB Gateway Installation Brookfield Farm



Air Temperature/Humidity Sensor  
(left)

Leaf Wetness Sensor (right)





# Inserting Soil Moisture Sensor

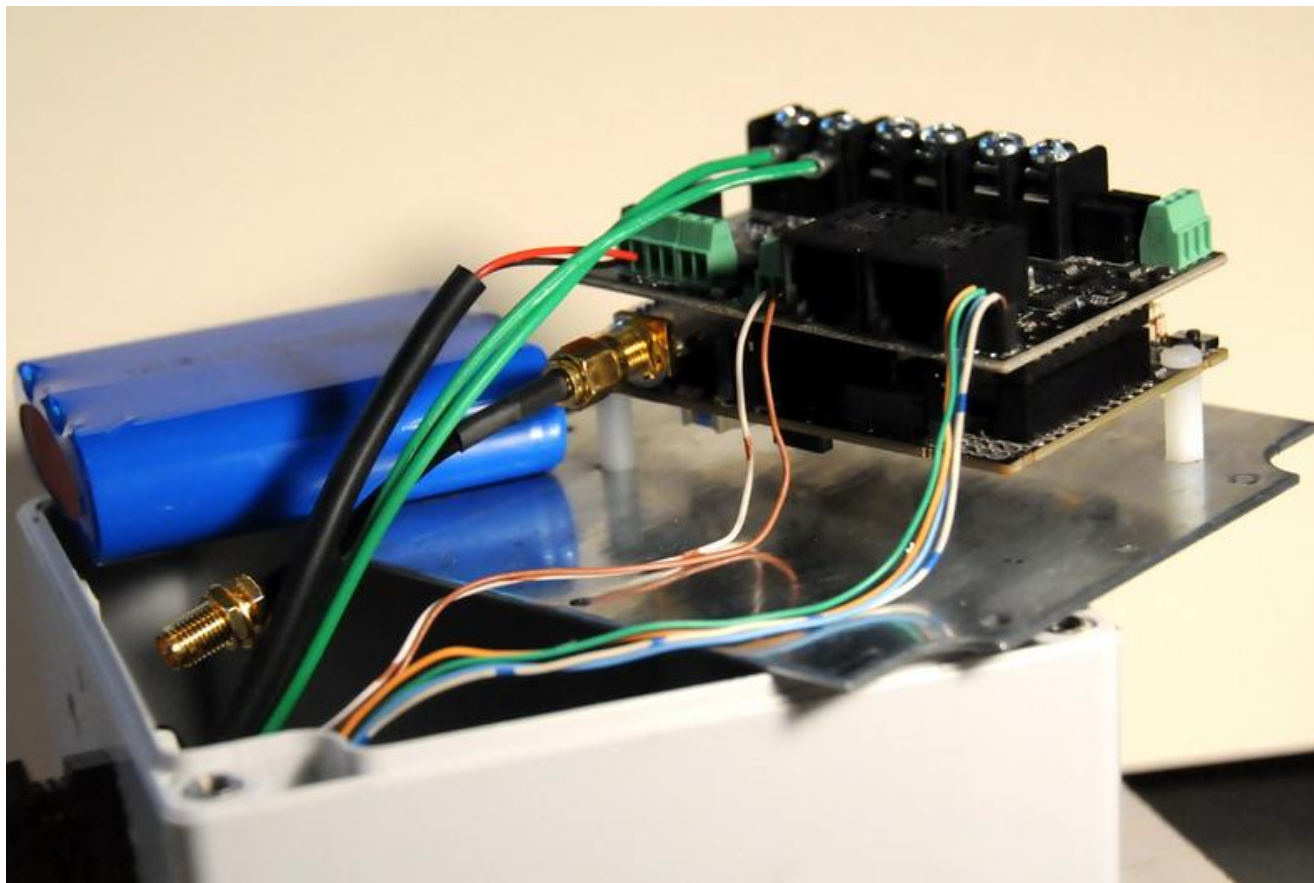


# Brookfield - Soil Temperature Sensor

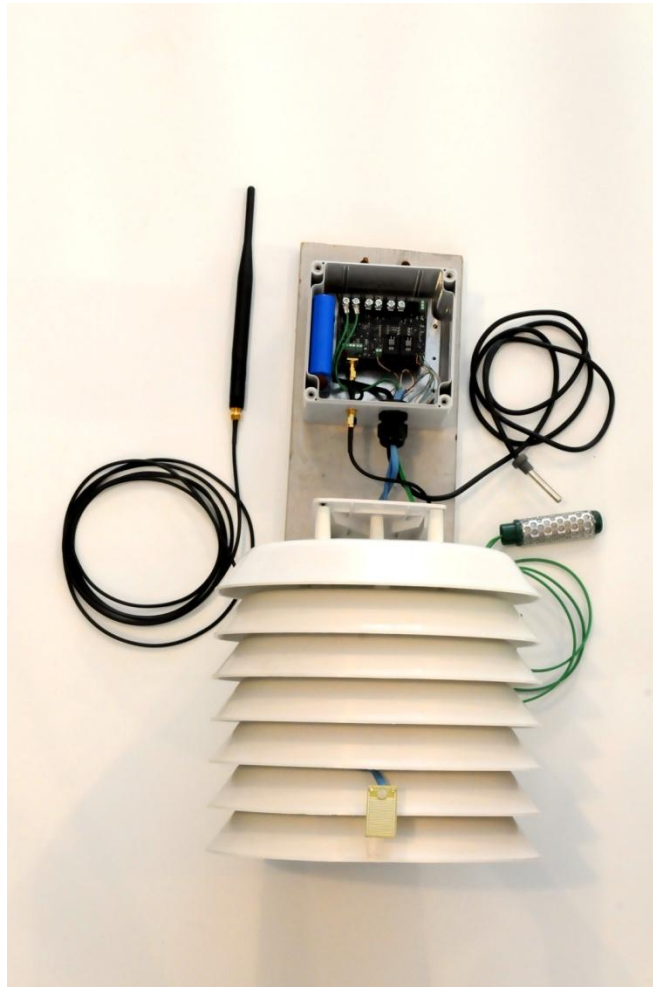




# Configured Libelium Boards



# Brookfield - Final Field Configuration





**Brookfield - Libelium sensor with solar shield,  
solar panel and antenna extension in strawberry field**



# Brookfield Sensor in tomato greenhouse

Heat  
Shielding





## Brookfield - Sensor in Walk-In Cooler

Cygnus  
Sensor



## Brookfield Lower Field – Cellular Gateway with Sensors near Broccoli, Pepper and Eggplant fields



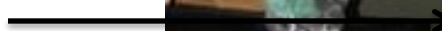


UMass Research Farm  
Gateway Computer  
and Yagi Directional Antenna

Yagi



Gateway  
Laptop



UMass Onion Low Tunnel Before Covering  
Gateway is Behind Barn in Distance



## Red Fire Farm Vegetable Storage Project Sensor

Carrots

Cygnus  
Sensor



## RT Cirrus Data Display-Network Devices List

**RT**CIRRUS



SENSOR Cloud

[Networks](#)

[Map](#)

[Reports](#)

[Alerts](#)

[Admin](#)

08/06/2012 09:32:49 AM **sare** [ [Log Off](#) | [Edit](#) ]

### Brookfield Farm USB Gateway

	Updated	Name	Address	Description	Latitude	Longitude
<a href="#">Sensors</a>   <a href="#">Edit</a>	07/31/2012 07:15:49 PM	Root Cellar	0013A200406164CB			
<a href="#">Sensors</a>   <a href="#">Edit</a>	08/06/2012 09:31:54 AM	Harnois Fieldhouse-Tomatoes	0013A200406164CE			
<a href="#">Sensors</a>   <a href="#">Edit</a>	08/06/2012 09:24:06 AM	Lower Field-Flowers	0013A2004064AB23			
<a href="#">Sensors</a>   <a href="#">Edit</a>	08/01/2012 10:17:25 AM	Computer Gateway (no sensors)	0013A20040860B0C			
<a href="#">Sensors</a>   <a href="#">Edit</a>	08/06/2012 09:28:07 AM	West Field-Tomatoes	0013A2004086167D			
<a href="#">Sensors</a>   <a href="#">Edit</a>	08/02/2012 03:08:33 PM	Upper Field-Tomatoes	0013A2004086199E			
<a href="#">Sensors</a>   <a href="#">Edit</a>	08/06/2012 09:25:53 AM	Walk-in Cooler	0013A20040980D05			
<a href="#">Sensors</a>   <a href="#">Edit</a>	08/06/2012 09:25:33 AM	Greenhouse	0013A20040980FDB			

[Refresh](#) | [Back to Network List](#)

free iPhone App



Powered by  
**Windows Azure**

© 2012 Reilly Technology Corp



**GODADDY.COM®**  
**VERIFIED & SECURED**  
VERIFY SECURITY



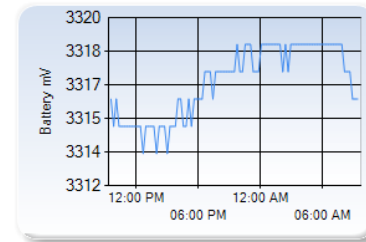
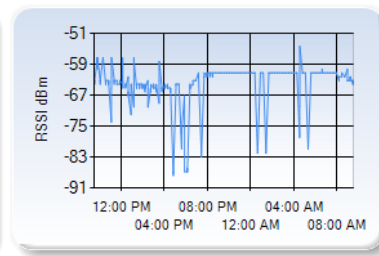
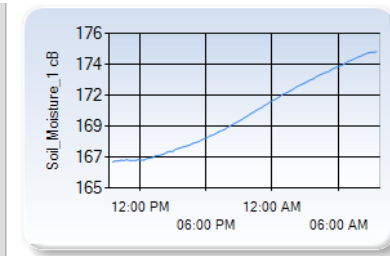
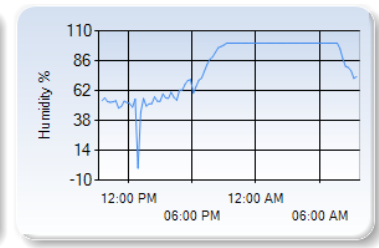
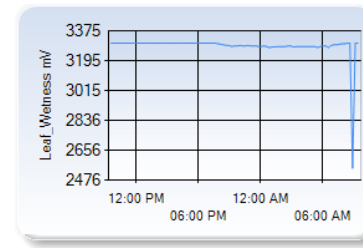
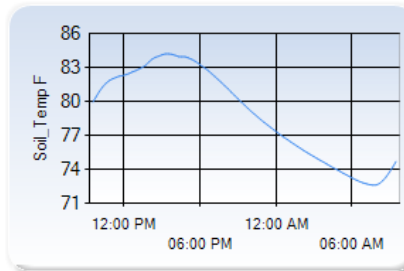
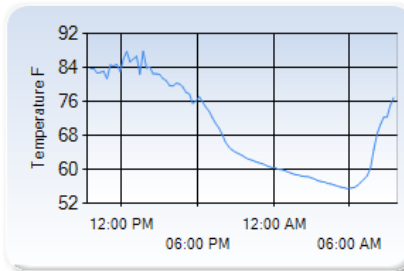
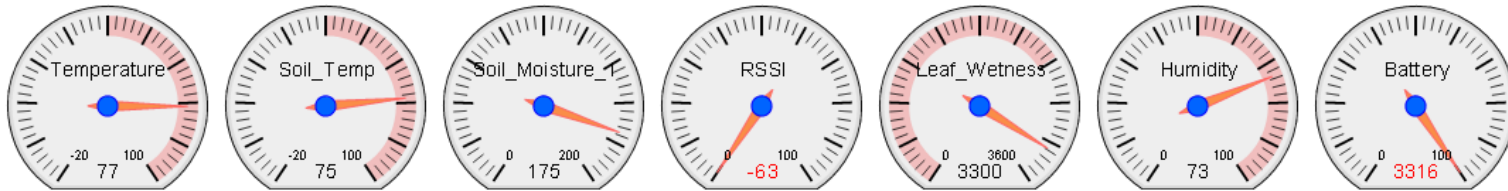
# RT Cirrus Data Display – One Device

Brookfield Farm USB Gateway > Harnois Fieldhouse-Tomatoes (0013A200406164CE)

## Sensor Cache

Updated	Sensor	Value	Units
08/07/2012 09:28:47 AM	Temperature	77.0	F
08/07/2012 09:28:35 AM	Soil_Temp	74.6	F
08/07/2012 09:28:33 AM	Soil_Moisture_1	174.6	cB
08/07/2012 09:28:48 AM	RSSI	-63.0	dBm
08/07/2012 09:28:48 AM	Leaf_Wetness	3300.0	mV
08/07/2012 09:28:47 AM	Humidity	73.4	%
08/07/2012 09:28:30 AM	Battery	3316.1	mV

[Refresh](#) | [Back to Device List](#)

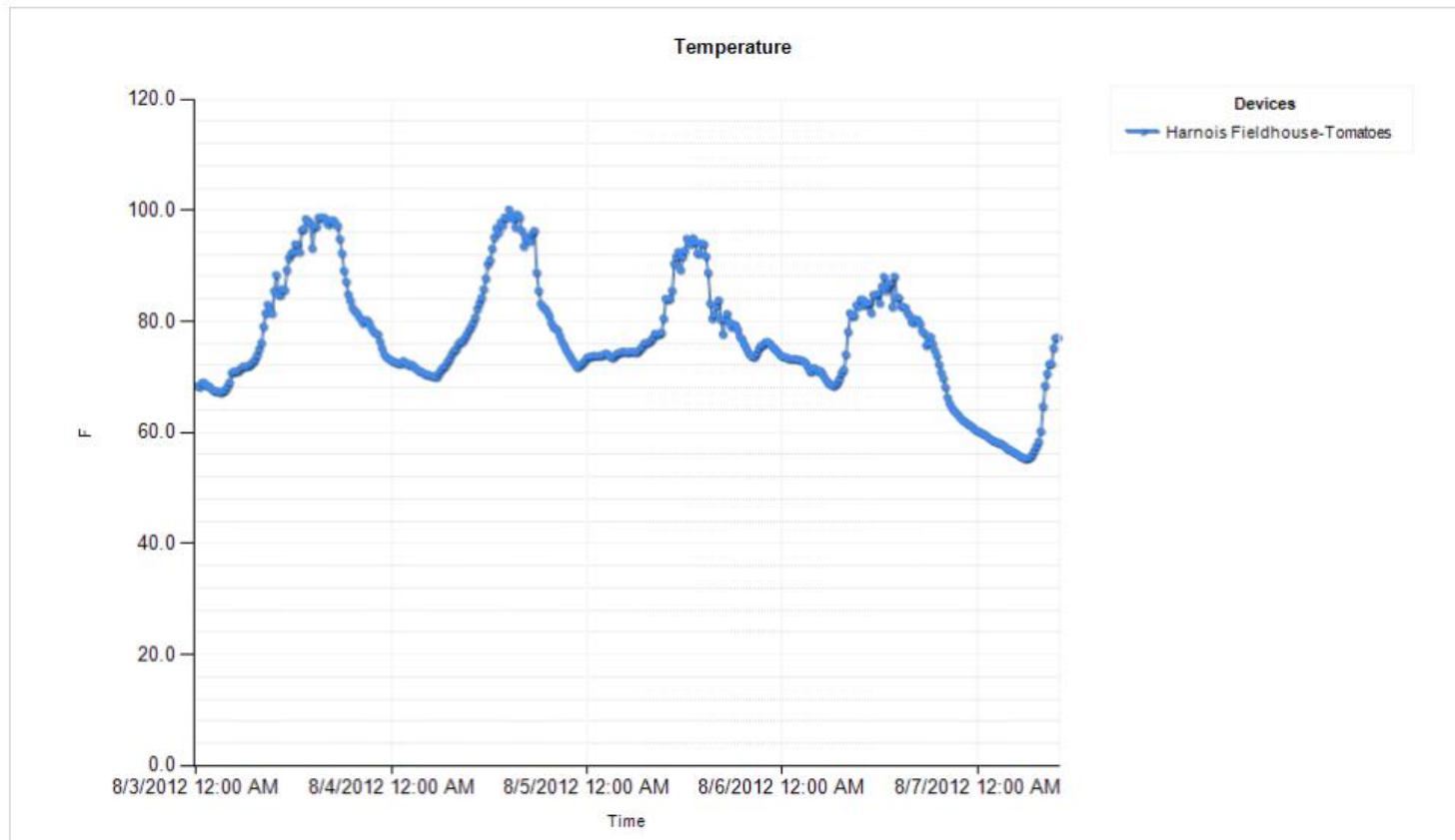


# RT Cirrus—Intraday Line Chart

## Intraday Sensor Report

08/07/2012 09:52:49 AM

Network: Brookfield Farm USB Gateway



# RT Cirrus—Intra Day Tabular Report

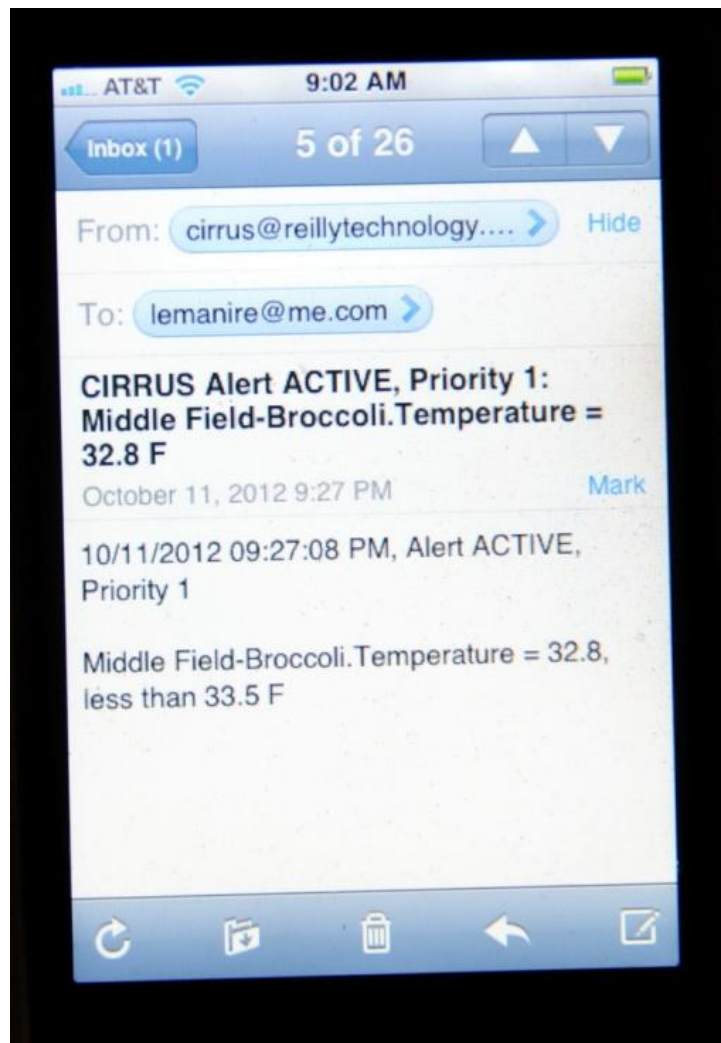
## Intraday Sensor Report

08/07/2012 10:08:19 AM

Network: Brookfield Farm USB Gateway

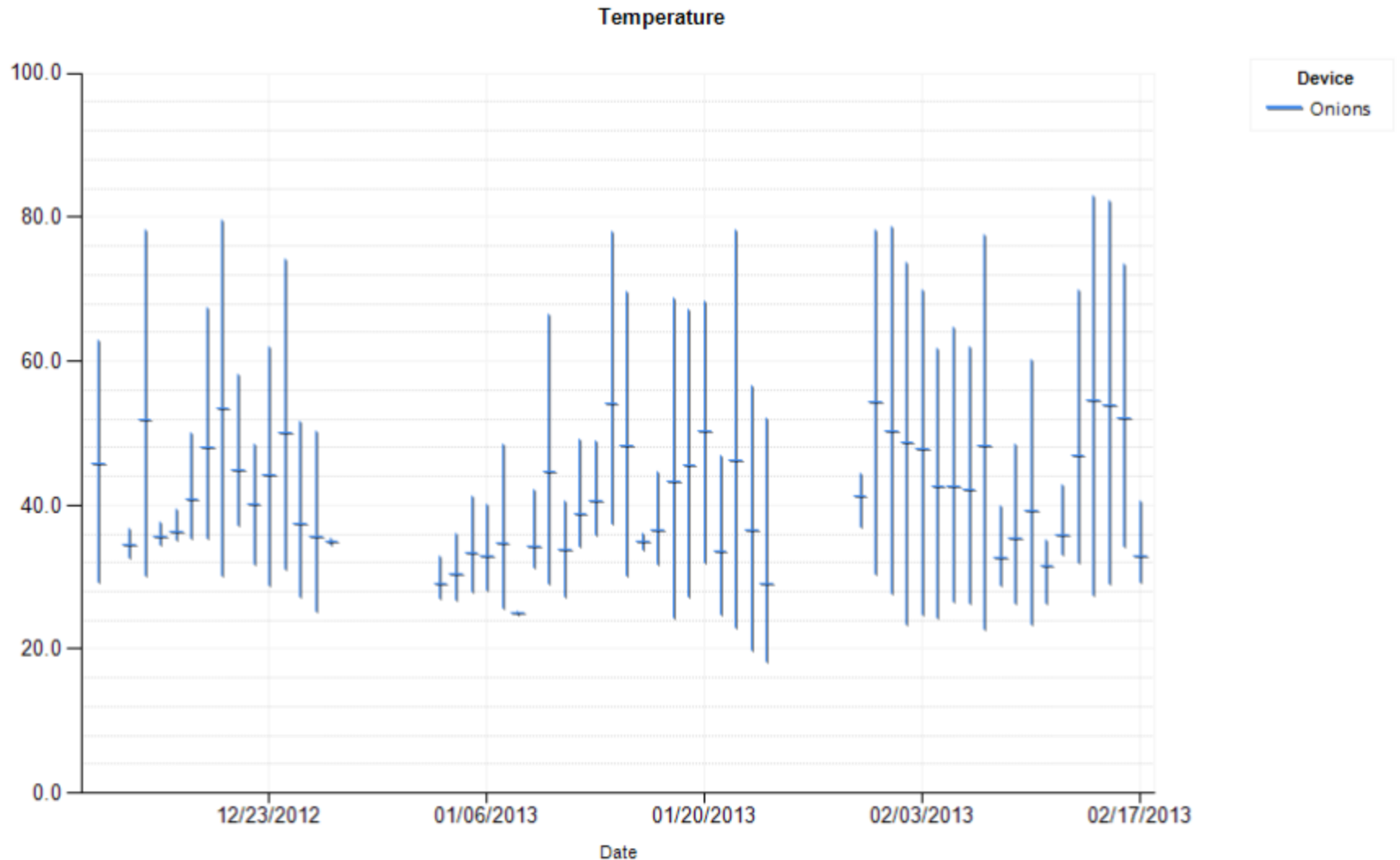
Device	Sensor	Date	Time	Value	Units
West Field-Tomatoes					
	Soil_Temp				
		☐ 08/03/2012			
			Min	74.2	F
			Max	84.2	F
			Avg	78.0	F
		☐ 08/04/2012			
			12:07:53 AM	79.5	F
			12:23:31 AM	79.3	F
			12:39:09 AM	79.1	F
			12:54:47 AM	78.9	F
			01:10:25 AM	78.7	F
			01:26:03 AM	78.5	F
			01:41:41 AM	78.3	F
			01:57:19 AM	78.1	F
			02:12:57 AM	78.0	F
			02:28:35 AM	77.8	F
			02:44:12 AM	77.6	F
			02:59:50 AM	77.5	F
			03:15:28 AM	77.3	F

## Alert email on iPhone





# Daily Range Chart for UMass Onion Low Tunnel - Breaks Resulted from Gateway Computer Issue or Loss of Internet



For more information contact:

Dan Kaplan, Principal Investigator, [www.brookfieldfarm.org](http://www.brookfieldfarm.org)

Larry Manire, Technical Manager, [lemanire@cox.net](mailto:lemanire@cox.net)