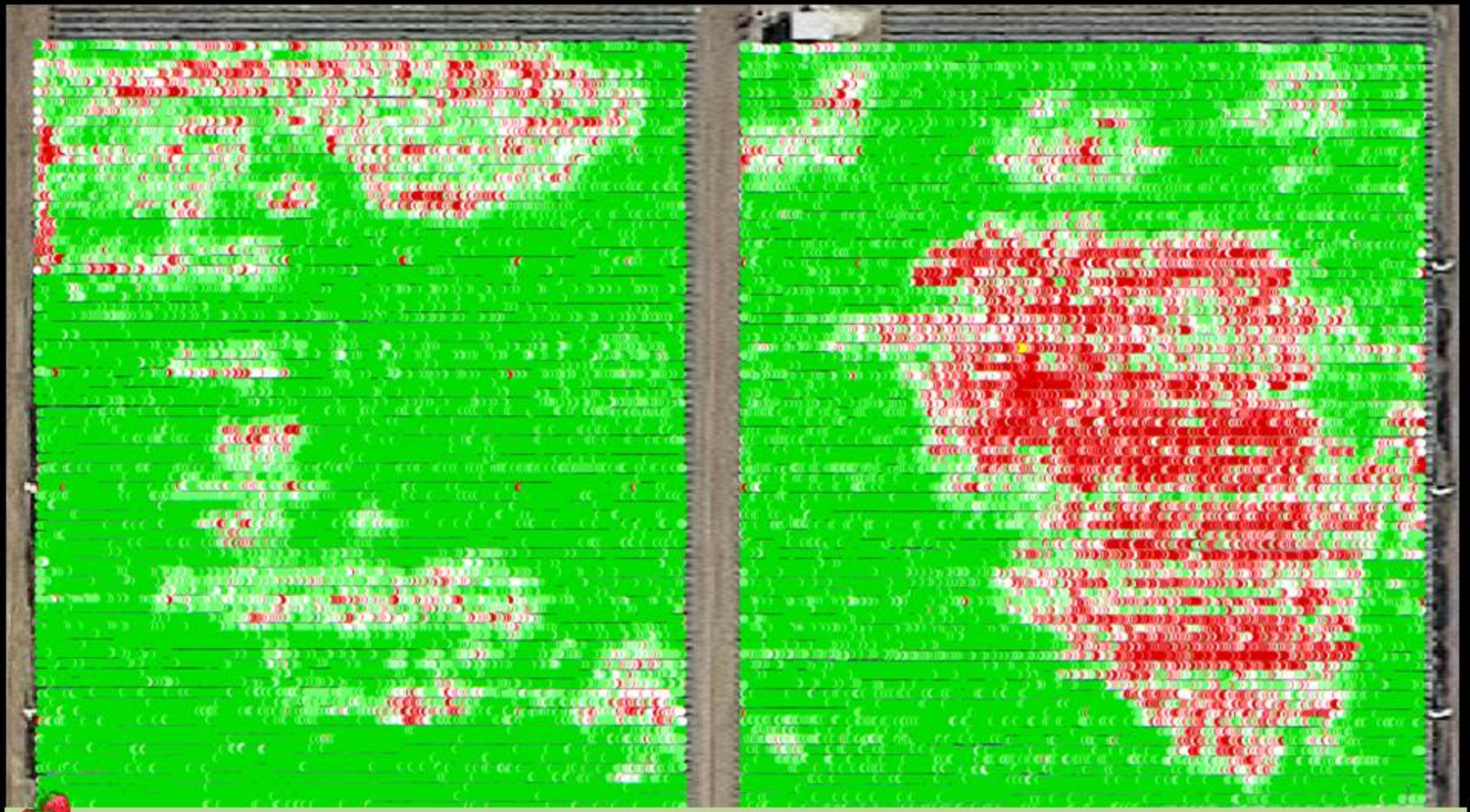
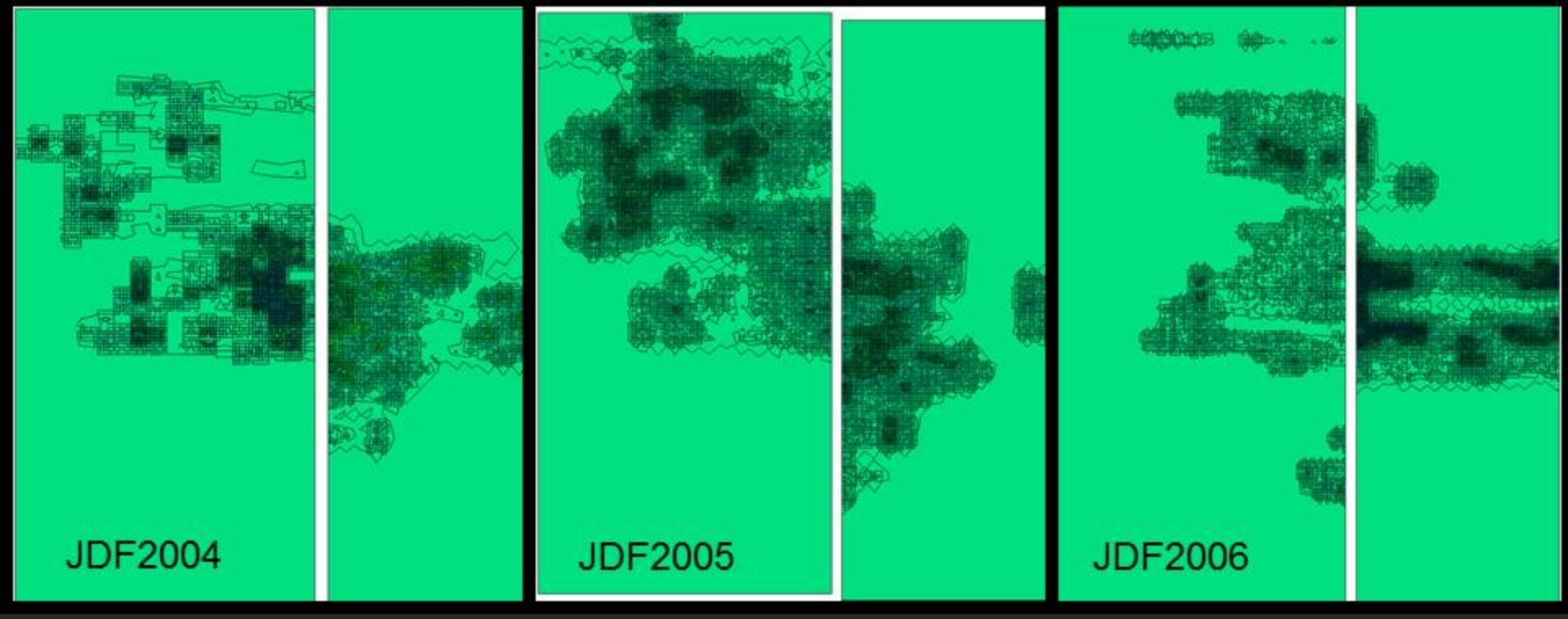


10:40 -11:10 am Strawberry Yield and Sting Nematode Impacts Estimated from Remote Sensing Technologies- Using Measures of Strawberry Canopy Greenness.

(Joseph W. Noling, Arnold W. Schumann, Billy Crow and Marjorie Cody)

Strawberry Agritech, August 5, 2015



FIELD DISTRIBUTION OF STING NEMATODE DAMAGE IN March of 2004, 2005, AND 2006

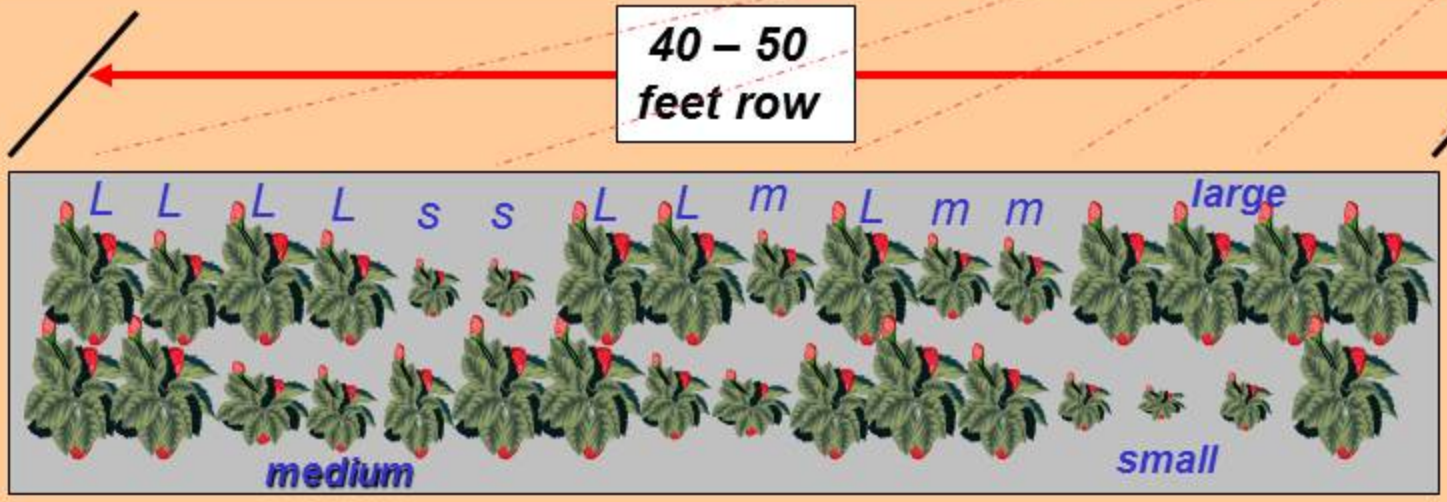
What do the maps tell us ? **When, Where Problem Distributed**

Clearly, YIELD MAPS WOULD INCREASE UTILITY & HAVE IMMEDIATE MANAGEMENT IMPLICATION


Large
Medium
Medium
Small
Large
Small
Small
In Addition to Counting, Started Assessing Yield of Different Plant Sizes

Ground Truthing Sting efficacy and treatment performance

PLANT SIZE DISTRIBUTIONS enumerated for All Fields and Chemical Treatments by Row and Sprinkler Section



	Canopy Diameter	Relative Yield
Small	< 8 ”	17%
Medium	<12 ”	48%
Large	>12 ”	100%

and Dead = 0 %

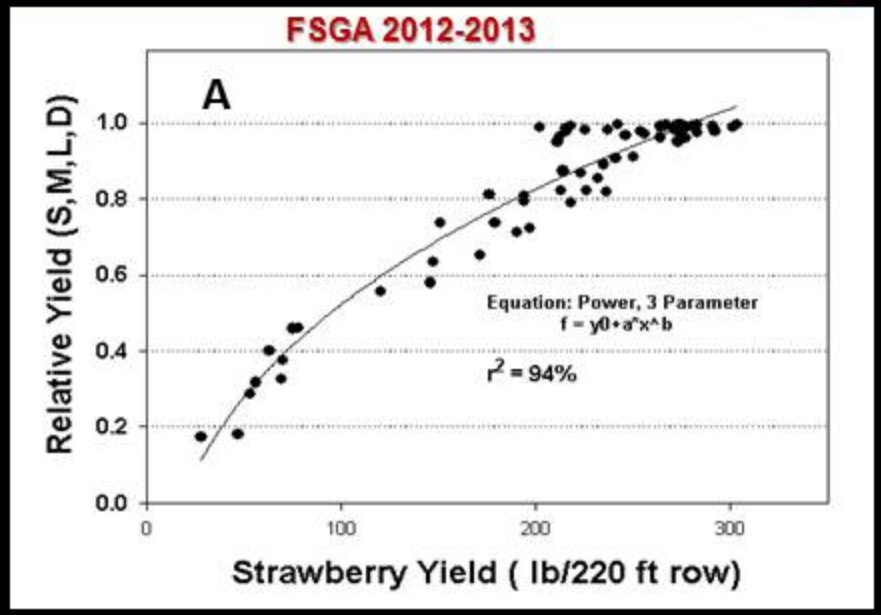
RELATIVE YIELD computed as the sum contribution from all plant of different sizes within each sprinkler section

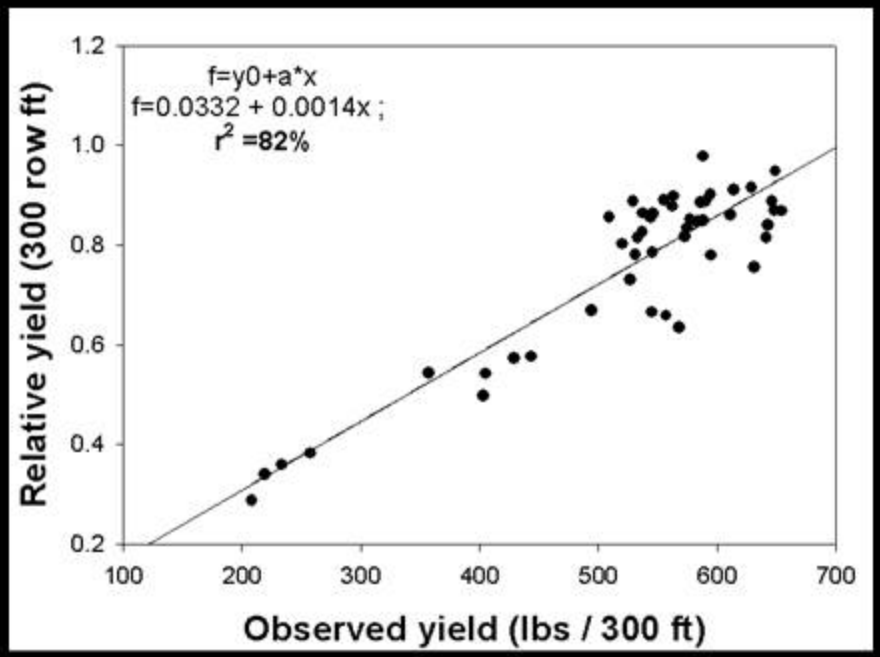
Evaluating the Methodology – Relative Yield vs YIELD

End of Season Ground Truthing

vs

Hand Harvesting





Very close agreement between

Hand Harvest Yields

&

Relative Yields

Based on Assessments of Different Plant Sizes (S,M,L,D)

Creating the Map, Comparing the Treatments .....

Characterizing Overall Crop Performance in over 60 Sting Nematode Infested Large Scale Grower Field Demonstration Trials 2009

Relative Yield

	location	trmt	*obs	relyld.	%small	%medium	%large
1	location	trmt	*obs	relyld.	%small	%medium	%large
2	T_Alexanc	MBr	88	0.8646	0.03625	0.17506	0.7737
3	T.Alexand	chisel	64	0.92684	0.003362	0.10028	0.87777
4	T.Alexand	nochisel	64	0.91344	0.00732	0.13865	0.8451
5	TimBlake-	Inline	48	0.92488	0.00547	0.1281	0.862
6	TimBlake-	Inline	48	0.93854	0.00643	0.08976	0.89403
7	Blanco	MBr	80	0.8567	0.0588	0.1548	0.7719
8	M_Brown		72	0.85352	0.02508	0.21238	0.7465
9	Chancey	chisel	40	0.97656	0.001804	0.03351	0.96005
10	Chancey	nochisel	50	0.97912	0.000825	0.02474	0.96701
11	M.Council	PicClor 60	84	0.8708	0.01689	0.2172	
12	M.Council	Midas50/5	60	0.91658	0.00736		
13	M.Council	Midas98/2	48	0.91264	0.01		
14	M.Council	MBr50/50	69	0.896			.818
15	Duke_Farm		80			.52	0.5863
16	FL_Pacific	Dazitol				0.17634	0.7453
17	FL_Pacific-W				0.02988	0.18909	0.7639
18	RonG			.86811	0.03019	0.1972	0.7676
19	RonGo		56	0.85952	0.02087	0.2349	0.7423
20	RonGoo	ne	48	0.95464	0.0058	0.077	0.9164
21	RonGood	EC+Inline	48	0.96943	0.003165	0.03982	0.94963
22	RusselGo	Telone EC	52	0.88973	0.01901	0.15778	0.71919
23	RusselGo	EC+Inline	64	0.93318	0.01213	0.10752	0.87911
24	Green		56	0.89142	0.01692	0.1781	0.8024

Relative Yield

25	C_Grooms	MBr	60	0.93519	0.00608	0.11164	0.88016
26	C_Grooms	Midas	48	0.94267	0.00562	0.09623	0.89517
27	C_Grooms	Paladin	48	0.94045	0.00397		84 0.88955
28	C_Grooms	MBr	36	0.92894	0.00		3 0.8651
29	C_Grooms	Vapam	48	0.92			0.86895
30	P.Haire-N	Vapam	5				393 0.7257
31	P.Haire-S	Vapam				7	0.3644 0.497
32	EddieMercer						0.03646 0.2005 0.7582
33	Eddi						0.84996 0.02123 0.17183 0.5528
			56	0.3343	0.4783	0.4156	0.052
			48	0.559	0.2711	0.389	0.3248
			48	0.28839	0.556	0.3451	0.02708
37	Sapp-1	PicClor 60	48	0.5626	0.2498	0.2646	0.3922
38	Sapp-2	PicClor 60	48	0.84784	0.03501	0.1993	0.7455
39	Sapp-3	PicClor 60	48	0.8549	0.0636	0.1631	0.7652
40	Skeeter-1	none	108	0.734	0.0877	0.3292	0.5598
41	Skeeter-2	none	50	0.20346	0.2945	0.2635	0.026
42	Skeeter-3	Telone	90	0.13698	0.4574	0.1226	0
43	Stickles-C	Inline	56	0.86938	0.02102	0.2104	0.764
44	Stickles-C	Inline	56	0.87435	0.02057	0.2055	0.7715
45	Stickles-CharlieTaylo		64	0.85978	0.03343	0.2079	0.7536
46	Stickles-MooreLake-		48	0.87008	0.03286	0.19631	0.7695
47	Stickles-MooreLake-		48	0.87529	0.02298	0.2021	0.77363
48	Stickles-MooreLake-		48	0.90401	0.01313	0.15917	0.82479

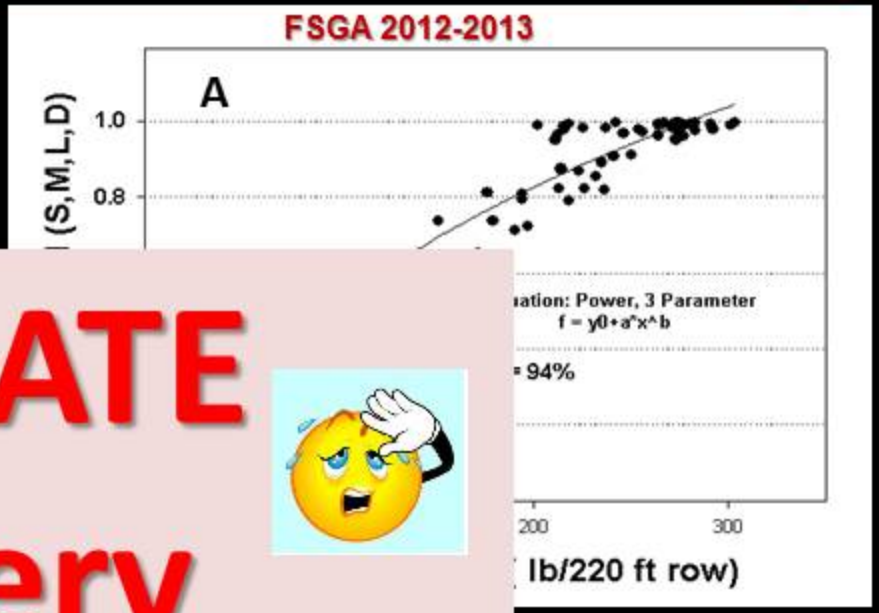
DID WE USE THE INFORMATION ----- Absolutely

* *Each observation represents plant size distributions (no. of s,m,l,dead) within 48-50 feet of plant row*

Evaluating the Methodology – Relative Yield vs YIELD

End of Season Ground Truthing

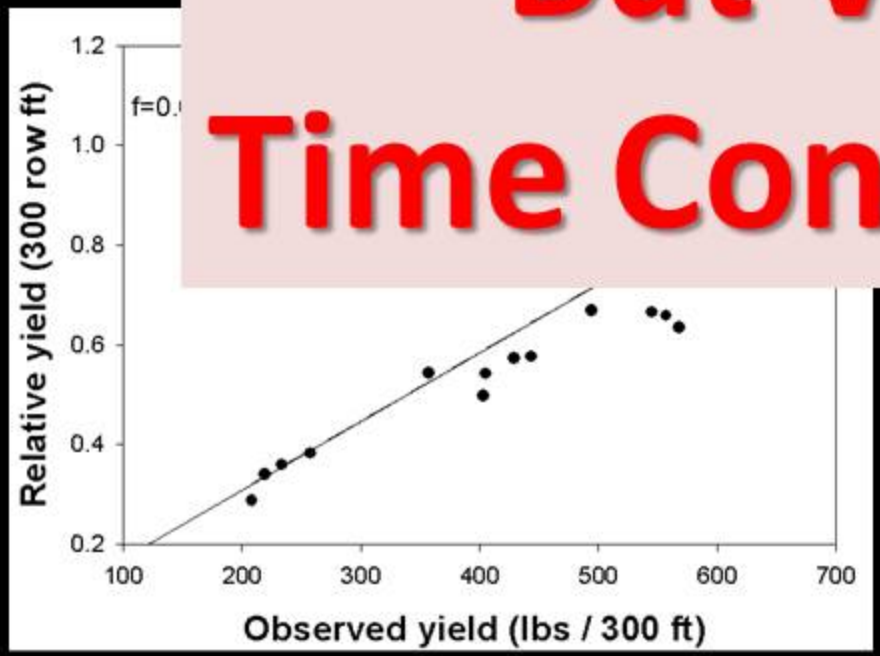
Hand Harvesting



ACCURATE

But Very

Time Consuming



ent between

t Yields

&

Relative Yields

Based on Assessments of Different Plant Sizes (S,M,L,D)

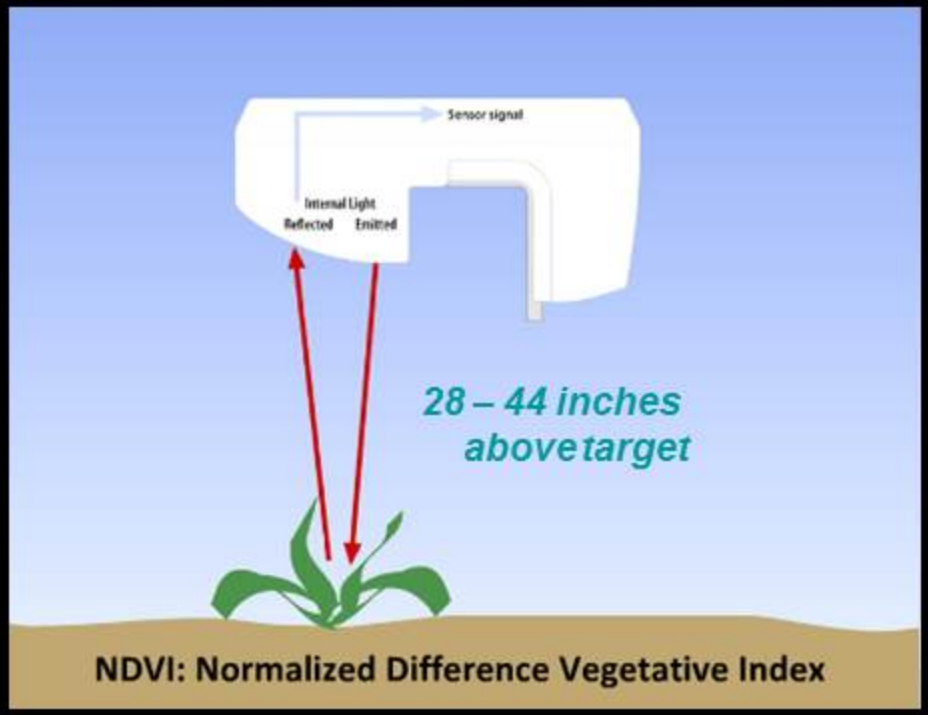
Maps to indicate where they occur and yield maps to estimate impacts

The Greenseeker® NDVI sensor

Trimble (formerly NTECH Industries, Ukiah, Ca)

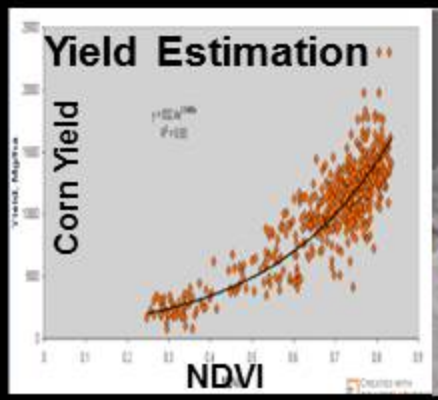
- The Greenseeker uses its own light source
- Normalized Difference Vegetation Index (NDVI)

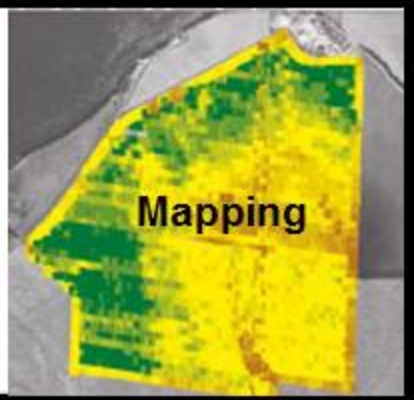
$$NDVI = (NIR - Red) / (NIR + Red)$$



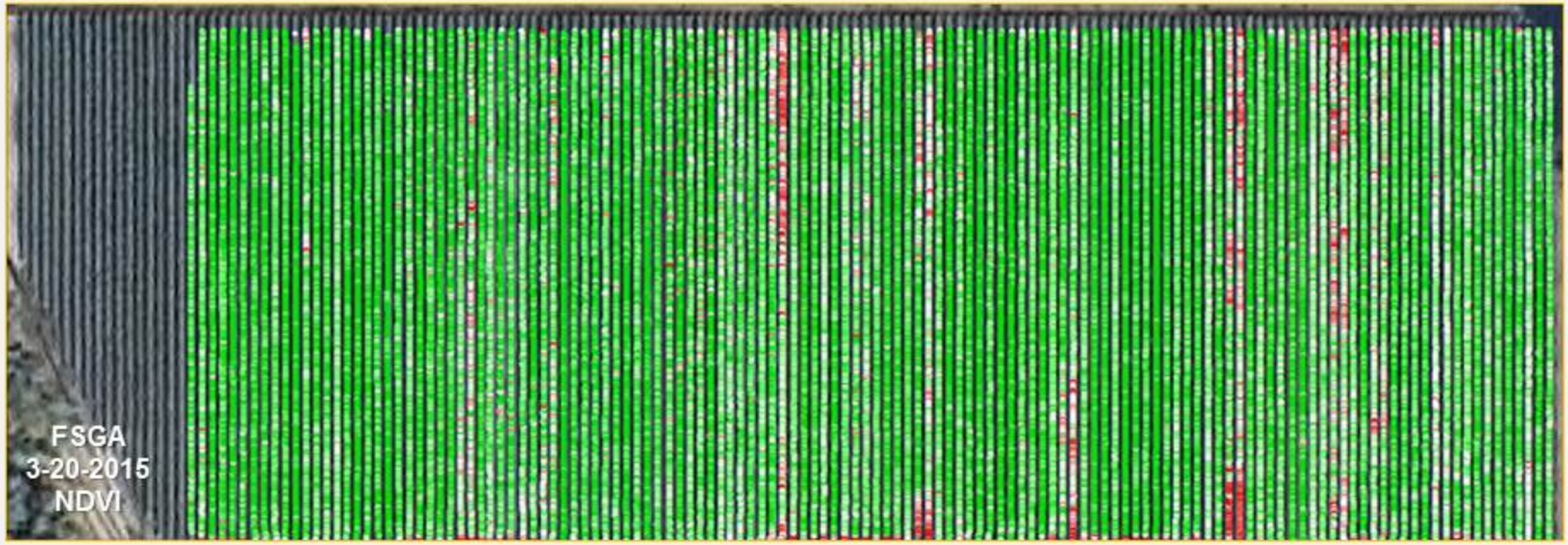
Emits light at two wavelengths, measures rellectances, computes and outputs NDVI, a measure of the amount and vigor of green plant canopy cover in its view

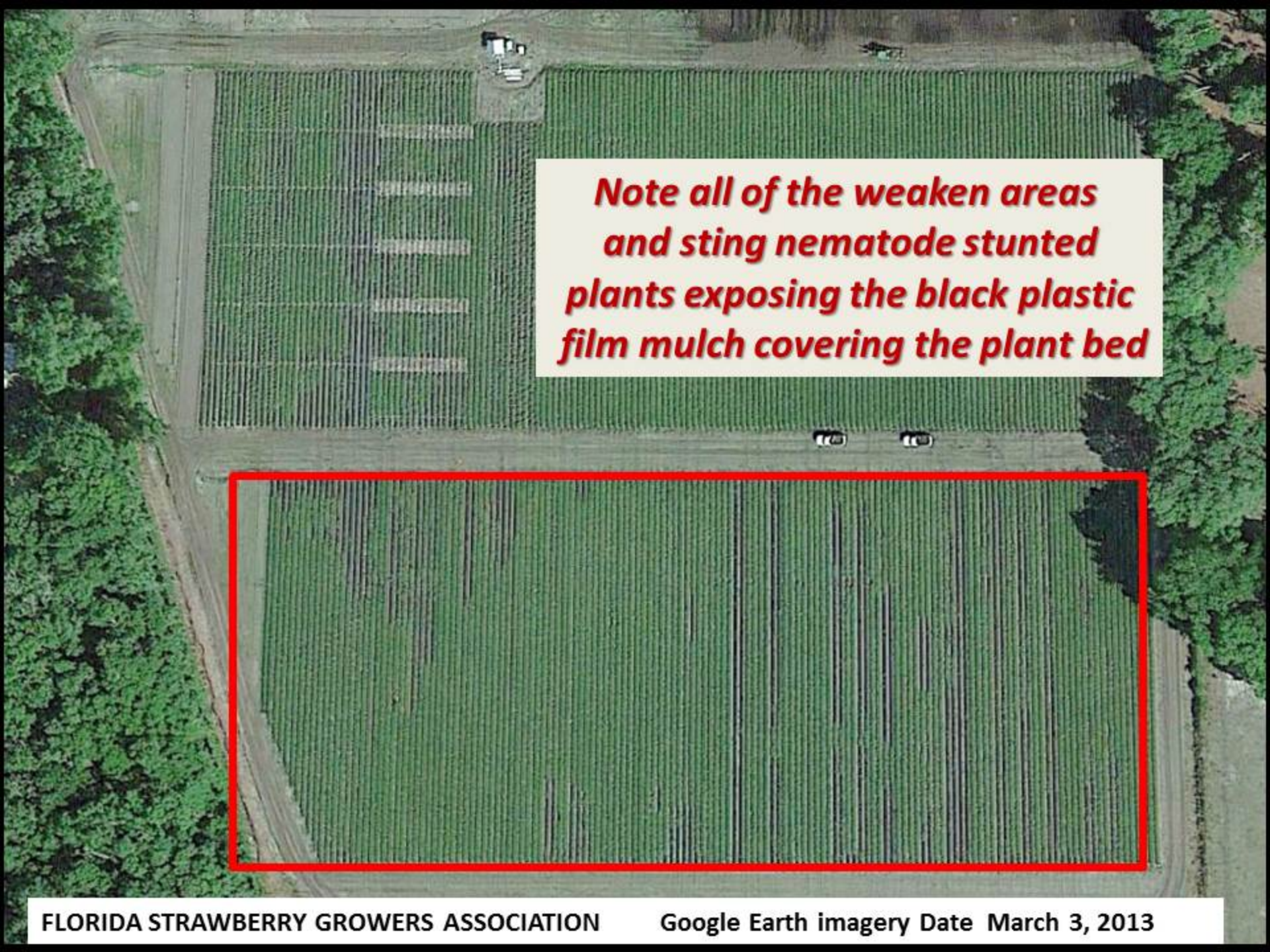
Healthy plants reflect more NIR





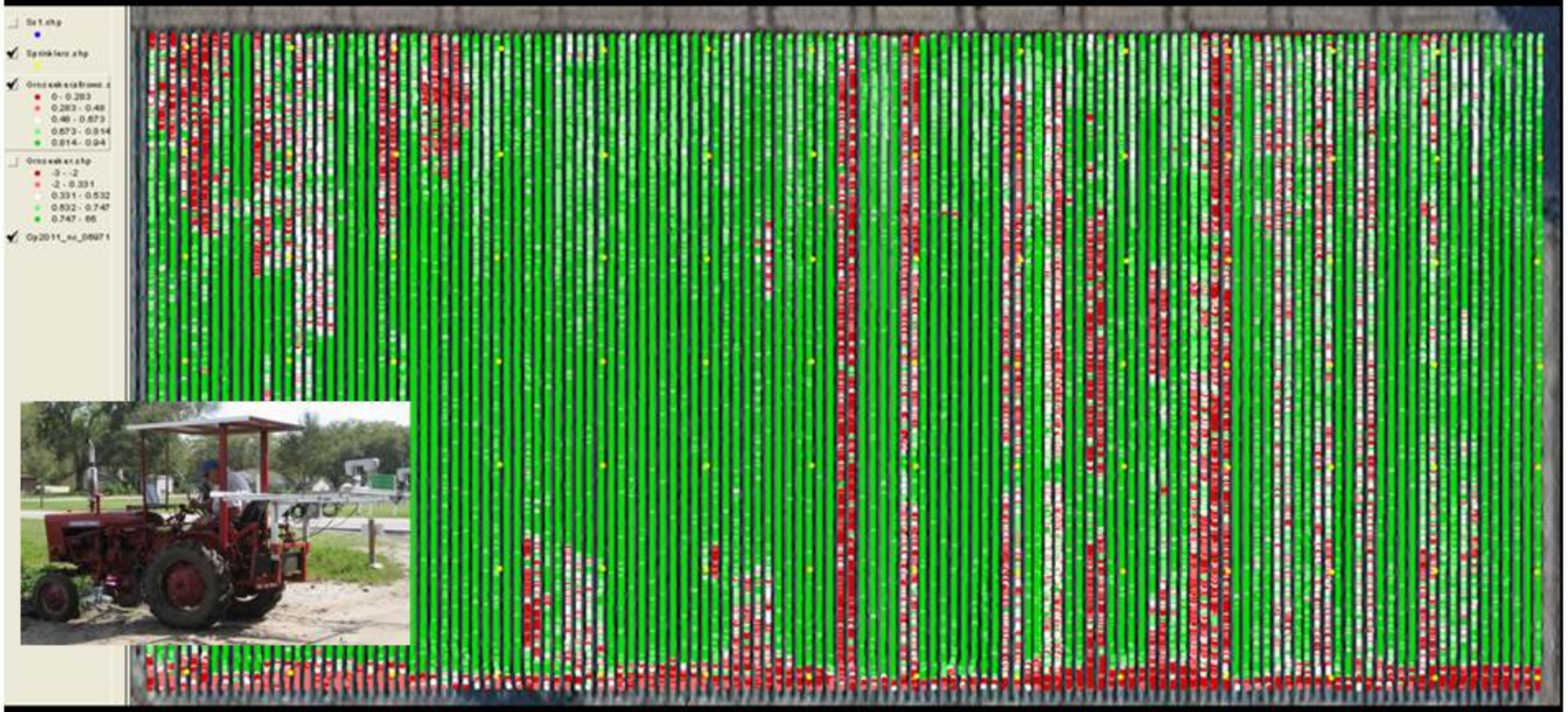
FSGA 2015 – Imaging Comparisons: Google vs NDVI





FLORIDA STRAWBERRY GROWERS ASSOCIATION Google Earth imagery Date March 3, 2013

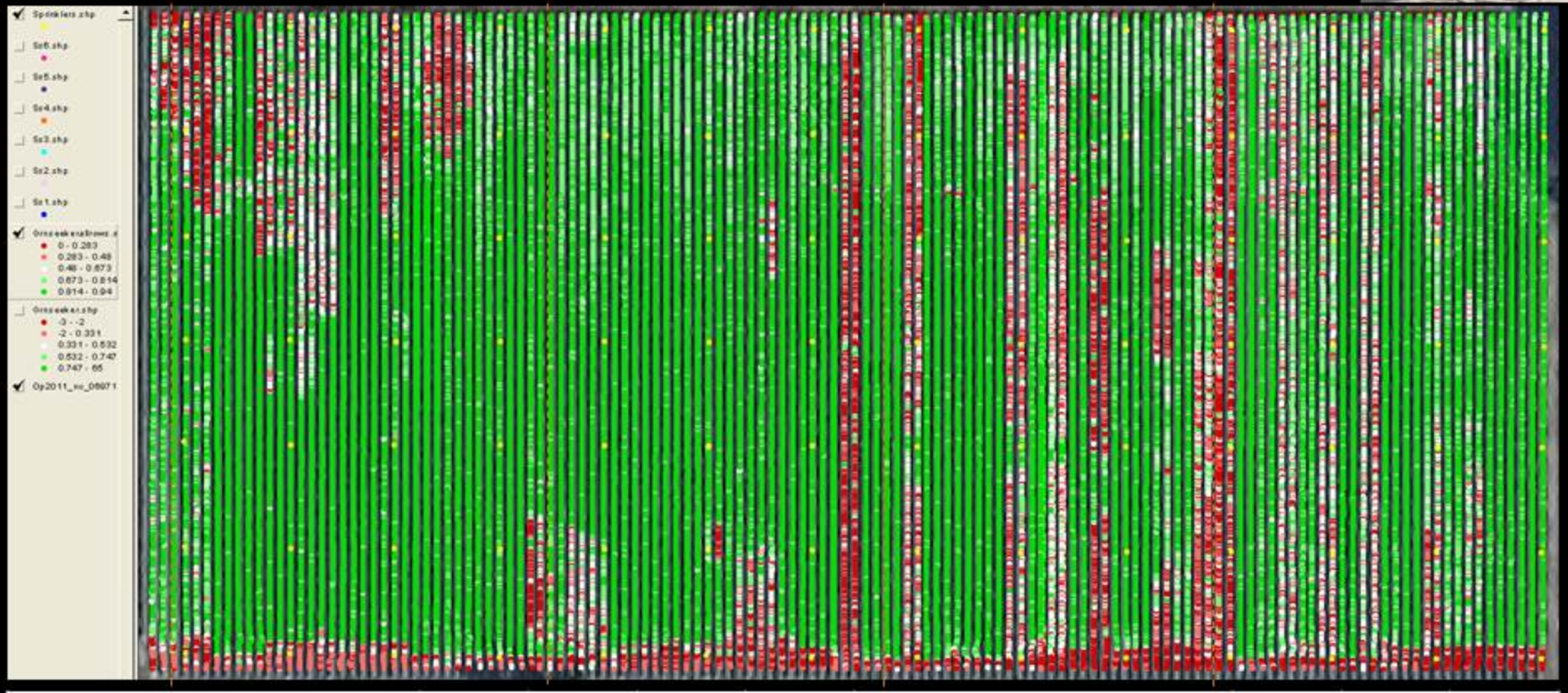
Characterizing Nematode Distribution and Fumigant Treatment Performance Using GreenSeeker and NDVI technologies



Florida Strawberry Growers Research & Education Foundation Farm March 4, 2013

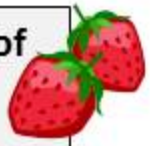
Field areas in red above indicate dead or small nematode stunted strawberry plants . Rows of stunted plants indicate a diversity of fumigant treatments which did not effectively control the Sting Nematode, Belonolaimus longicaudatus during 2012-2013!

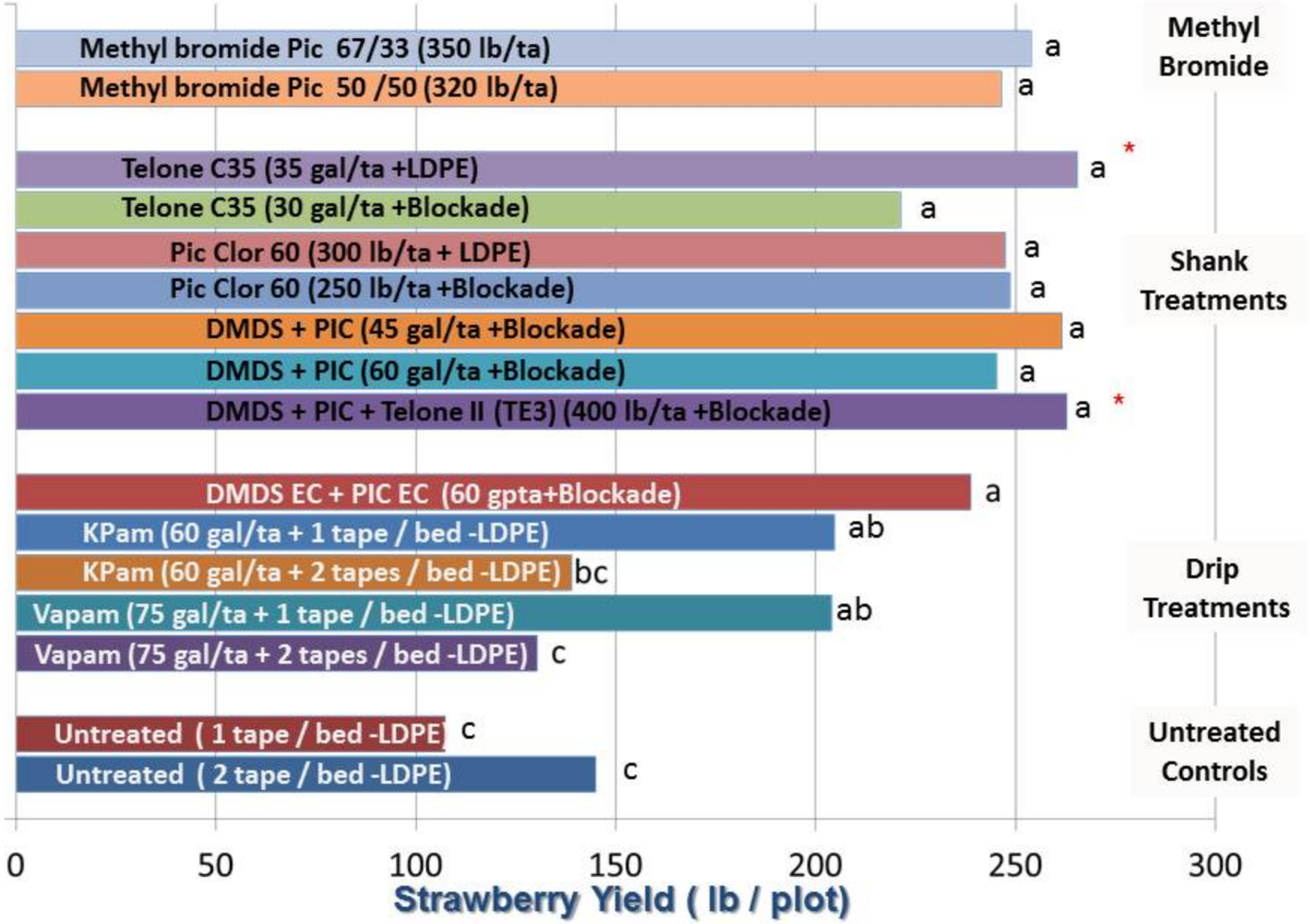
FSGA. NDVI Field Analysis Showing Distribution of Sting Nematode Stunted Plants at end of season on March 3, 2013



trmt	NDVI	SE	obs	trmt	NDVI	SE	obs
1-Methyl Bromide 67/33 (350 lb/ta)	851	1.08	4165	9-Pic-Clor60 (300 lb/ta)+LDPE	797	2.14	4497
2-Methyl Bromide 50/50 (320 lb/ta)	822	1.71	3685	10-Pic-Clor60 (250 lb/ta)+Blockade	799	1.86	4144
3-TeloneC35 (35gpta)+LDPE	816	1.77	3346	11-Kpam (60gpta)+LDPE-1 tape	688	3.14	4162
4-TeloneC35 (30gpta)+Blockade	800	2.63	3334	12-Kpam (60gpta)+LDPE-2 tapes	628	3.06	4099
5-DMDS + PIC (45gpta)	853	1.21	3745	13-Vapam (75gpta)+LDPE-1 tape	713	3.59	3386
5-DMDS + PIC (60gpta)	846	1.31	3299	14-Vapam (75gpta)+LDPE-2 tapes	631	3.54	3316
7-DMDS+PIC+TeloneII(Te3)(400 lb/ta)	835	1.52	3326	15-Untreated-1 tape	450	4.64	3746
8-DMDS + PIC EC(60gpta)	861	1.02	3710	16-Untreated-2 tapes	606	4.08	3313

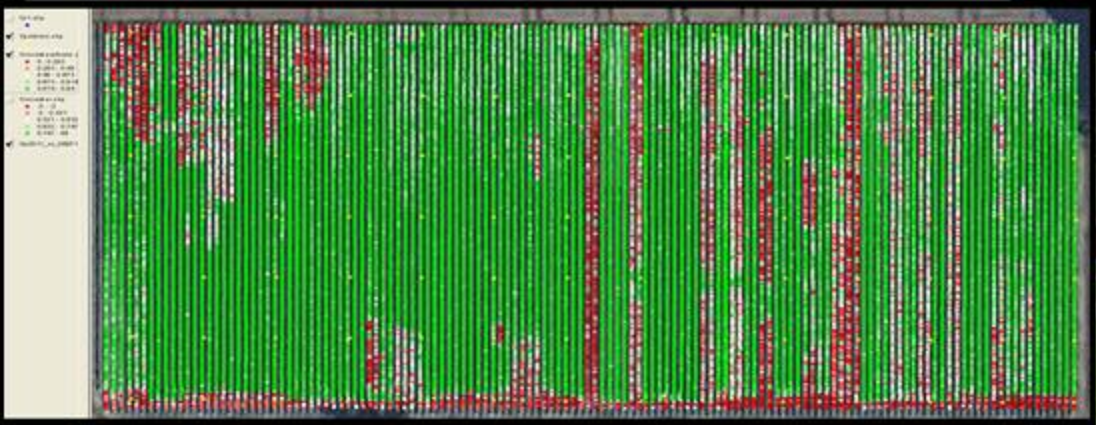
Figure 1. Strawberry fruit yields (lb/plot) for 16 different fumigants, rates of application, types of plastic mulch, and numbers of drip tapes per bed applied via shank or drip tape delivery at the Florida Strawberry Growers Association Farm in Dover, FL during Fall 2012-Spring 2013.



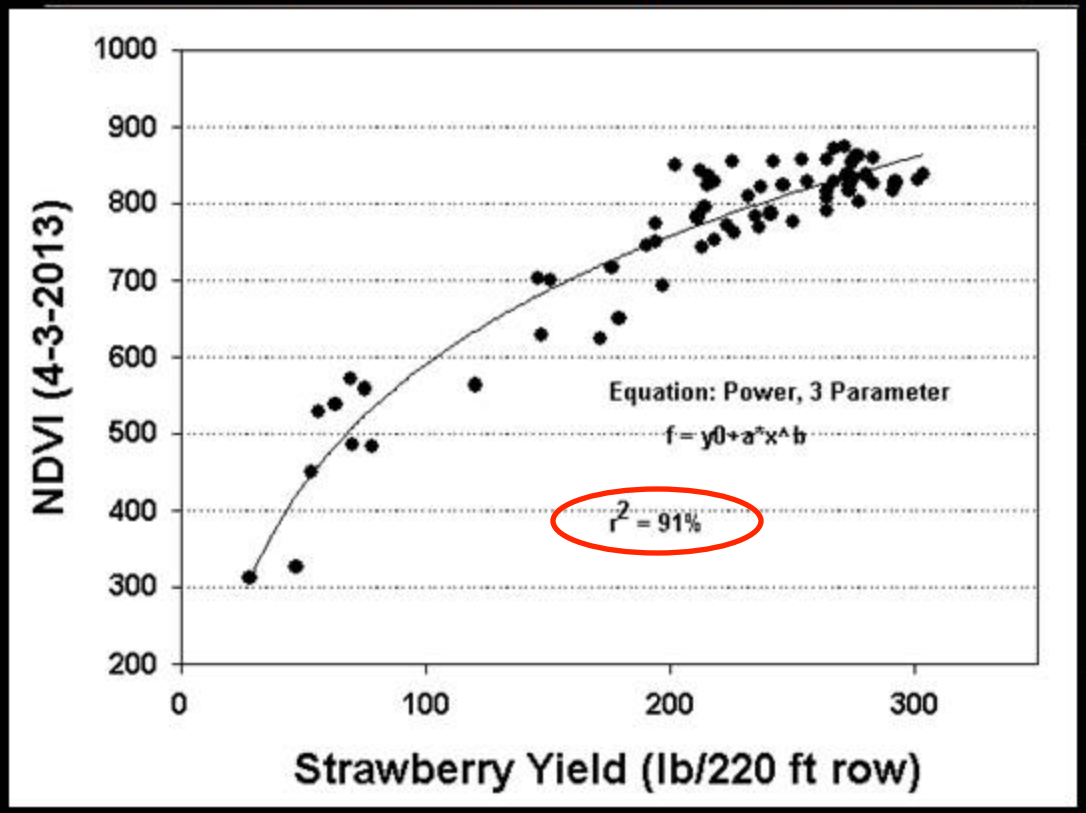


Characterizing Nematode Distribution and Fumigant Treatment Performance Using GreenSeeker and NDVI technologies

FSGA 2013



Florida Strawberry Growers Research & Education Foundation Farm March 4, 2013



Very close agreement between

Hand Harvest Yields
&
NDVI

Assessments of Canopy cover

The system works as an accurate alternative to hand harvesting, and for field mapping for crop loss assessment / insurance purposes

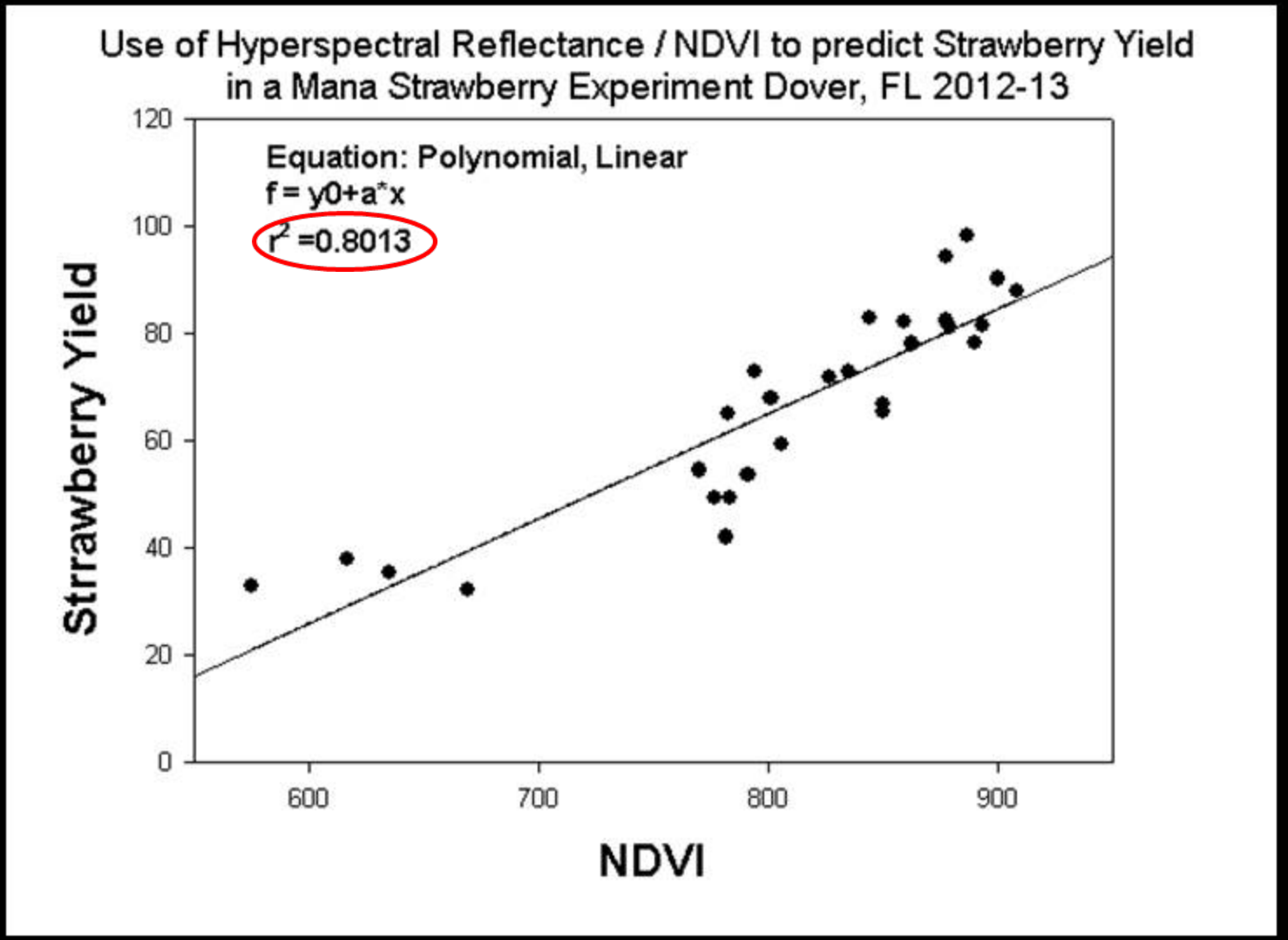
Evaluating the Methodology- Proof of Concept

Closely correlated variables!

End of Season
NDVI Assessment

vs

Hand Harvesting

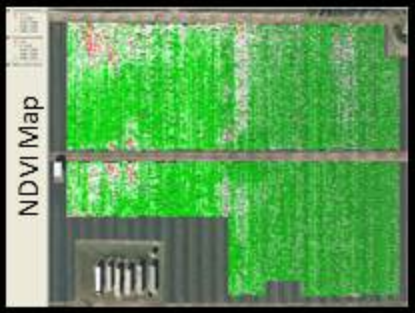


Evaluating the Methodology- Proof of Concept

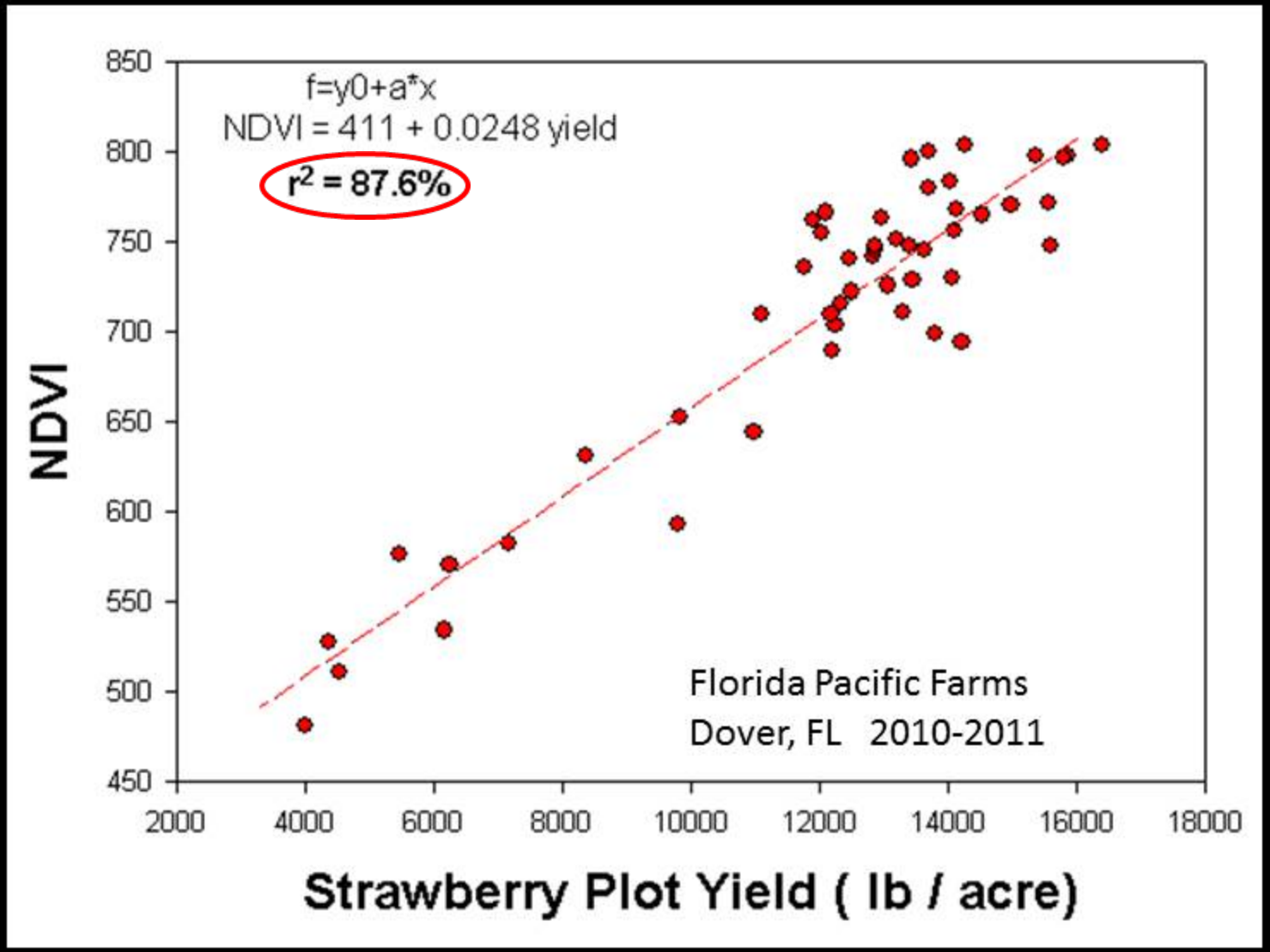
End of Season
NDVI Assessment

vs

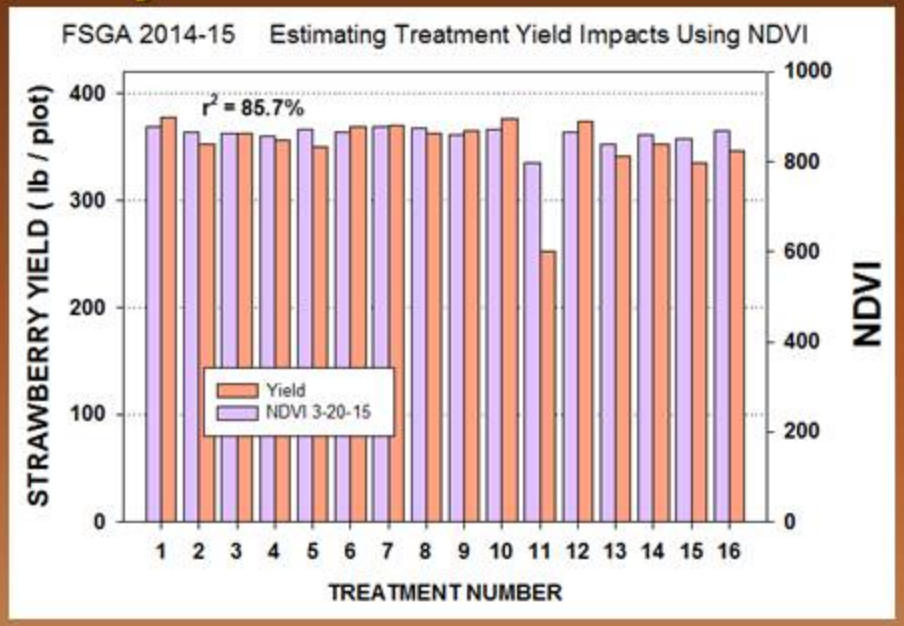
Hand Harvesting



Closely correlated variables!



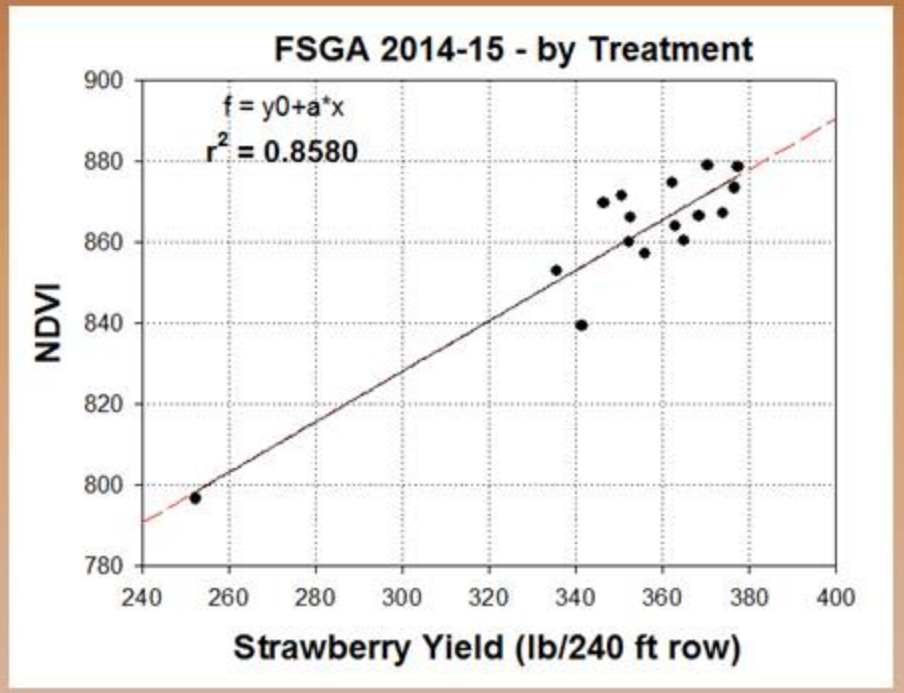
Direct and Indirect Measures of Berry Yield - FSGA 2014-15



- *Close Agreement between NDVI and Hand Harvesting*

Mapping Provides Permanent Record

- Treatment Performance
- Stunted Plant Locations



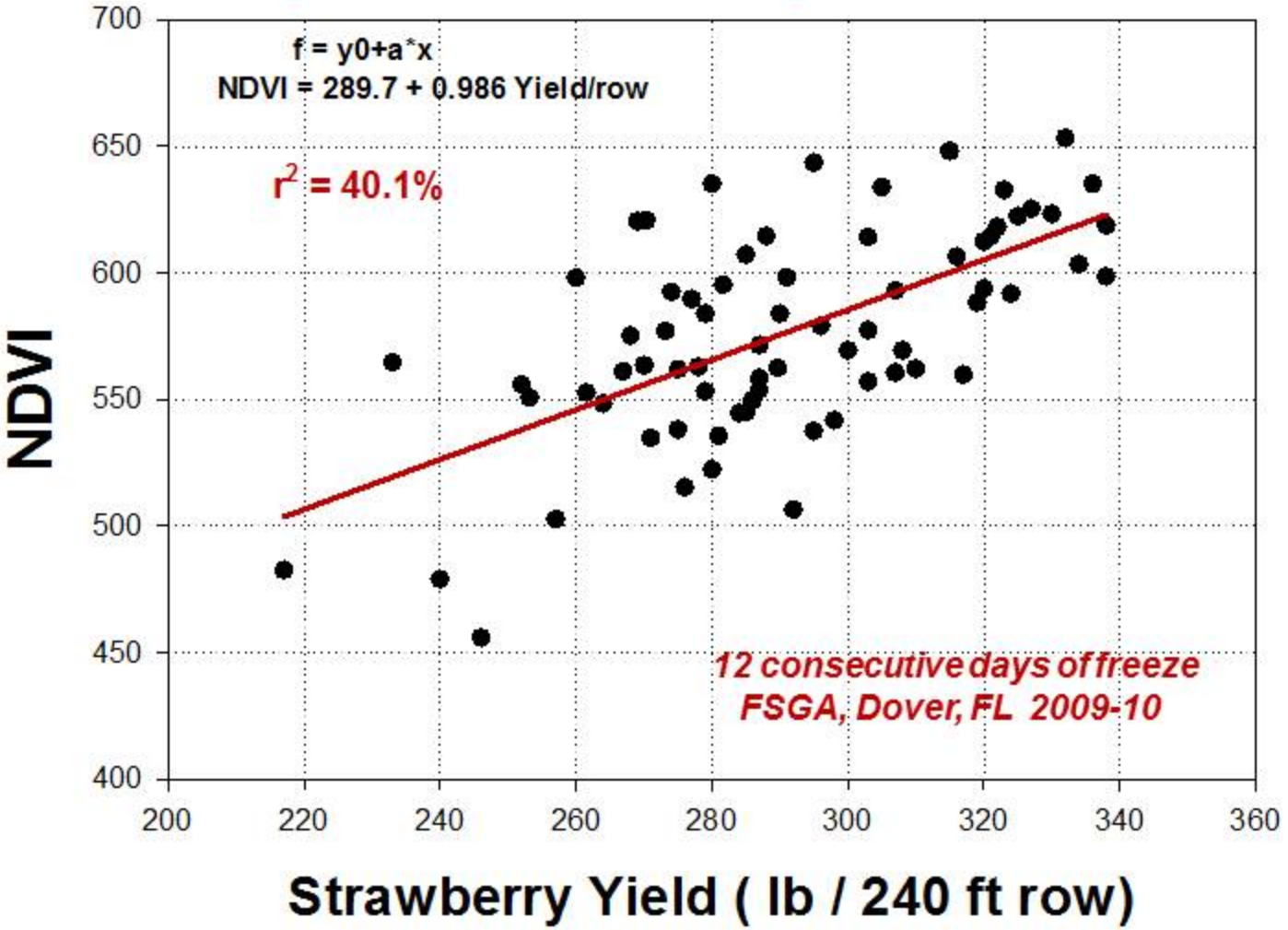
Evaluating the Methodology- Understanding Variation

Environmentally Induced - harvest yields differentially affected?

End of Season NDVI Assessment

vs

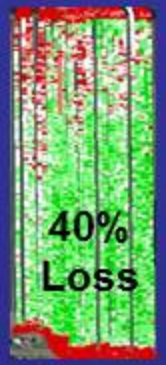
Hand Harvesting



What can we Conclude:

Hand harvesting

Simple Tool for :



- Nematode Mapping
- Crop Loss Assessment
- Cost effective alternative to labor intense picking to quantify treatment differences among Sting Nematode Management alternatives

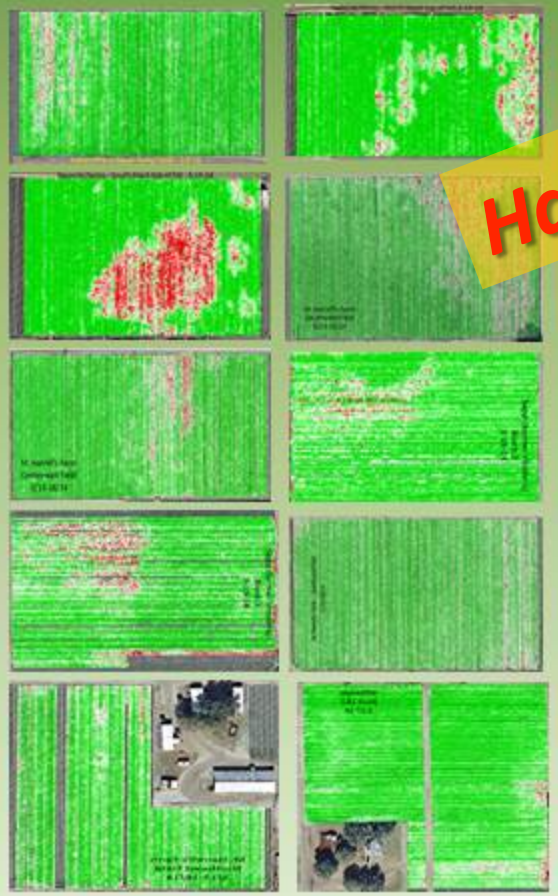
(particularly useful for large scale demos with many cooperators and pinpoint accuracy not required)

FSGA sponsored ...

14 Grower Demo's

- Different Fumigants
- Rates of Application
- Tarp Permeabilities

compared with
Grower Standard



FSGA (rows 1-96)
- DMDS + PIC (60gpta;38gpa) + Blockade
- DMDS EC(50gpta)+Vapam(75gpta)+Blockade
- TE3 (400 lbs/ta;24gpa) + Blockade
- DMDS EC + PIC EC ( ) + Blockade

FSGA (rows 97-122)
- TE3 (12gpa) + VaporSafe
- TE3 (18gpa) + Blockade
- TE3 (24gpa) + Blockade
- Mbr+Pic 67/33 (350lb/ta)

Favorite Farms Labor Camp Field
- DMDS (24gpa) + VaporSafe
- DMDS + PIC (38gpa) + Blockade
- TE3 (24gpa) + Blockade

Favorite Farms - with 2 blocks McIntosh
- DMDS + PIC (38gpa) + Blockade
- TE3 (24gpa) + Blockade

Favorite Farm -Bethlehem Rd (3 fields)
- TE3 (gpa) + Blockade(3.58 gal/min;4.2mph)
- TE3 (24gpa) + Blockade
- DMDS + PIC (38gpa) + Blockade

Favorite Farm-Bethlehem Rd - South blk
- TE3 (gpa) + Blockade(3.58 gal/min;4.2mph)
- TE3 (24gpa) + Blockade
- DMDS + PIC (38gpa) + Blockade

Sapp Farm -Block 1
- TE3 (24gpa) + TIF
- DMDS + PIC (38gpa) + TIF

Sapp Farm -Block 2&3
- TE3 (19gpa) + Imaflex
- TE3 (19gpa) + VaporSafe
- TE3 (19gpa) + Blockade
- DMDS + PIC (30gpa) + Total Blockade
- DMDS + PIC (30gpa) + Imaflex
- DMDS + PIC (30gpa) + VaporSafe

Stickles Florida Pacific Blocks 1&2
- TE3 (24gpa) + FilmTek
- TE3 (24gpa) + VaporSafe
- Telone C35 (22 gpa) + Filmtek

Stickles Florida Pacific Blocks 3-6
- DMDS + PIC (38gpa) + FilmTek + NoDevrinol
- DMDS + PIC (38gpa) + FilmTek + Devrinol
- Pic Clor 60 (300 lb/ta) No Devrinol
- Pic Clor 60 (300 lb/ta) + Devrinol

Whiteside- Moores Lake
- TE3 (19gpa) + VaporSafe
- TE3 (12gpa) + VaporSafe
- TE3 (24 gpa) + Blockade
- Pic Clor 60 (300 lb/ta) + LDPE

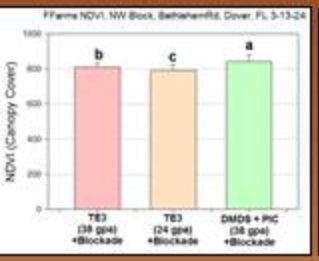
Whiteside in Front of House
- TE3 (19gpa) + VaporSafe
- TE3 (12gpa) + VaporSafe
- TE3 (24 gpa) + Blockade
- Pic Clor 60 (300 lb/ta) + LDPE

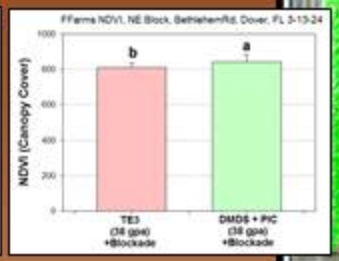
Adam Young Farm
- DMDS (38gpa) + Blockade
- DMDS (38gpa) + FilmTek
- DMDS (38gpa) + TIF
- DMDS (23gpa) + FilmTek
- DMDS (23gpa) + TIF

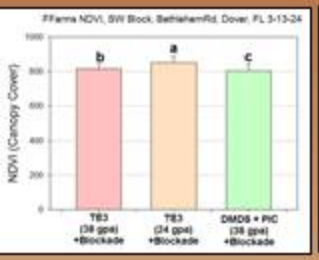
Ronnie Young Farm
- TE3 (12gpa) + VaporSafe
- TE3 (24gpa) + Blockade

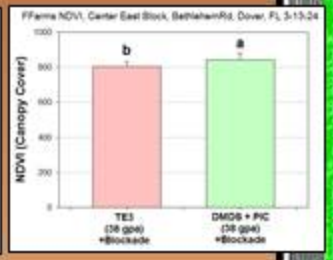
Have we used NDVI ----- You Bet ☺

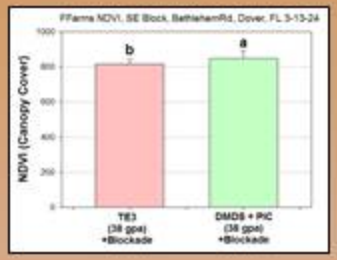
Field and Whole Farm Experimental Units





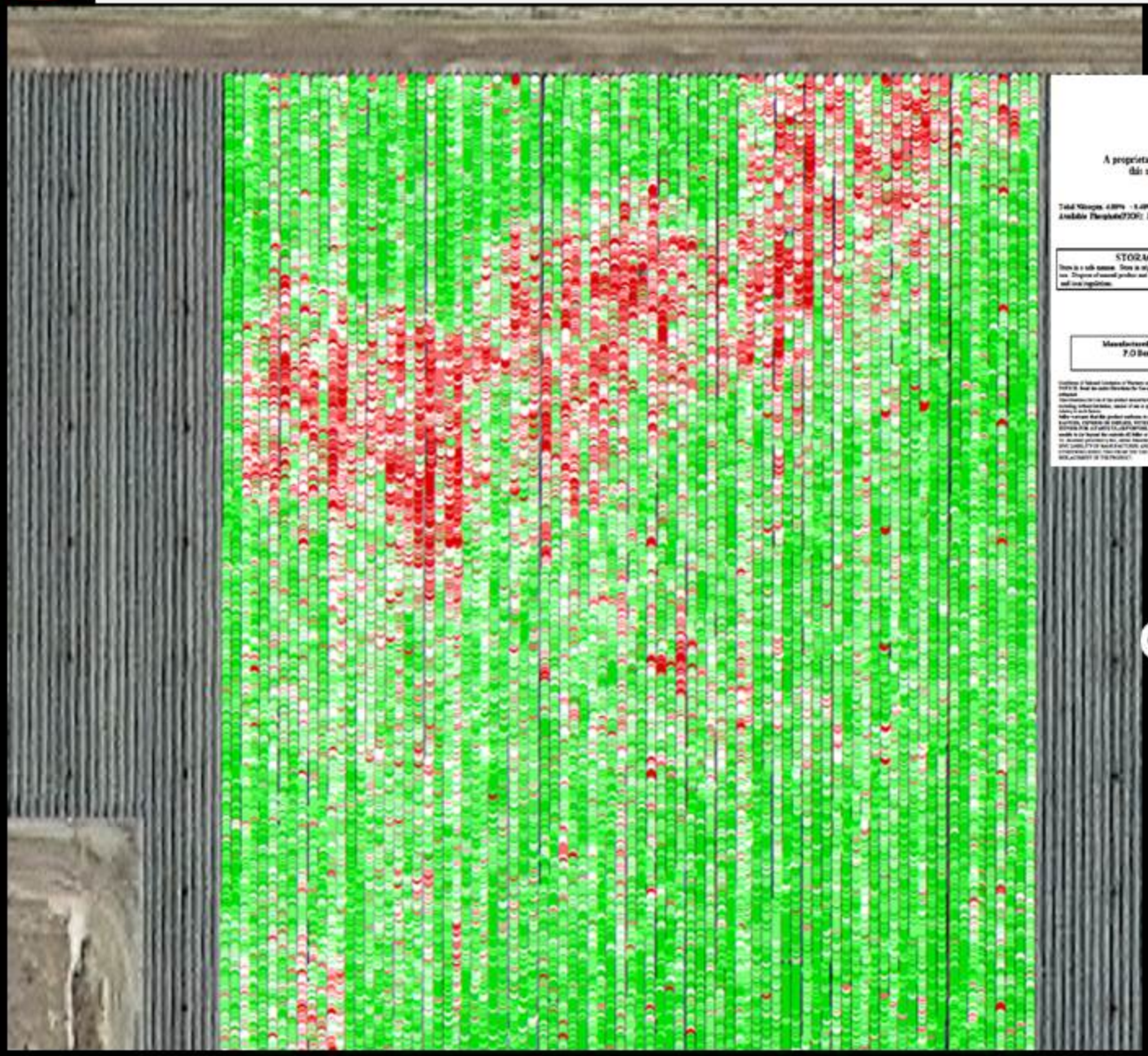






Of the 3 DMDS treatments DMDS +PIC (60 gpta) the Best NONE Solved Nematode Problem

Favorite Farms –East of Labor Camp March 2015



RootGuard.

Soil Amendment

A proprietary blend (patent pending) of differing grinds of crab shell and a blend of organic materials, this mix has been engineered to enhance the natural occurring soil microbial communities

Guaranteed Analysis: 4-3-0

Total Nitrogen 4.00% - 3.49% Ammoniacal Nitrogen, 0.45% Other Water Soluble Nitrogen, 3.55% Water Insoluble Nitrogen
Available Phosphate(P2O5) 3% contained CONTROLLED RELEASE NITROGEN- 3.55%

Derived from: Crab Meals, Feather Meal

STORAGE AND DISPOSAL

Store in a cool moisture Store in original container only and keep tightly sealed when not in use. Dispose of unused product and empty containers in accordance with Federal, State and local regulations.

DIRECTIONS FOR APPLICATION

Best land management practices should be used at all times with any fertilizer, this material should not be permitted to enter public or private water supplies (including well), and any inlet streams or rivers SEE APPLICATION RATE SHEET

NET WEIGHT: 40 lbs (18.17 KG)

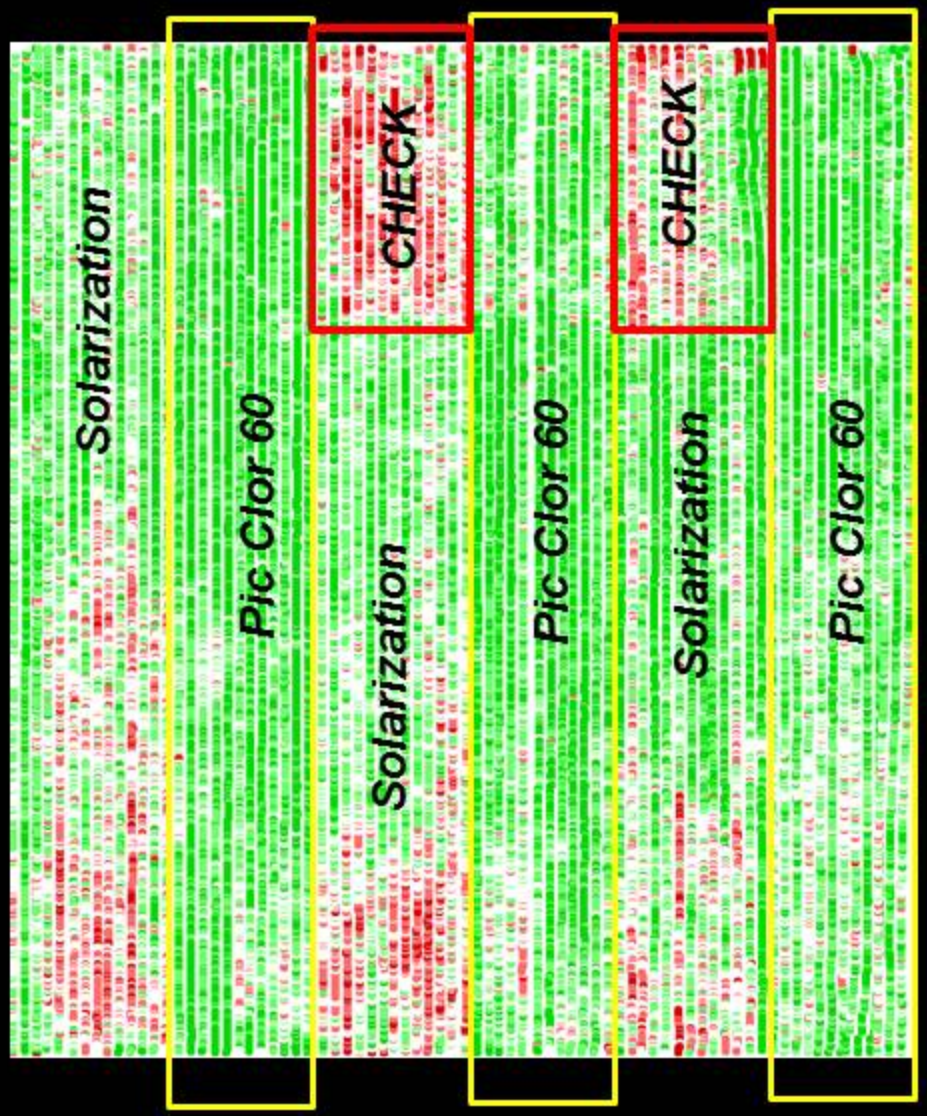
Manufactured by/for: Agricultural Solutions, LLC
P.O Box 167, Safety Harbor, FL 34695

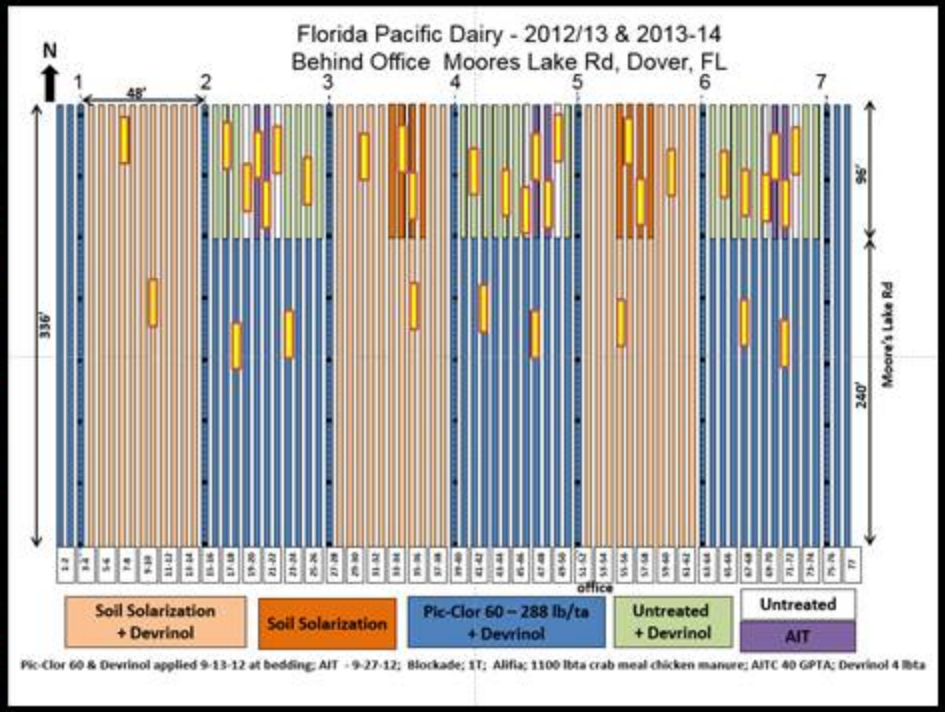
Information regarding the contents and levels of metals in this product will be available on the Internet at http://www.aapfco.org/metals.html

NDVI Map Of Strawberry Canopy Density Following 3nd year of *RootGuard* ®

(>1000 lb/a)

Driscoll Farm– Soil Solarization – AITC Blocks March 2015





- *Solarization ineffective*
- *Pic Clor 60 not perfect*
- *Dominus not imperfect*

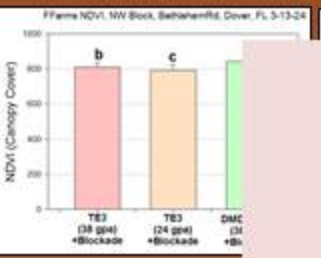
Describing Double Cropping Impacts by NDVI

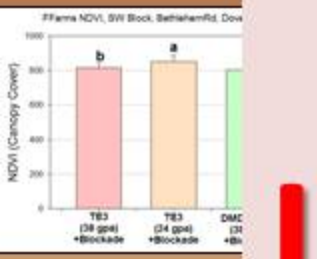
Do You Notice Any Pattern of Nematode Damage Between Successive Crops ?

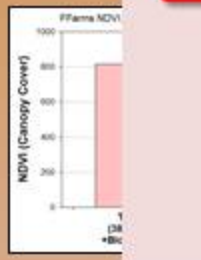
Highest Crop Damage in 2nd Crop well correlated w/ Areas of Least Damage In 1st crop

Powerful tool to map and describe Biological interactions

Field and Whole Farm Experimental Units







ACCURATE But Very Limited in Scope & application

Of the 3 DMDS treatments DMDS +PIC (60 gpta) the Best NONE Solved Nematode Problem

Assessing Strawberry Canopy Size and Sting Nematode Impact Using Color Digital Imaging

Experiment 1
Spring 2014

IDS Systems GmbH UI-124XLE
USB 2.0
SXGA (1280 x 1024) CMOS sensor

Experiment 2
Spring 2015

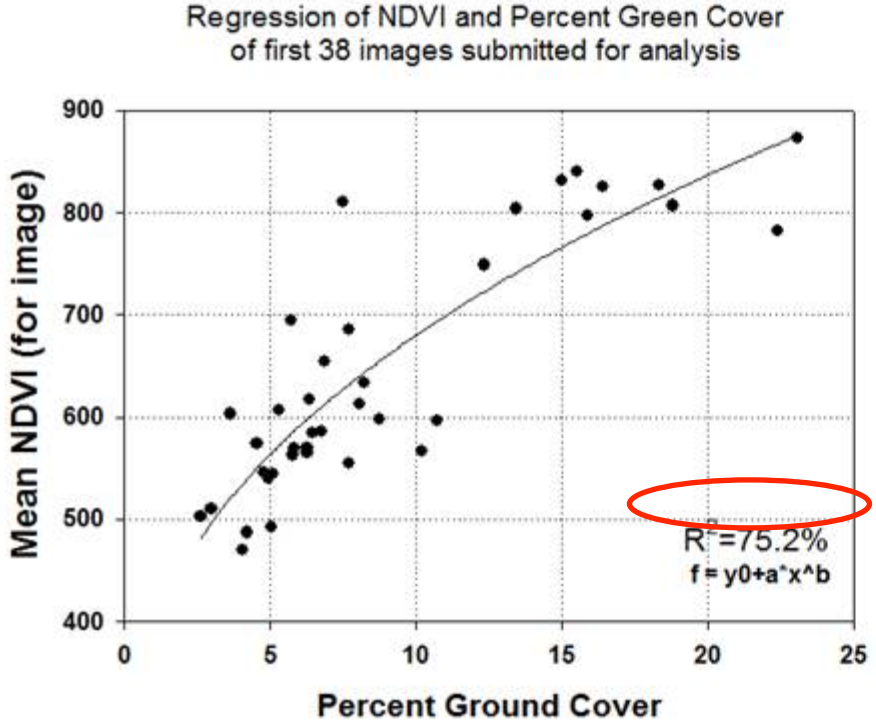
Nikon Coolpix S9100
Video Mode
30 Hz
(51,000+)

Experiment 1- Spring 2014

The Pictures We Got !

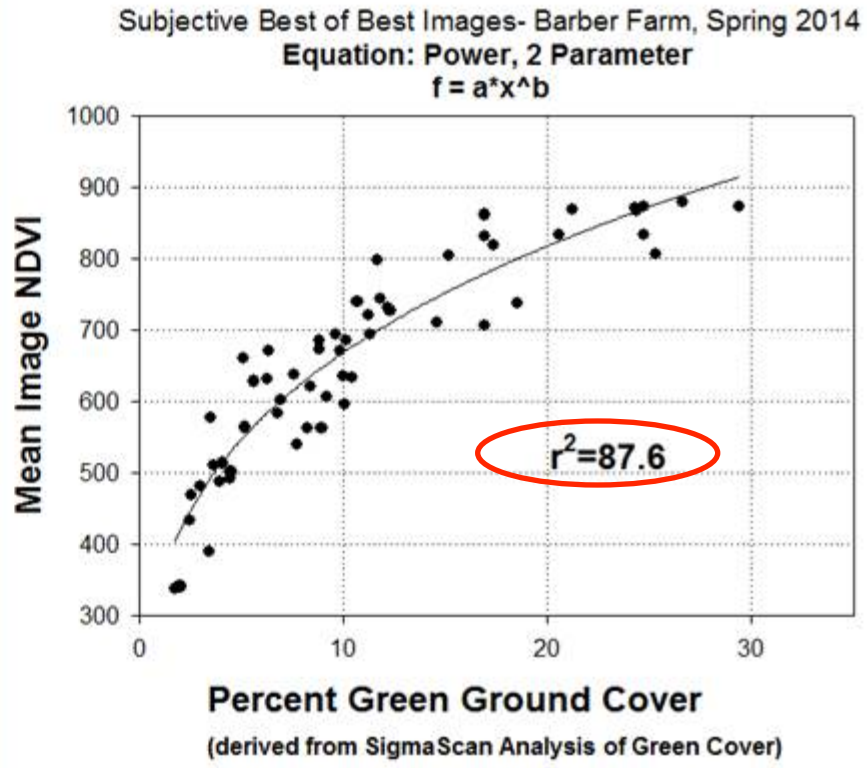
Something closer to what we should be after. Some added soft lighting probably required

Comparing NDVI & Image Greenness (pixels)



Regression Analysis Using images which minimize boom or interior shading, Washout, or images which include large portions of the row middle (off center) removed much of the variation and improved descriptive capability.

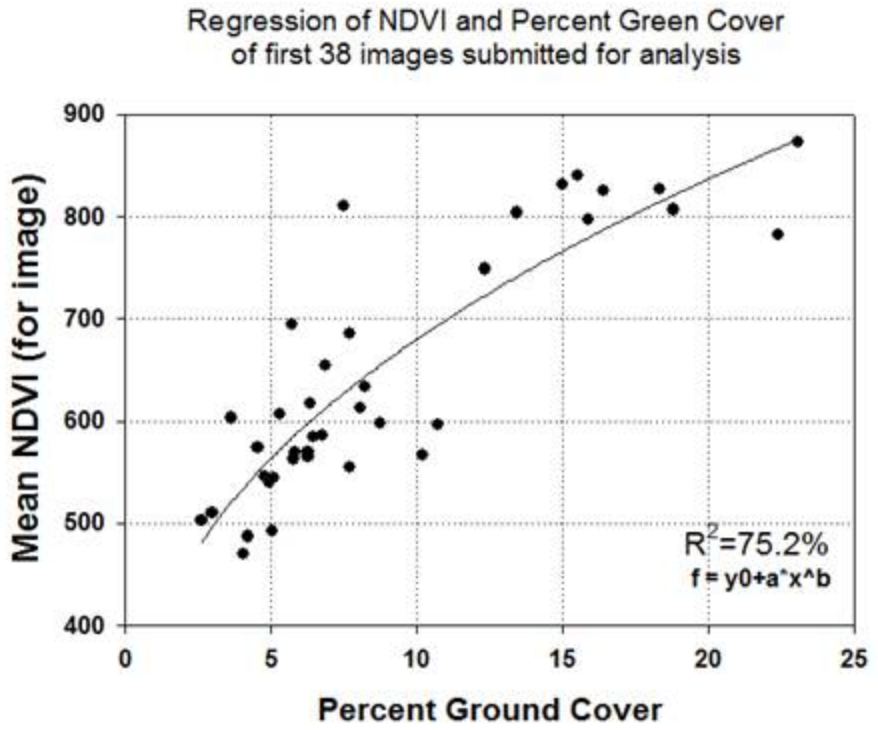
Regression Analysis Without regard to image quality. Even though image quality was quite poor, percent ground cover computed from green Pixels is still very descriptive of NDVI.



One is as good as the other!

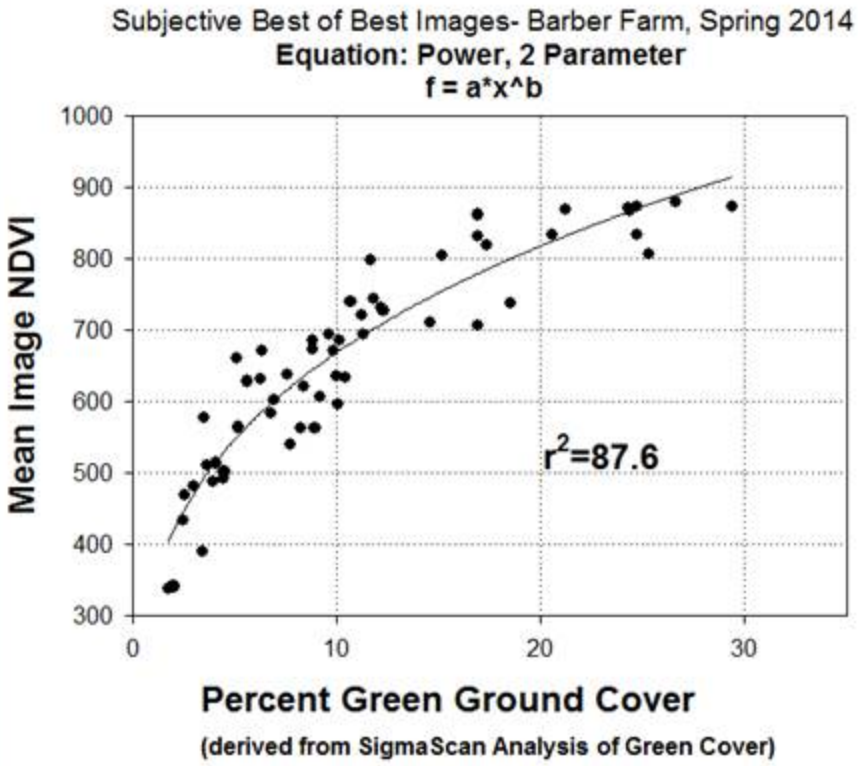
NDVI or Digital Images

Comparing NDVI & Image Greenness (pixels)



Regression Analysis Without regard to image quality. Even though image quality was quite poor, percent ground cover computed from green Pixels is still very descriptive of NDVI.

Regression Analysis Using images which minimize boom or interior shading, Washout, or images which include large portions of the row middle (off center) removed much of the variation and improved descriptive capability.



One is as good as the other!

NDVI or Digital Images

Experiment 2 Spring 2015
Nikon Coolpix S9100
Video Mode 30 Hz
(51,000+ images to analyze)

Shaded Row Video Clips

vs

Full Sun Video Clips

1000 have been processed ☹

General Summary

- Strawberry yields were well correlated and described by end of season counts of plant sizes (Relative Yield) and by NDVI
- The GreenSeeker was effectively used to evaluate a variety of mulch / fumigant treatments within Grower Demo's
- Both methods capable of Providing Growers Insights to Product Performance using quantitative data relating Strawberry Canopy Cover and Relative Yield

THE END

Digital Imaging:

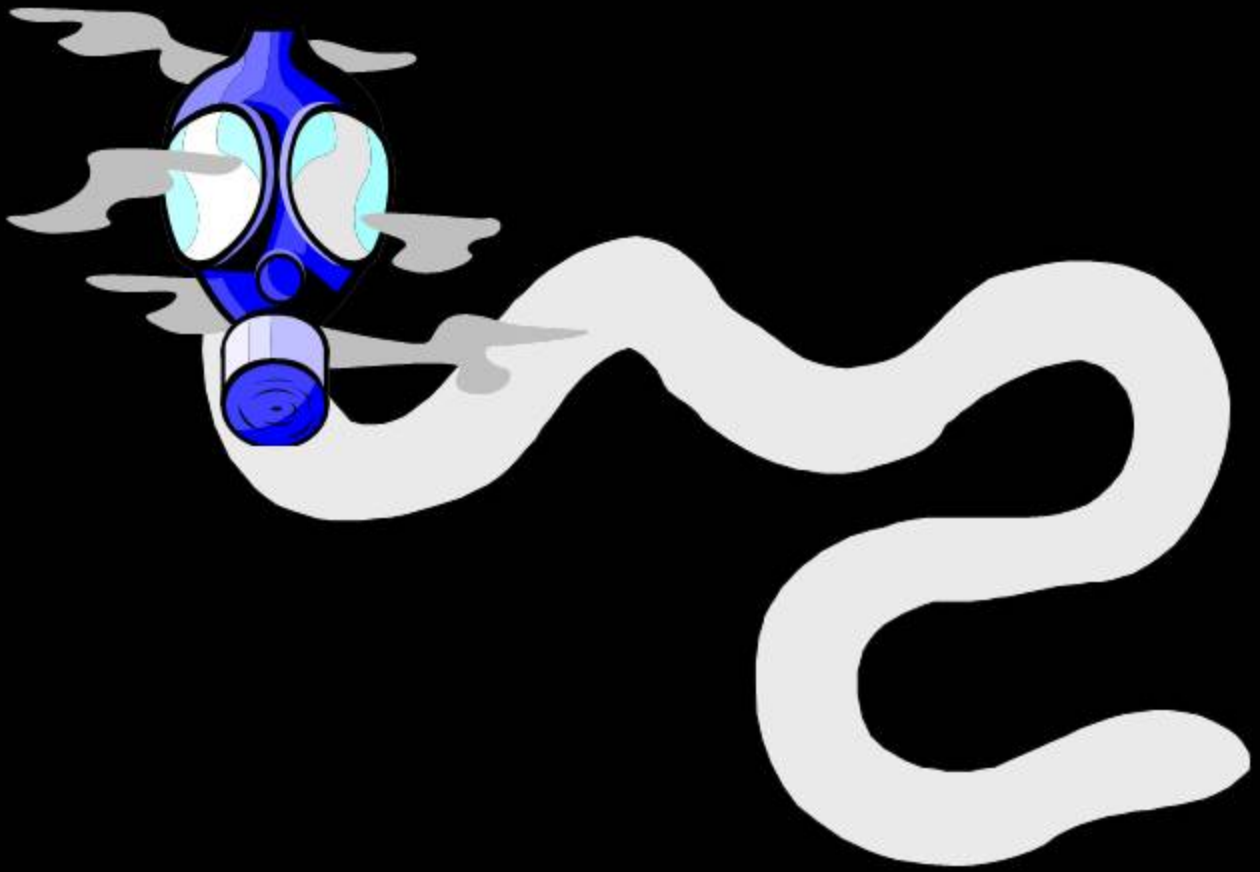
Lessons learned and Problems to resolve:

1. **We need to eliminate the shadow from the camera boom**- To do this we have built a frame for a tarp to cover the entire boom to minimize washout from incident light.
2. **Install 12 volt lighting** to illuminate the bed below to minimize interior shading within the strawberry plant canopy
3. **Pay closer attention to orient / center the camera** on the bed middle, adjusting height to maximize bed only
4. **Pay much closer attention to color settings and calibration** of the camera prior to and during mapping
5. Additional image processing opportunities will be explored, such as quantifying the dead (brown) plant tissues, blooms, and red leaf tips from mite damage
6. The next step will be to process images in real time and make computerized decisions for smart-spraying

We are confident that digital imagery will ultimately serve as a superior alternative to NDVI for assessing Sting Nematode Impact

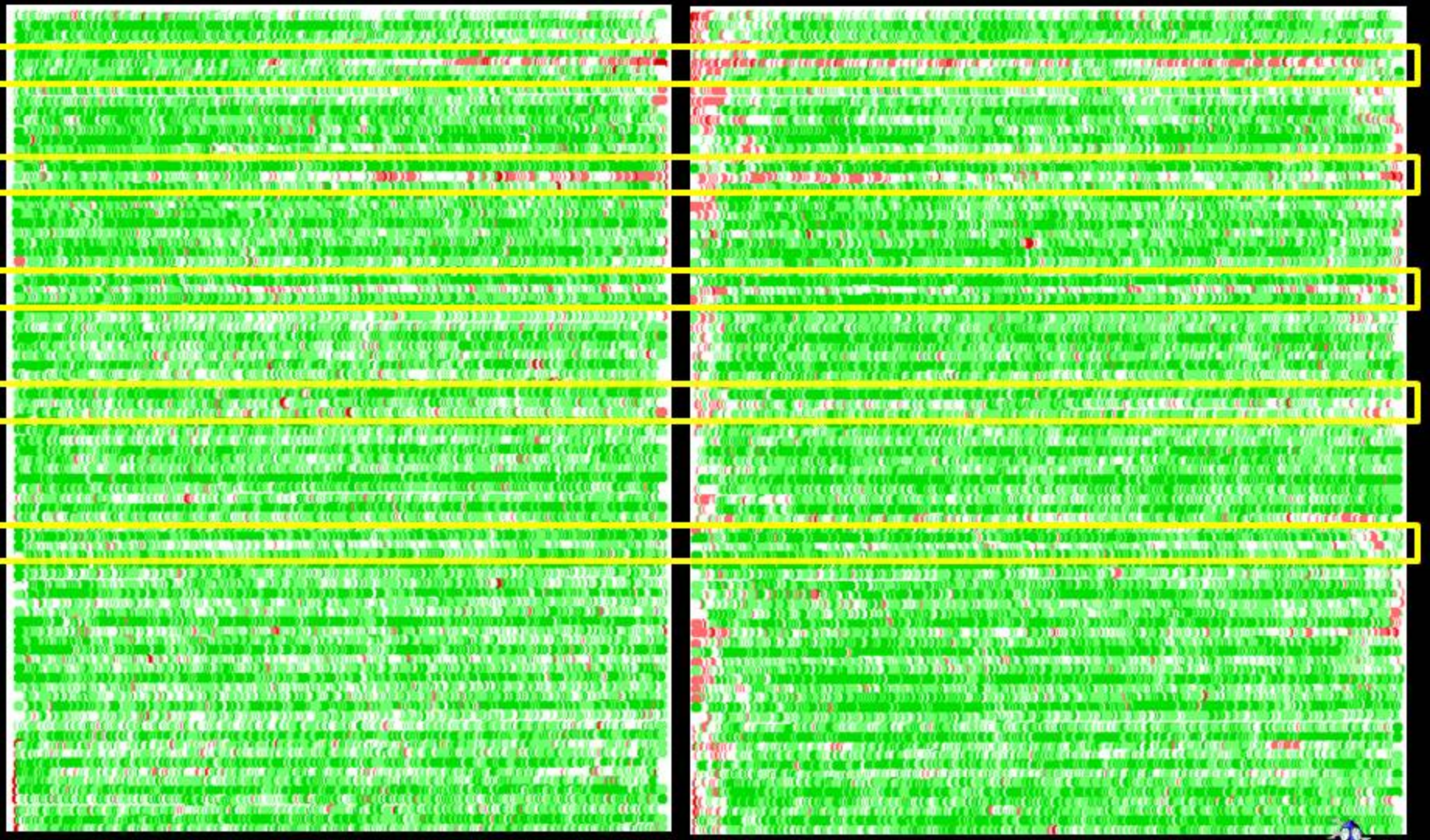
THE END

Thank you ---- ANY QUESTIONS?



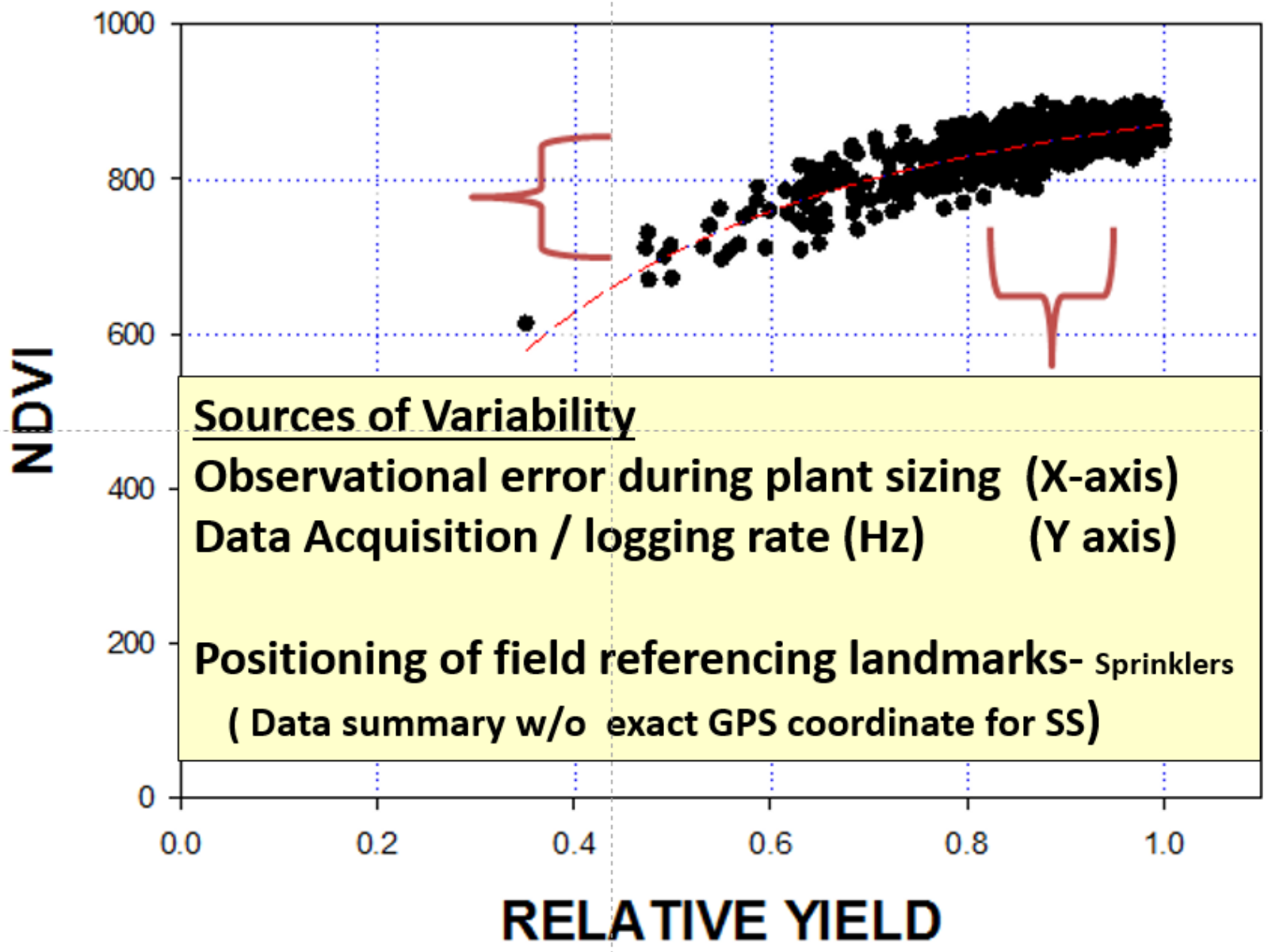
Field and Whole Farm Experimental Units

Summer Broadcast
Deep Shank Delivery of Telone II (18 gpa) (12" apart-15"deep)
End of Season NDVI -Driscoll Farm's- March 2015



Using sprinkler rows as benchmark, a very significant benefit to Deep Shank !

Evaluating the Methodology –Understanding Variation



Sources of Variability

Observational error during plant sizing (X-axis)

Data Acquisition / logging rate (Hz) (Y axis)

Positioning of field referencing landmarks- Sprinklers

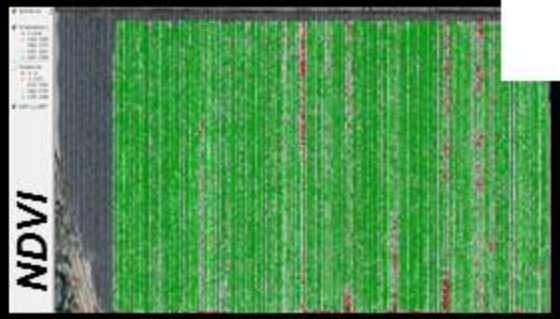
(Data summary w/o exact GPS coordinate for SS)

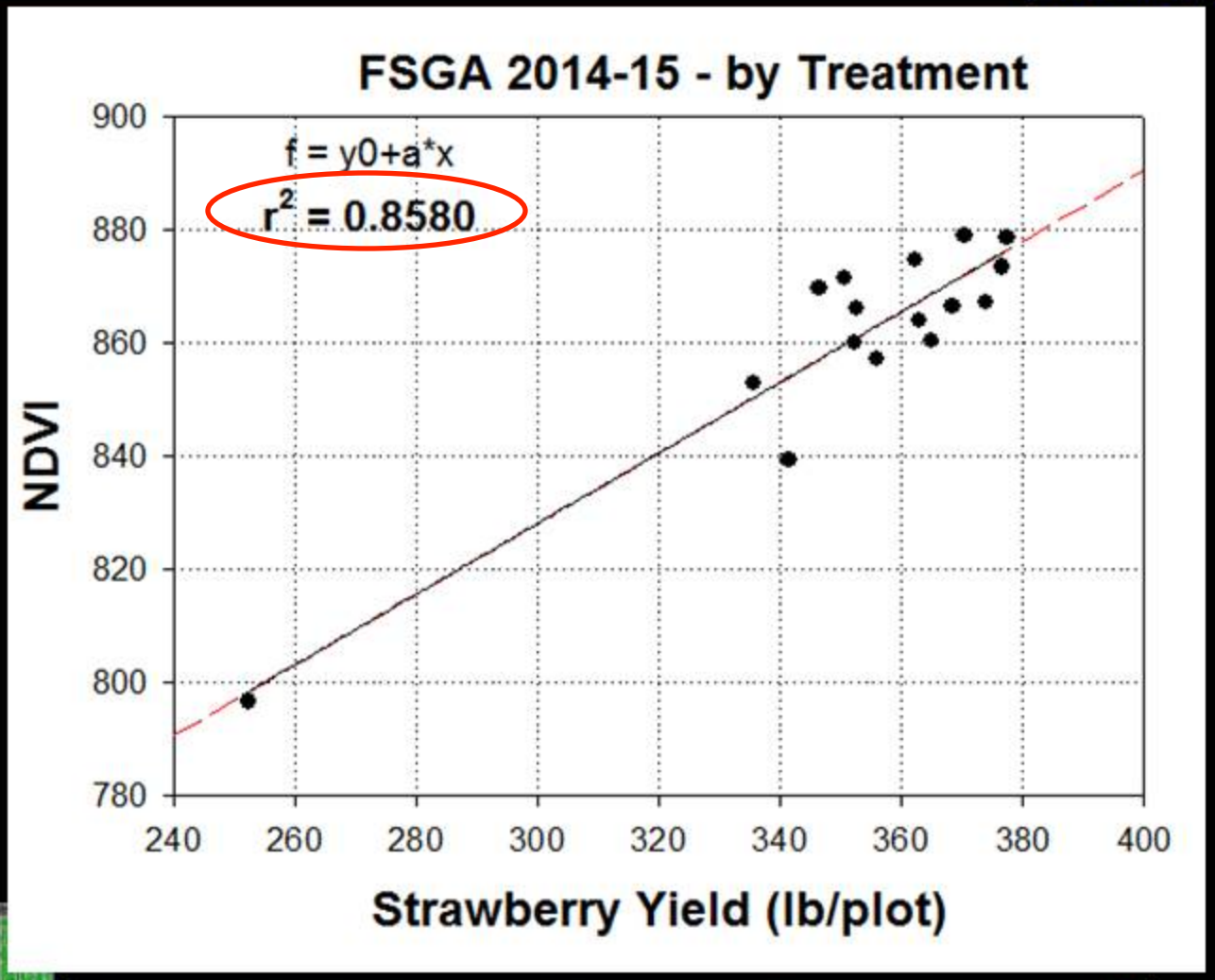
Closely Related Variables- FSGA 2014-15

End of Season
NDVI Assessment

vs

Hand Harvesting

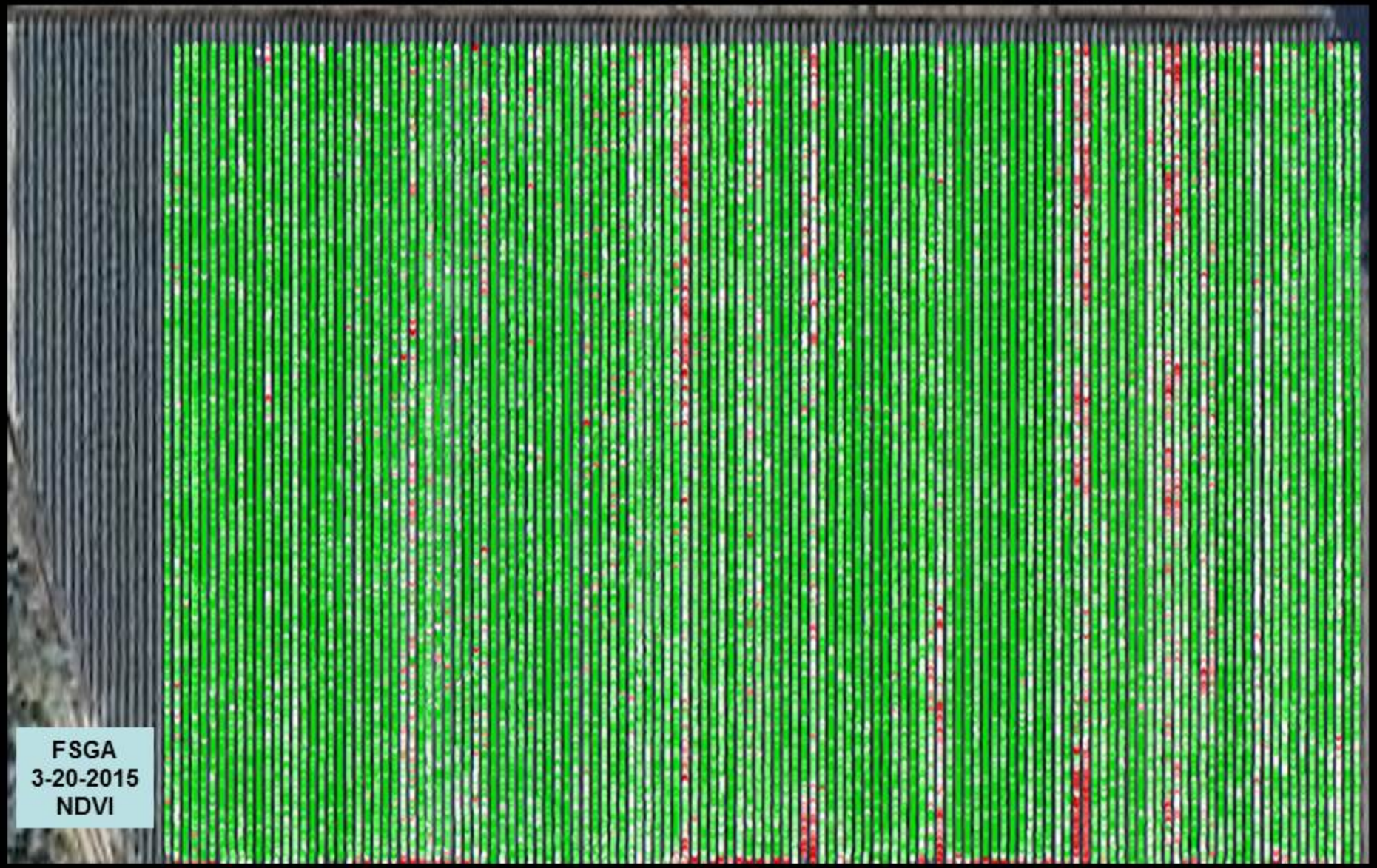




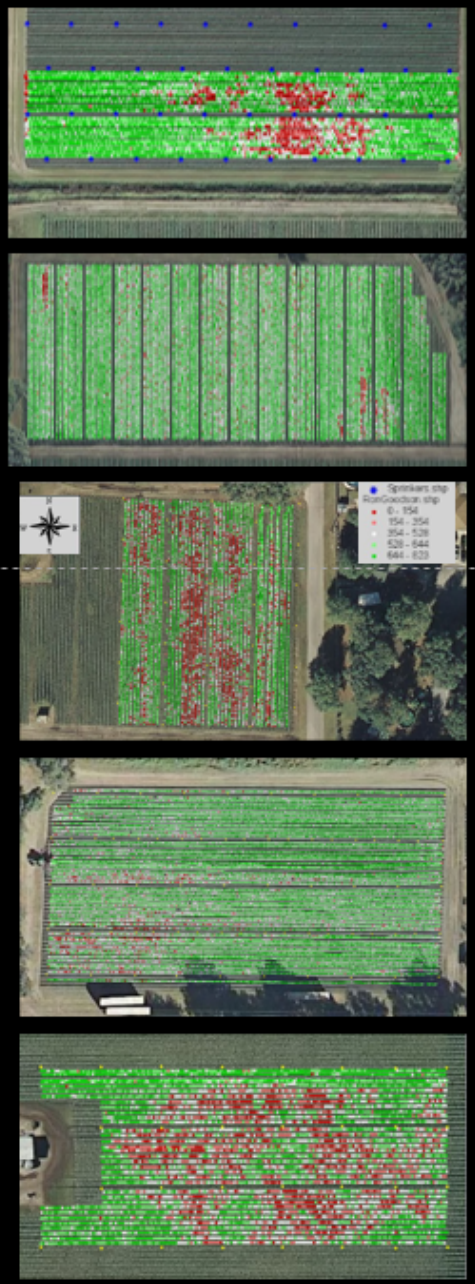
Treatment List for FSGA 2014-15

1. MBr + PIC 67/33 (350 lb/ta) + TIF VaporSafe
2. MBr + PIC 50/50 (320 lb/ta) + TIF VaporSafe
3. Telone C35 (35 gpta) + LDPE
4. Pic-Clor 60 (300 lb/ta) + LDPE
5. DMDS + PIC (40 gpta) + TIF Vaporsafe
6. DMDS + PIC (25 gpta) + TIF Vaporsafe
7. DMDS+PIC+Telone II (300 lbs/ta)+TIF Vaporsafe
8. DMDS EC+PIC (40gpta)+TIF Vaporsafe
9. Kpam (62 gpta) + LDPE
10. Dominus + PIC (400 lb/ta) + LDPE
11. Untreated + LDPE
12. Telone C35 (35 gpta+Deep Drip Telone II (18 gpta) + LDPE
12. Telone C35 (35 gpta)+Deep Shank Telone II (18 gpta) + LDPE
13. Dominus (25 gpta) + Blockade
14. Dominus+PIC 67/33 (325 lb/ta) + Blockade
15. PO + PIC (67/33) (400 lb/Ta) + Blockade
16. PO+Telone+PIC (40/40/20)(400lb) + Blockade

End of Season NDVI Canopy Density Map
FSGA 2014-15

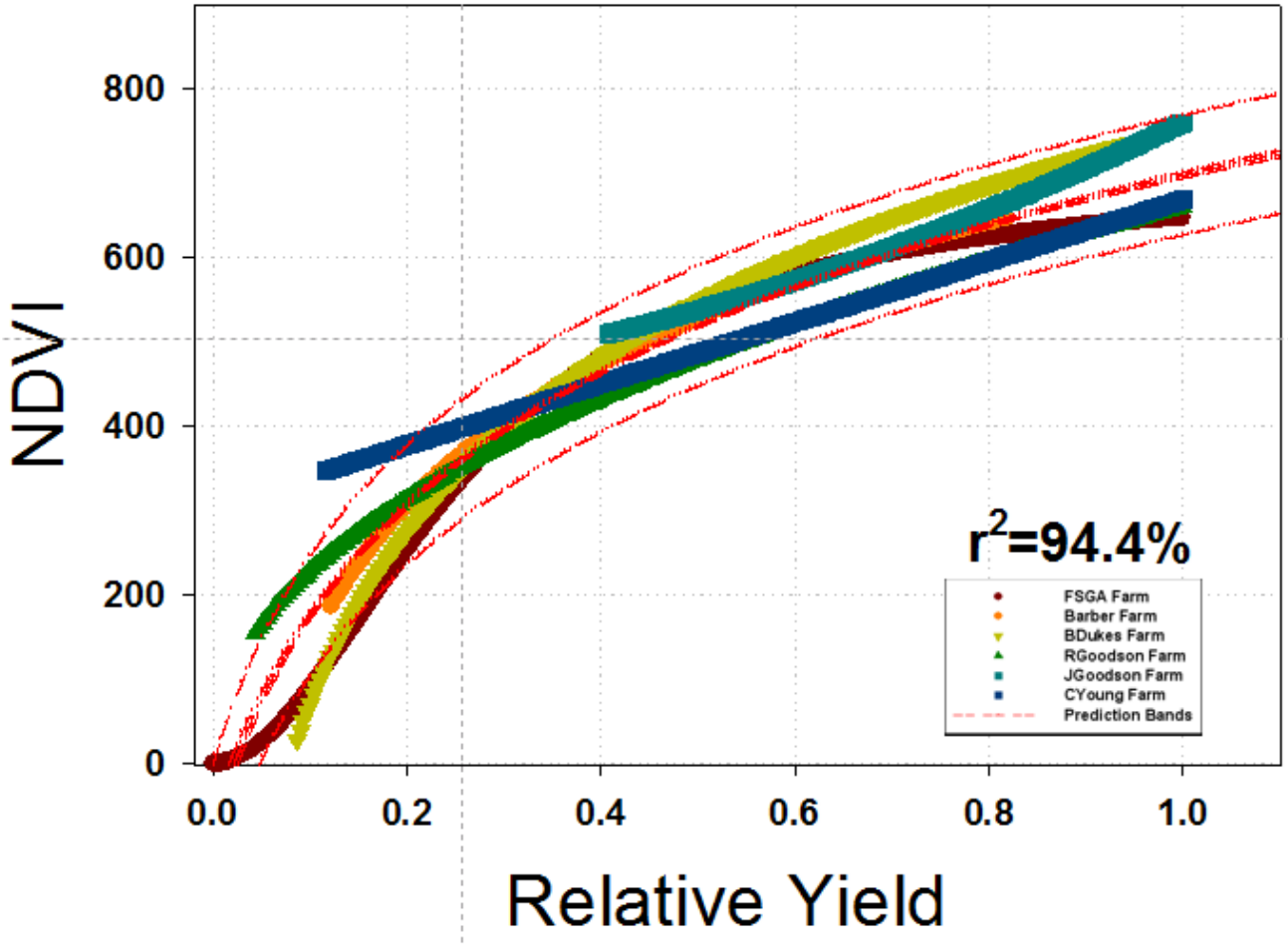


Understanding How To Calibrate Images with YIELD !



Comparison of Results from Six Field Studies 2009-10

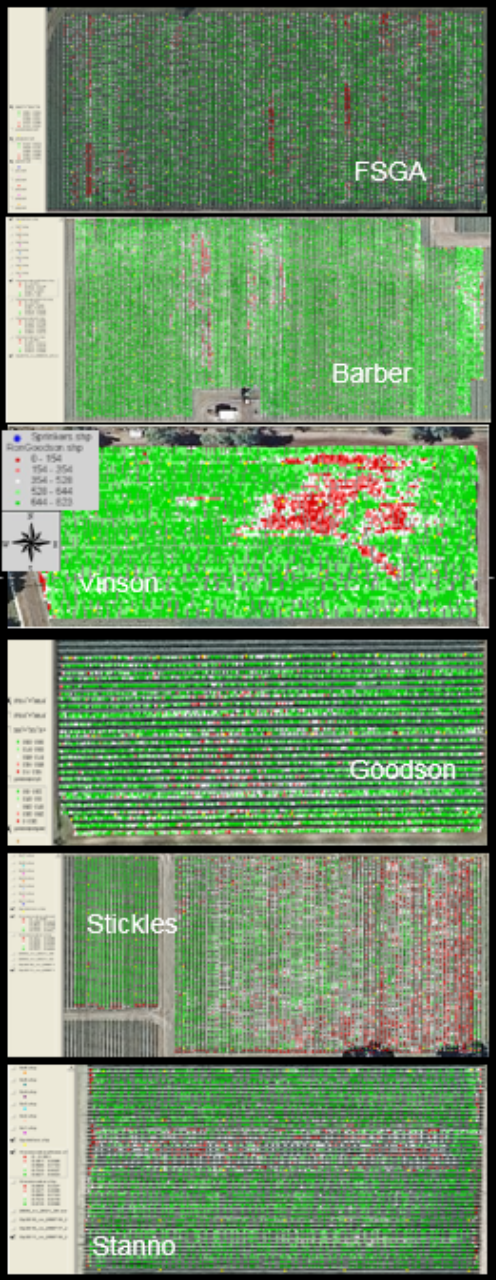
Relationships which don't have to be redefined for each field.
We know how to calibrate NDVI with Relative Plant Yield !



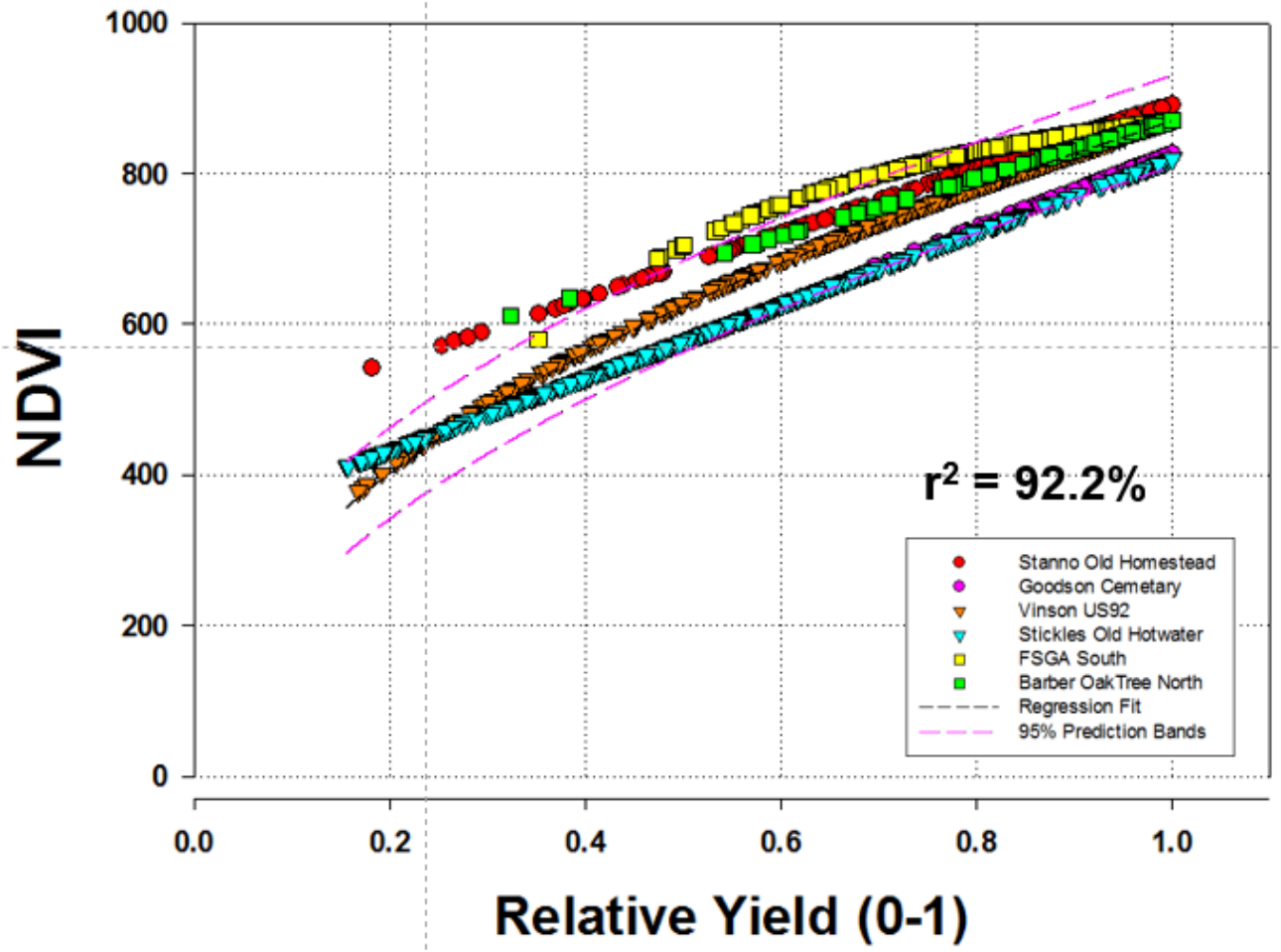
Equation: Logarithm, 3 Parameter
f=if(x-x0>0, y0+a*ln(abs(x-x0)), 0)

Understanding How To Calibrate Images with YIELD !

Comparison of Results from Six Field Studies 2011-2012



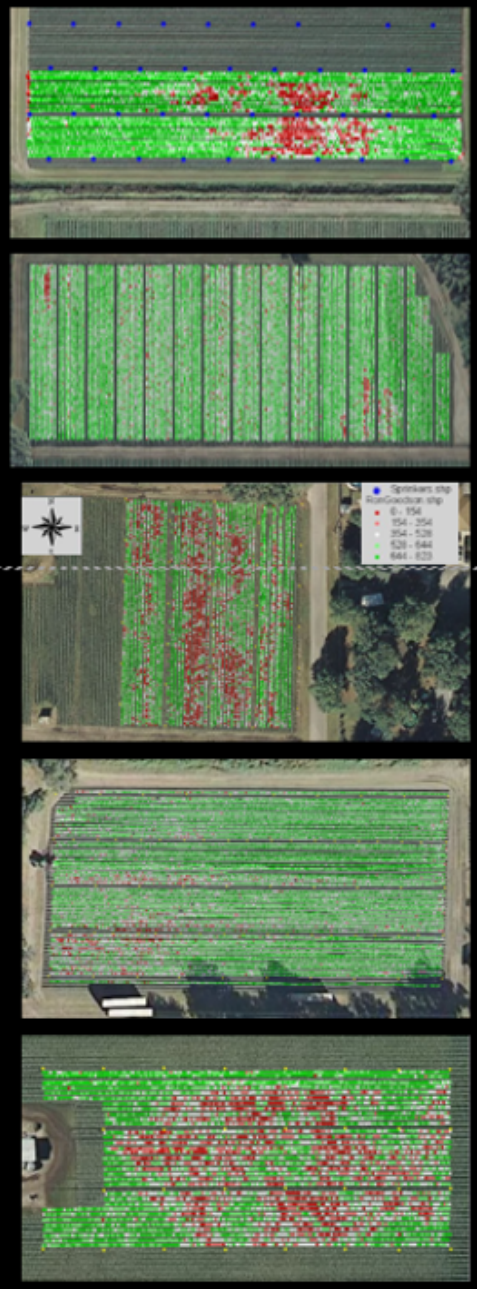
Relationships which don't have to be redefined for each field,
We know how to calibrate NDVI with Relative Plant Yield !



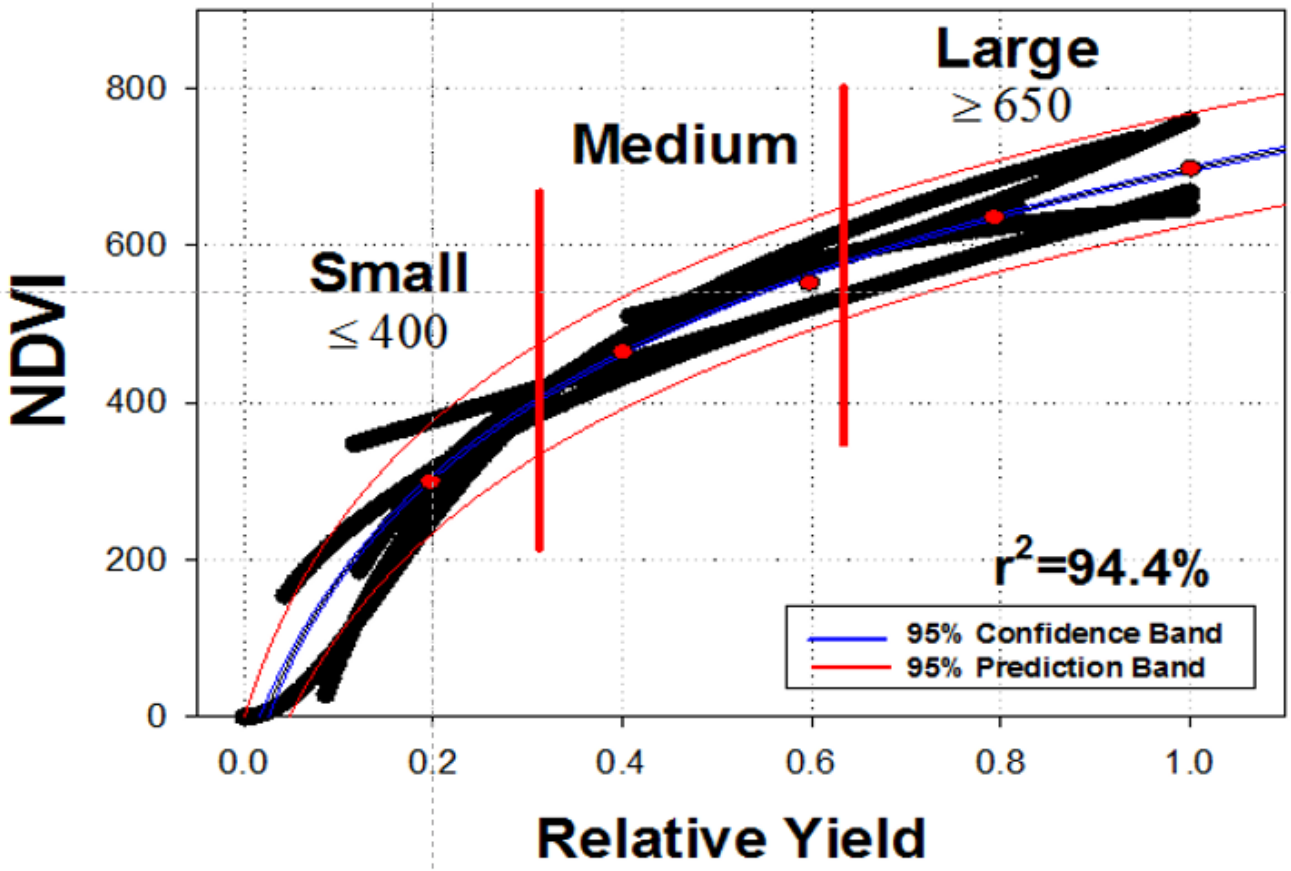
Equation: Power , 2 Parameter
f = a*x^b

Understanding How To Calibrate Images with YIELD !

Comparison of Results from Six Field Studies 2009-10

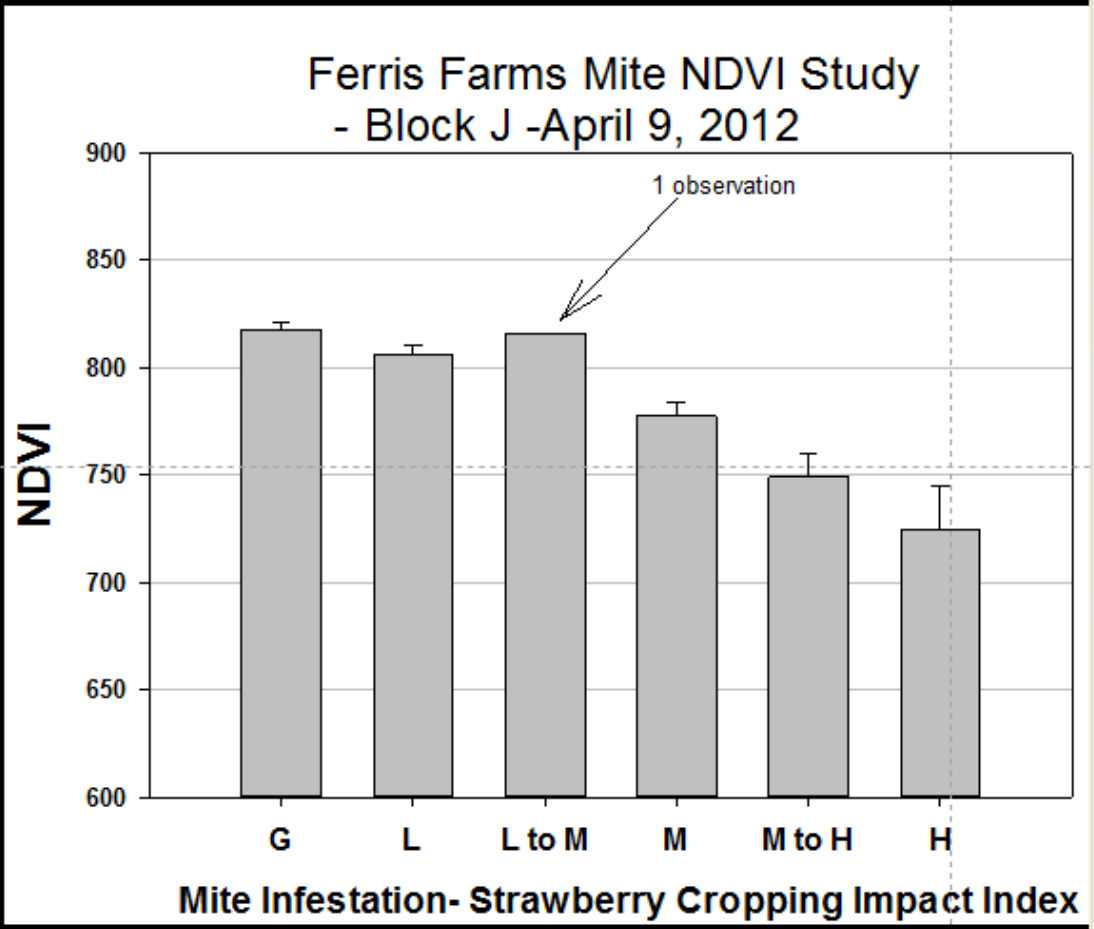


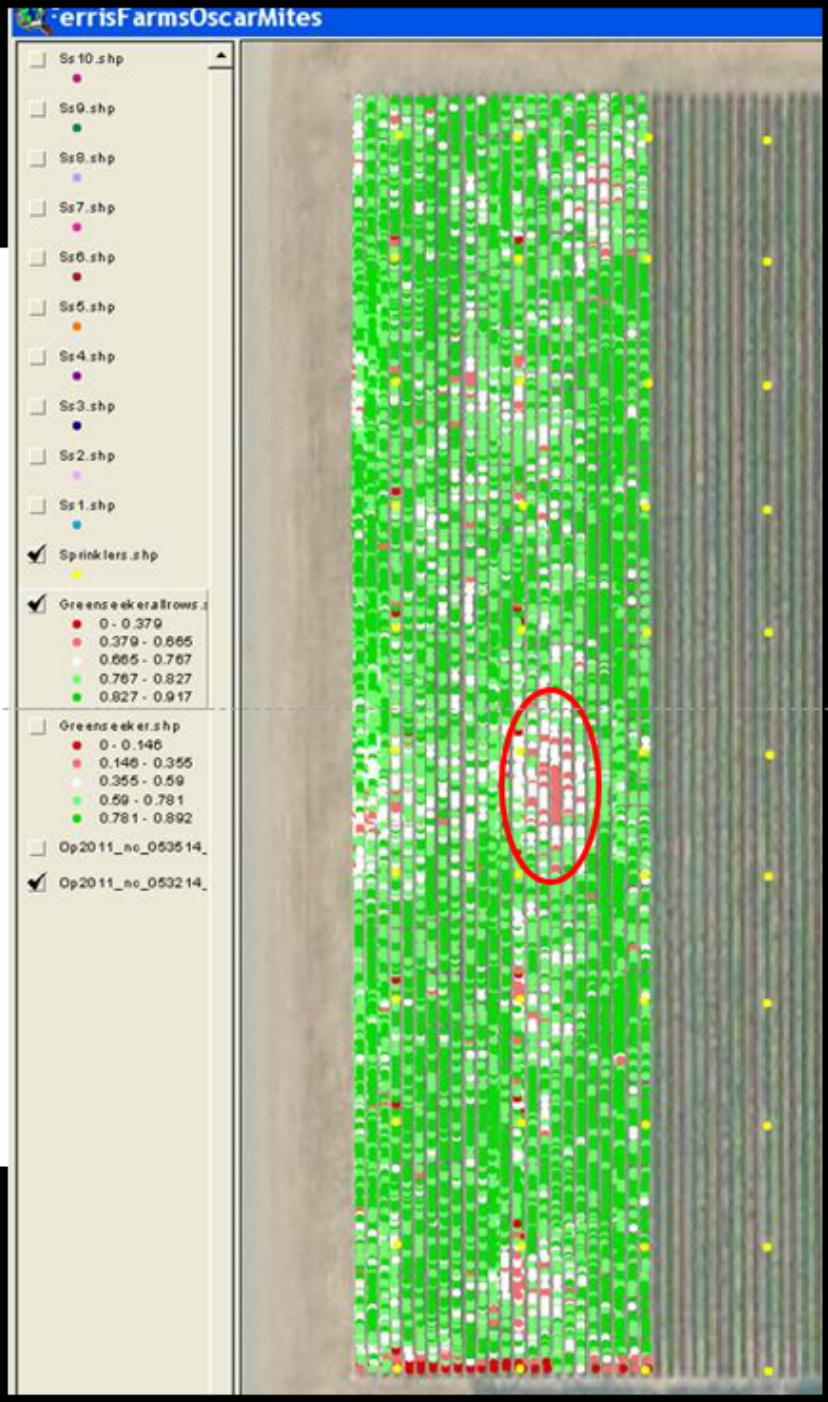
Based on Comparison of Results from Six Field Studies during 2009-2010, We know how to calibrate NDVI with Plant Yield !

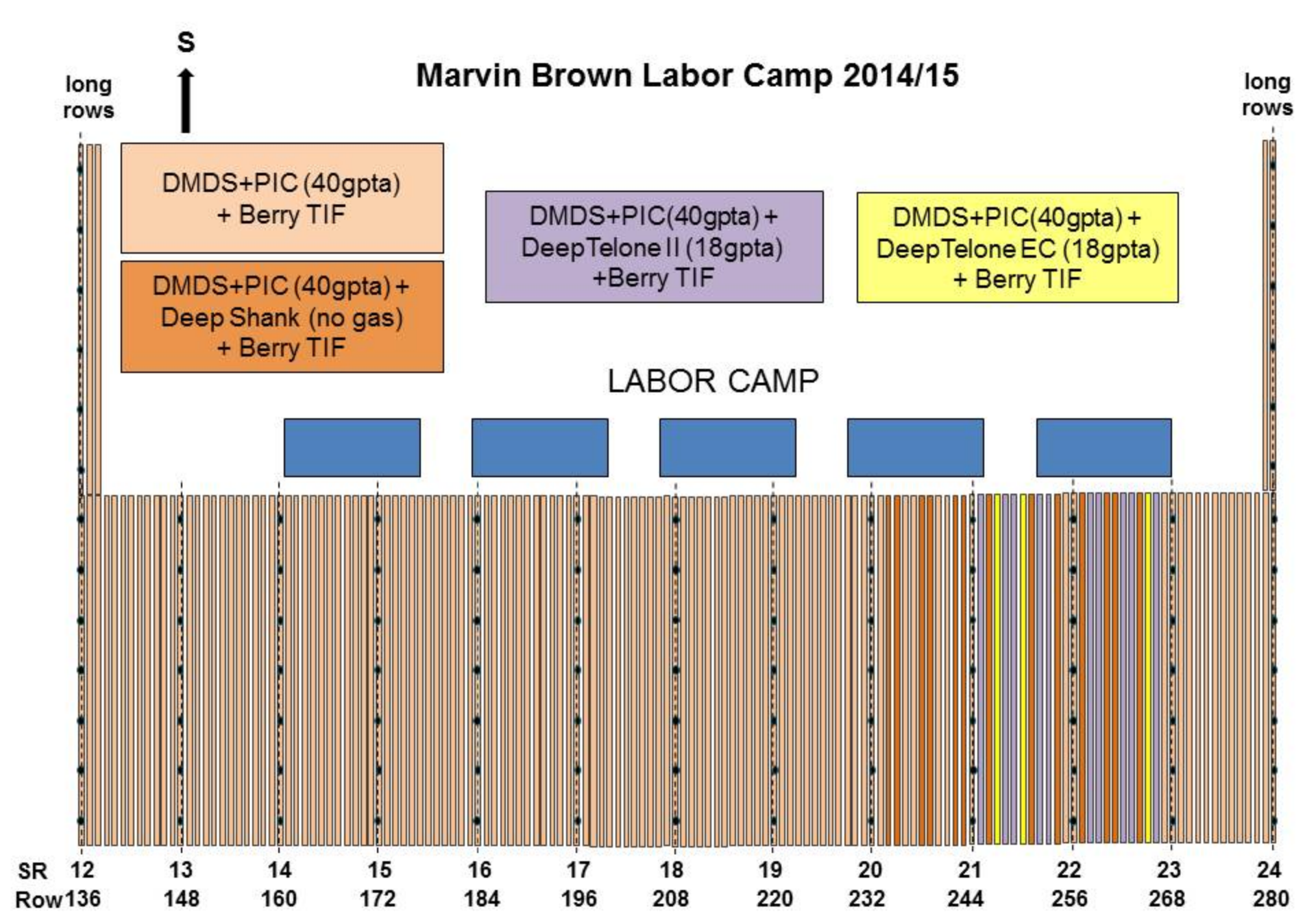


Equation: Logarithm, 3 Parameter
f=if(x-x0>0, y0+a*ln(abs(x-x0)), 0)

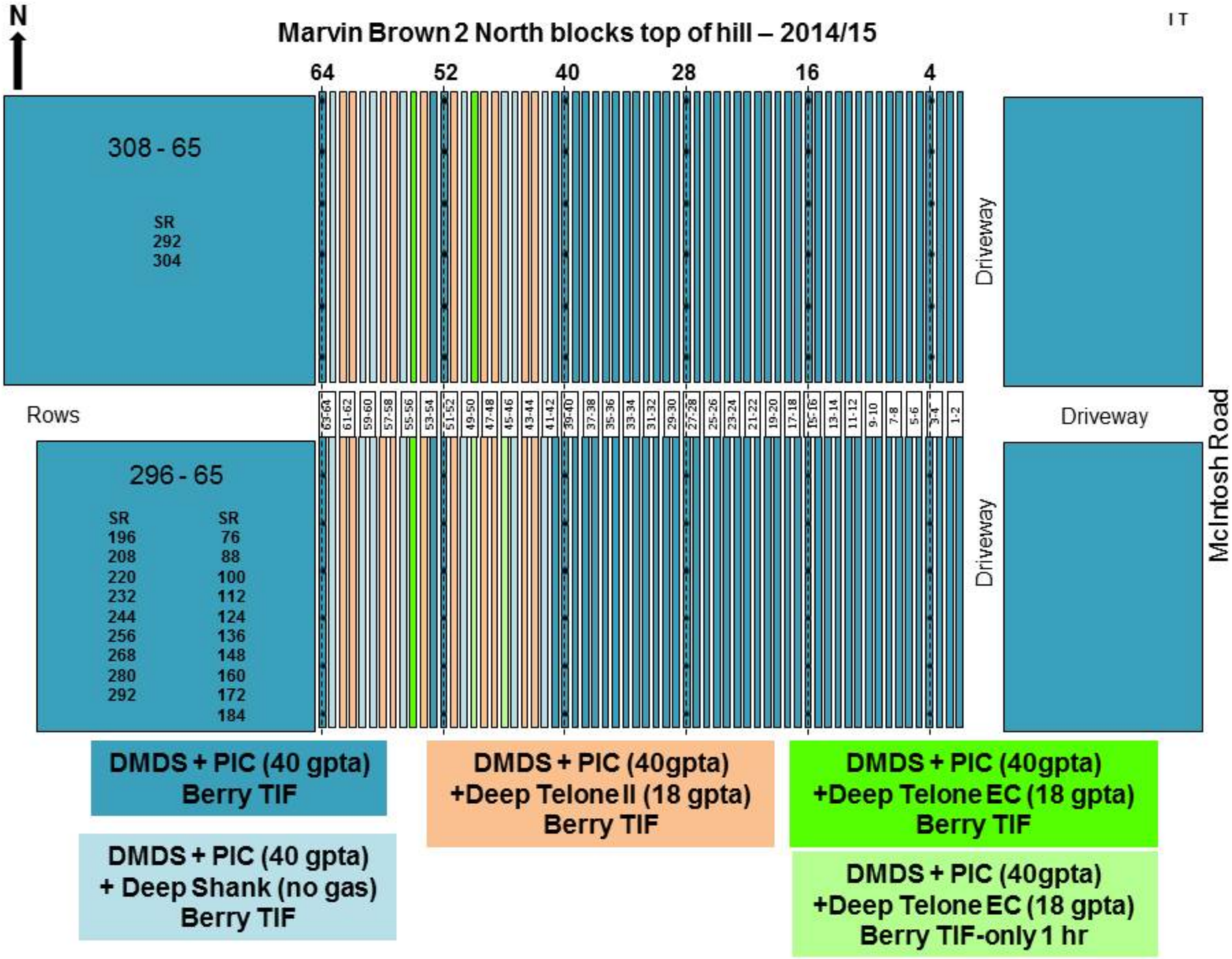
Future Endeavors ……

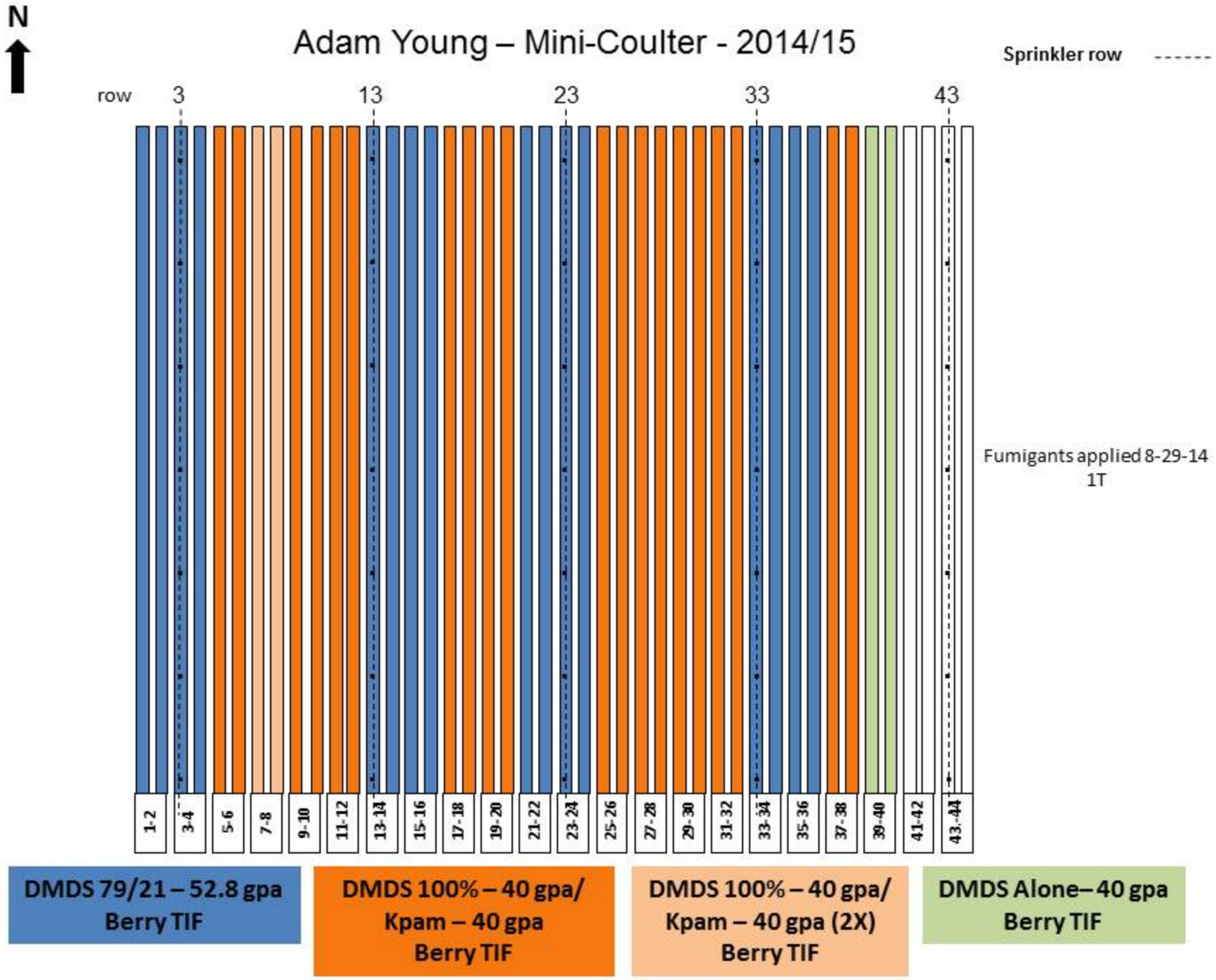





Marvin Brown Labor Camp 2014/15
S
long rows
long rows
DMDS+PIC (40gpta) + Berry TIF
DMDS+PIC (40gpta) + Deep Shank (no gas) + Berry TIF
DMDS+PIC(40gpta) + DeepTelone II (18gpta) +Berry TIF
DMDS+PIC(40gpta) + DeepTelone EC (18gpta) + Berry TIF
LABOR CAMP
SR 12 13 14 15 16 17 18 19 20 21 22 23 24
Row 136 148 160 172 184 196 208 220 232 244 256 268 280

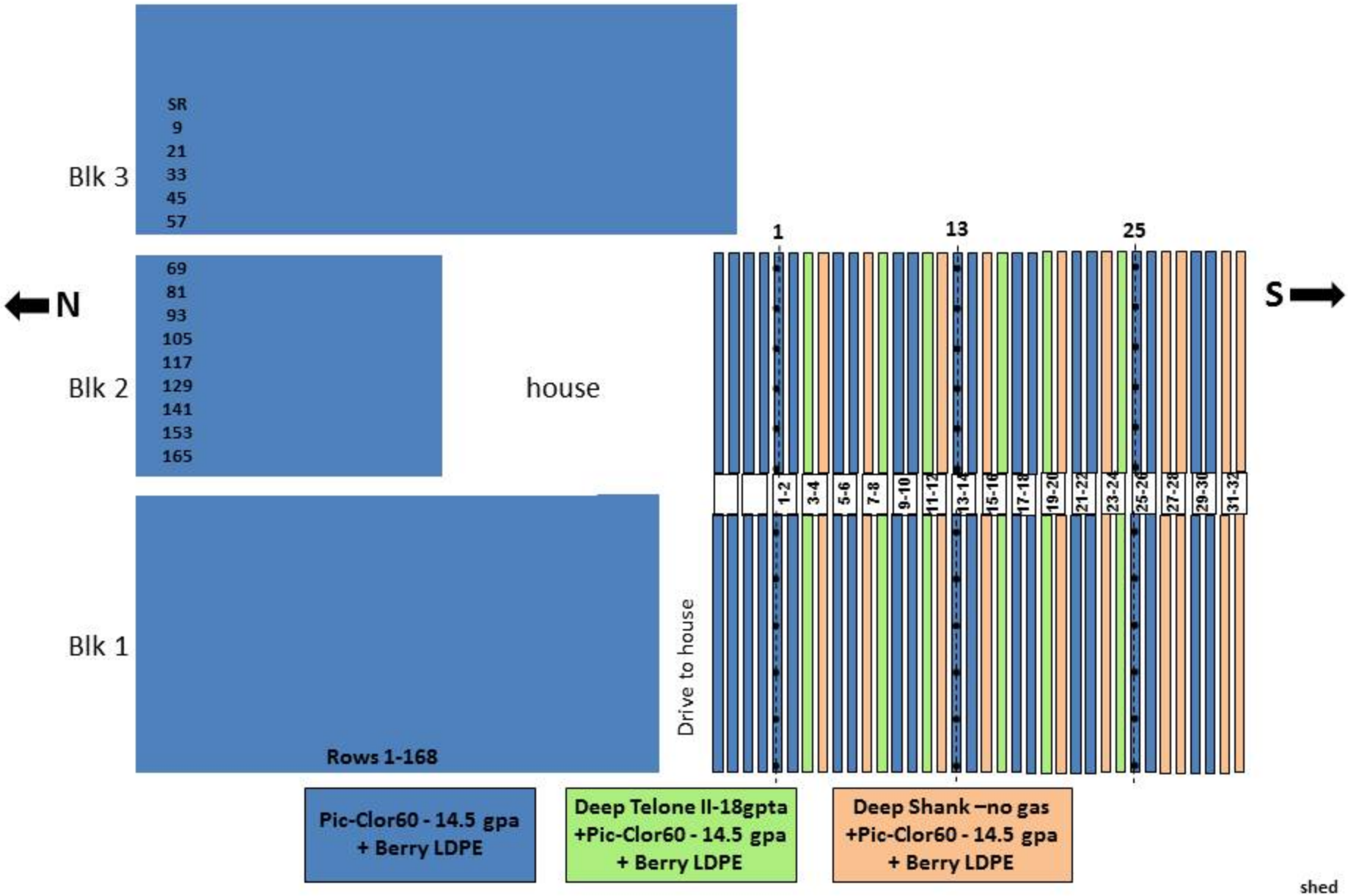
1T

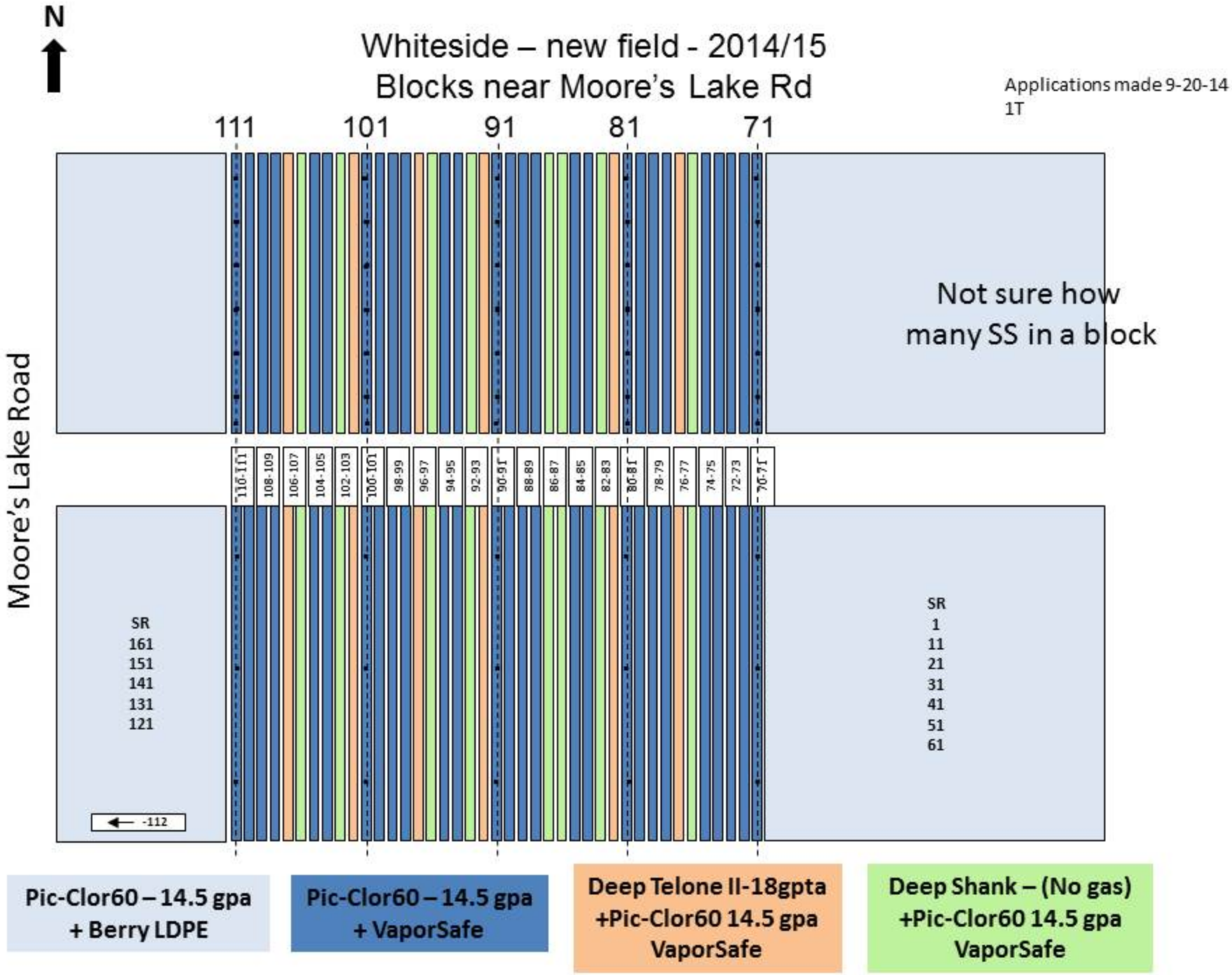

N
Marvin Brown 2 North blocks top of hill – 2014/15
IT
64
52
40
28
16
4
308 - 65
SR
292
304
Driveway
Rows
63-64
61-62
59-60
57-58
55-56
53-54
51-52
49-50
47-48
45-46
43-44
41-42
39-40
37-38
35-36
33-34
31-32
29-30
27-28
25-26
23-24
21-22
19-20
17-18
15-16
13-14
11-12
9-10
7-8
5-6
3-4
1-2
Driveway
296 - 65
SR
196
208
220
232
244
256
268
280
292
SR
76
88
100
112
124
136
148
160
172
184
Driveway
McIntosh Road
DMDS + PIC (40 gpta)
Berry TIF
DMDS + PIC (40gpta)
+Deep Telone II (18 gpta)
Berry TIF
DMDS + PIC (40gpta)
+Deep Telone EC (18 gpta)
Berry TIF
DMDS + PIC (40 gpta)
+ Deep Shank (no gas)
Berry TIF
DMDS + PIC (40gpta)
+Deep Telone EC (18 gpta)
Berry TIF-only 1 hr

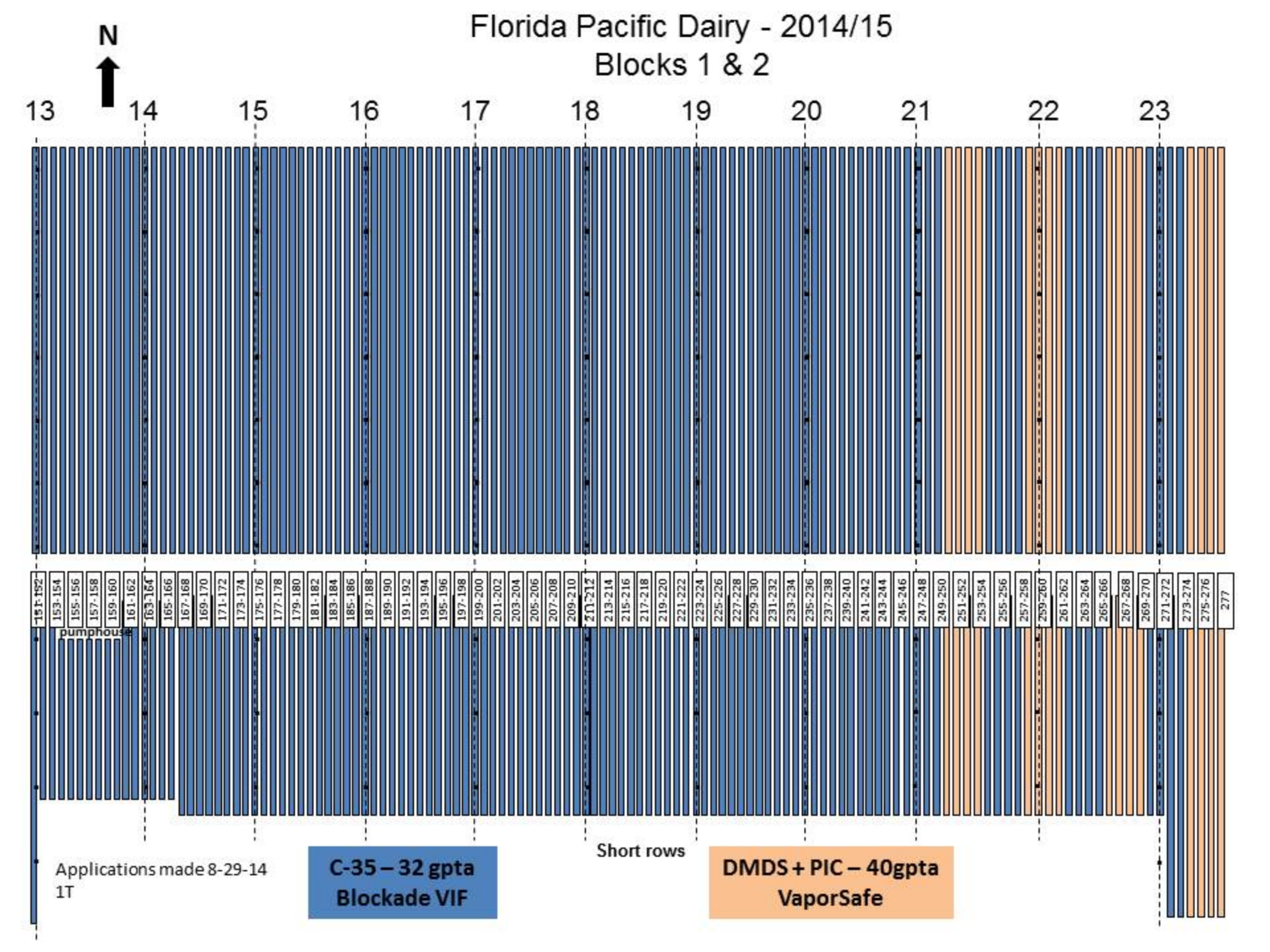

N
Adam Young – Mini-Coulter - 2014/15
Sprinkler row ------
row 3 13 23 33 43
1-2
3-4
5-6
7-8
9-10
11-12
13-14
15-16
17-18
19-20
21-22
23-24
25-26
27-28
29-30
31-32
33-34
35-36
37-38
39-40
41-42
43-44
Fumigants applied 8-29-14
1T
DMDS 79/21 – 52.8 gpa
Berry TIF
DMDS 100% – 40 gpa/
Kpam – 40 gpa
Berry TIF
DMDS 100% – 40 gpa/
Kpam – 40 gpa (2X)
Berry TIF
DMDS Alone– 40 gpa
Berry TIF

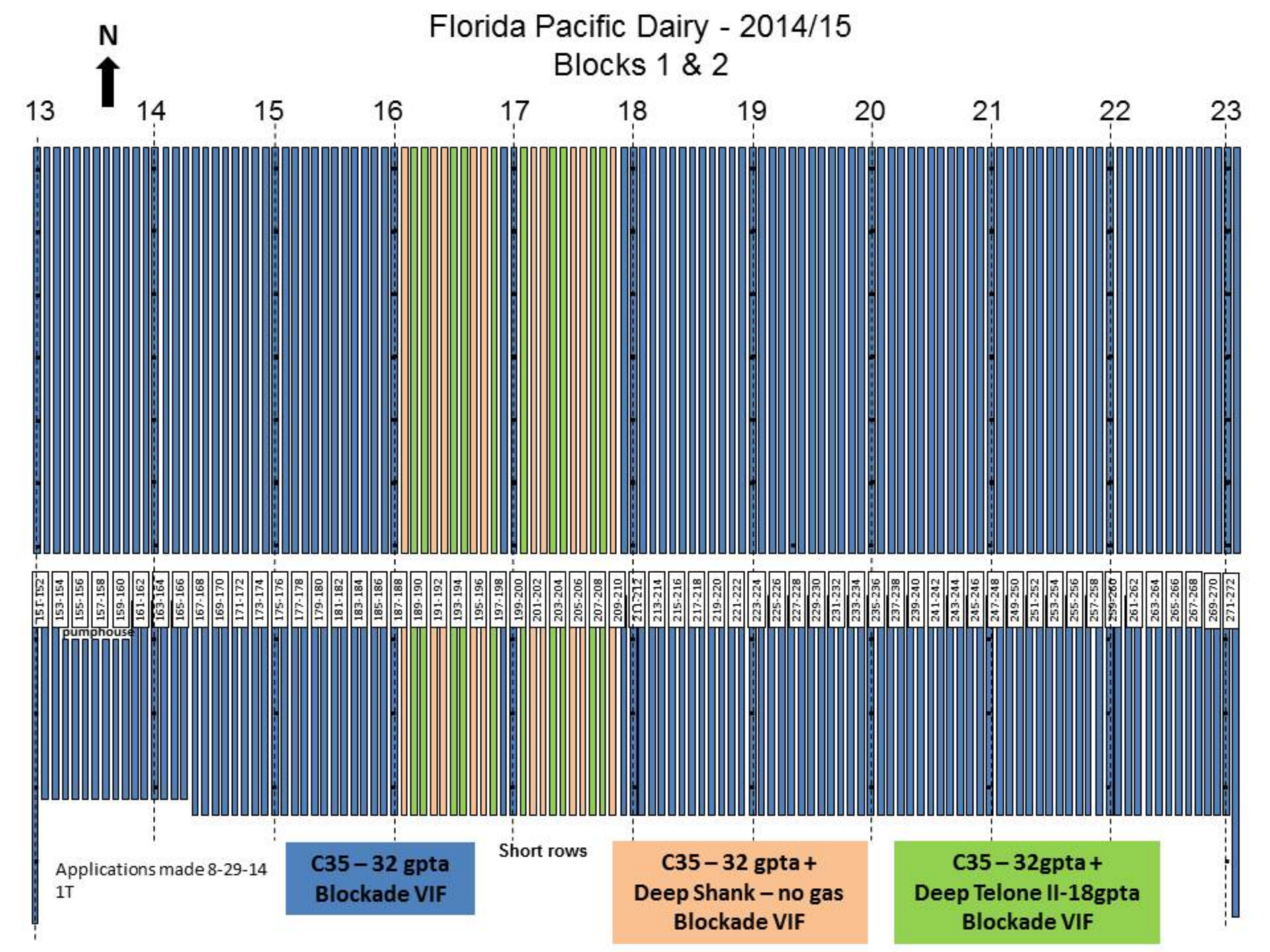
Whiteside – near house – 2014/15

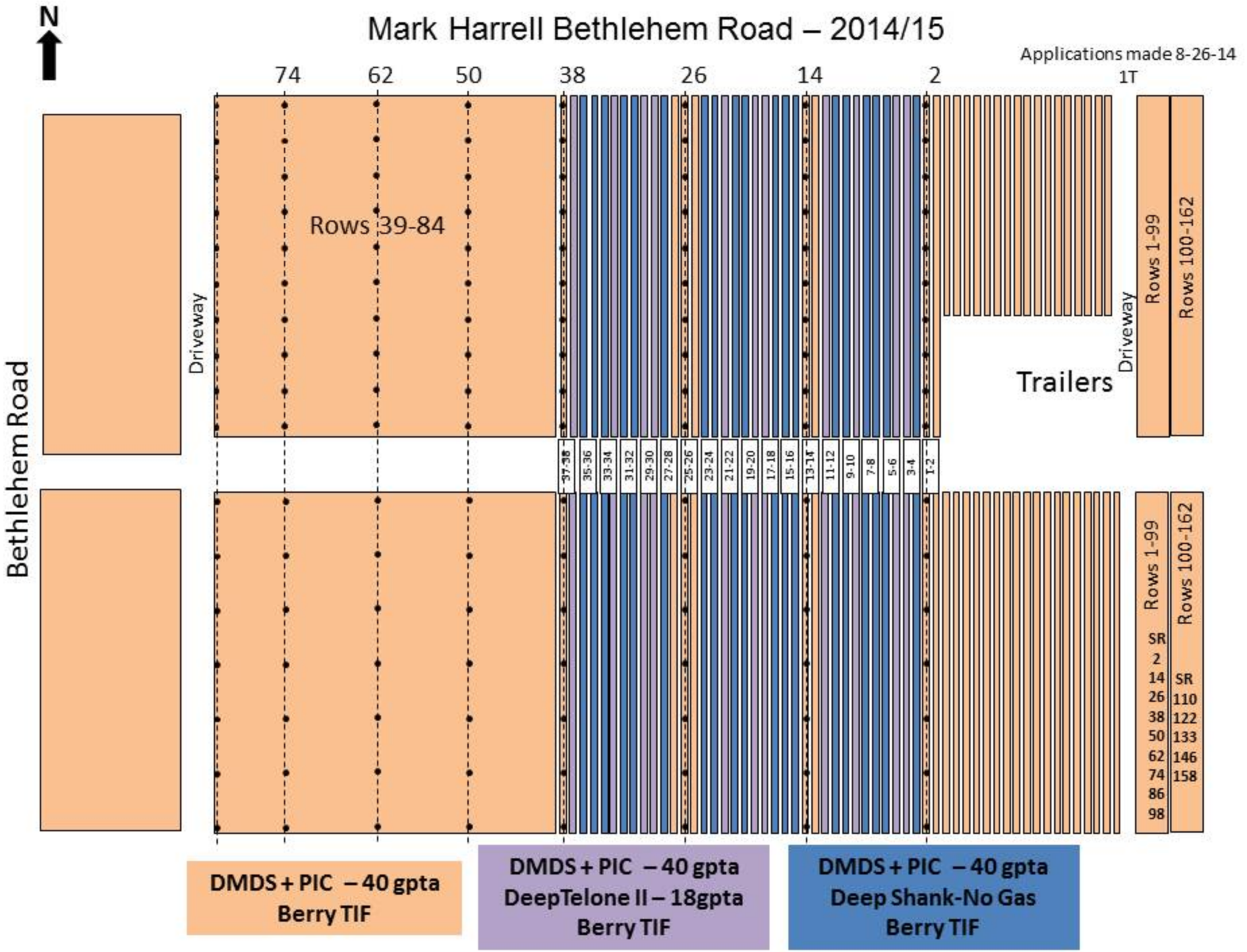
Sprinkler row ------

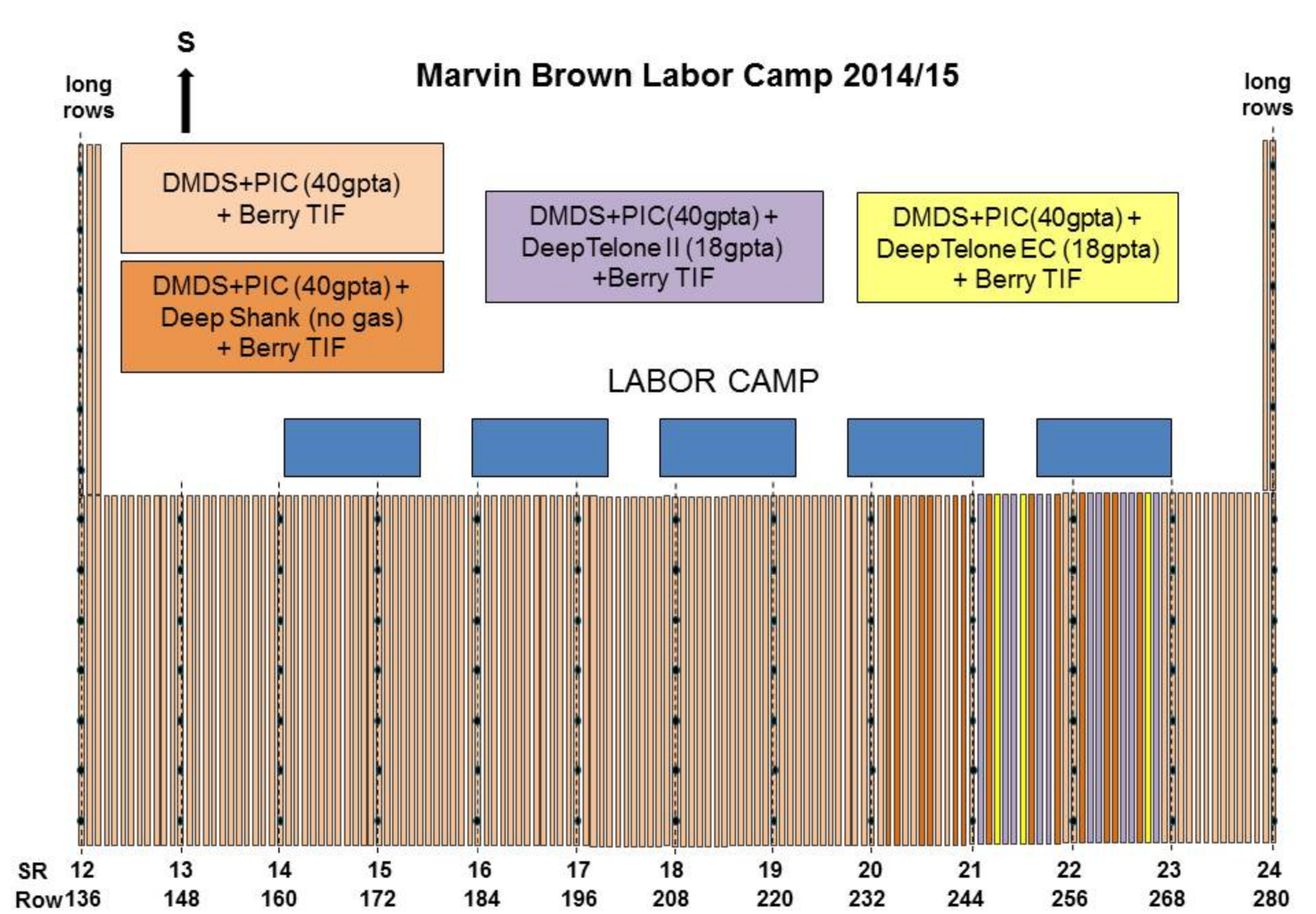



N
Whiteside – new field - 2014/15
Blocks near Moore's Lake Rd
Applications made 9-20-14
1T
111
101
91
81
71
Not sure how many SS in a block
Moore's Lake Road
116-111
108-109
106-107
104-105
102-103
100-101
98-99
96-97
94-95
92-93
90-91
88-89
86-87
84-85
82-83
80-81
78-79
76-77
74-75
72-73
70-71
SR
161
151
141
131
121
-112
SR
1
11
21
31
41
51
61
Pic-Clor60 – 14.5 gpa + Berry LDPE
Pic-Clor60 – 14.5 gpa + VaporSafe
Deep Telone II-18gpta +Pic-Clor60 14.5 gpa VaporSafe
Deep Shank – (No gas) +Pic-Clor60 14.5 gpa VaporSafe

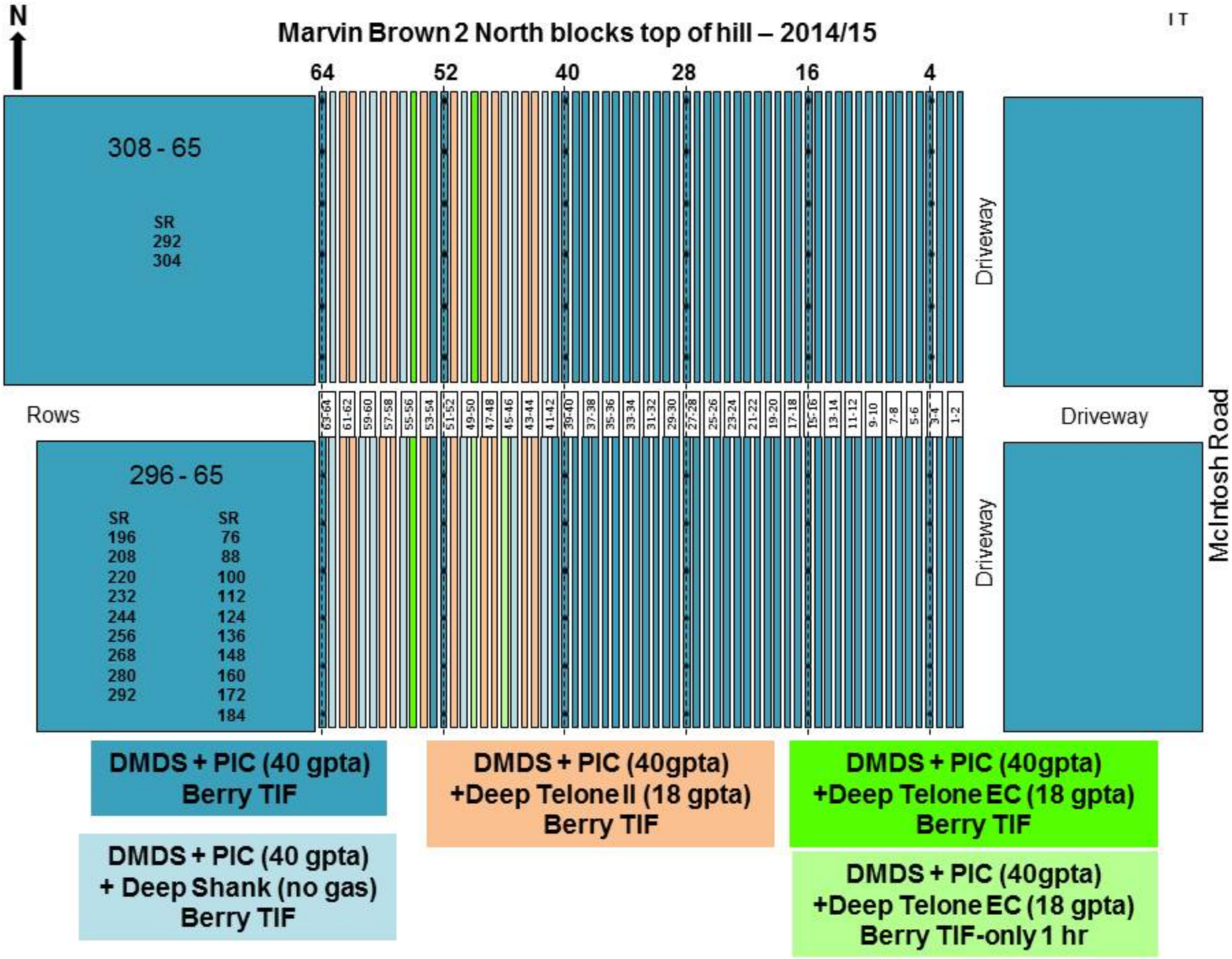

Florida Pacific Dairy - 2014/15
Blocks 1 & 2
N
13
14
15
16
17
18
19
20
21
22
23
151-152
153-154
155-156
157-158
159-160
161-162
163-164
165-166
167-168
169-170
171-172
173-174
175-176
177-178
179-180
181-182
183-184
185-186
187-188
189-190
191-192
193-194
195-196
197-198
199-200
201-202
203-204
205-206
207-208
209-210
211-212
213-214
215-216
217-218
219-220
221-222
223-224
225-226
227-228
229-230
231-232
233-234
235-236
237-238
239-240
241-242
243-244
245-246
247-248
249-250
251-252
253-254
255-256
257-258
259-260
261-262
263-264
265-266
267-268
269-270
271-272
273-274
275-276
277
pumphouse
Applications made 8-29-14
1T
C-35 – 32 gpta
Blockade VIF
Short rows
DMDS + PIC – 40gpta
VaporSafe


Florida Pacific Dairy - 2014/15
Blocks 1 & 2
N
13
14
15
16
17
18
19
20
21
22
23
151-152
153-154
155-156
157-158
159-160
161-162
163-164
165-166
167-168
169-170
171-172
173-174
175-176
177-178
179-180
181-182
183-184
185-186
187-188
189-190
191-192
193-194
195-196
197-198
199-200
201-202
203-204
205-206
207-208
209-210
211-212
213-214
215-216
217-218
219-220
221-222
223-224
225-226
227-228
229-230
231-232
233-234
235-236
237-238
239-240
241-242
243-244
245-246
247-248
249-250
251-252
253-254
255-256
257-258
259-260
261-262
263-264
265-266
267-268
269-270
271-272
pumphouse
Applications made 8-29-14
1T
C35 – 32 gpta
Blockade VIF
Short rows
C35 – 32 gpta +
Deep Shank – no gas
Blockade VIF
C35 – 32gpta +
Deep Telone II-18gpta
Blockade VIF

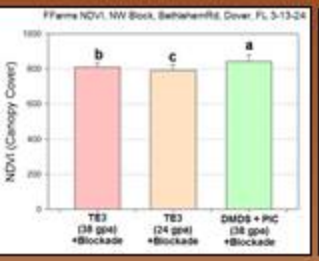

N
Mark Harrell Bethlehem Road – 2014/15
Applications made 8-26-14
74
62
50
38
26
14
2
1T
Rows 39-84
Driveway
Bethlehem Road
Trailers
Driveway
Rows 1-99
Rows 100-162
37-38
35-36
33-34
31-32
29-30
27-28
25-26
23-24
21-22
19-20
17-18
15-16
13-14
11-12
9-10
7-8
5-6
3-4
1-2
Rows 1-99
SR
2
14
26
38
50
62
74
86
98
Rows 100-162
SR
110
122
133
146
158
DMDS + PIC – 40 gpta
Berry TIF
DMDS + PIC – 40 gpta
DeepTelone II – 18gpta
Berry TIF
DMDS + PIC – 40 gpta
Deep Shank-No Gas
Berry TIF

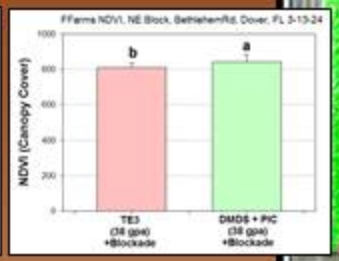

Marvin Brown Labor Camp 2014/15
S
long rows
long rows
DMDS+PIC (40gpta) + Berry TIF
DMDS+PIC (40gpta) + Deep Shank (no gas) + Berry TIF
DMDS+PIC(40gpta) + DeepTelone II (18gpta) +Berry TIF
DMDS+PIC(40gpta) + DeepTelone EC (18gpta) + Berry TIF
LABOR CAMP
SR 12 13 14 15 16 17 18 19 20 21 22 23 24
Row 136 148 160 172 184 196 208 220 232 244 256 268 280

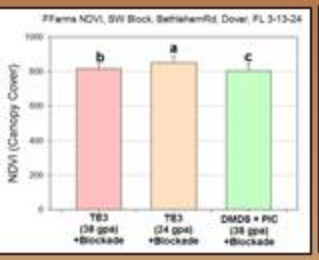
1T

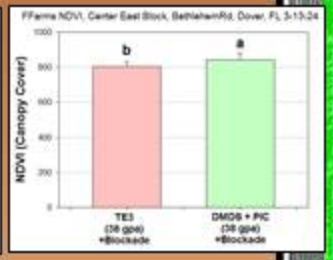

N
Marvin Brown 2 North blocks top of hill – 2014/15
IT
64
52
40
28
16
4
308 - 65
SR
292
304
Driveway
Rows
63-64
61-62
59-60
57-58
55-56
53-54
51-52
49-50
47-48
45-46
43-44
41-42
39-40
37-38
35-36
33-34
31-32
29-30
27-28
25-26
23-24
21-22
19-20
17-18
15-16
13-14
11-12
9-10
7-8
5-6
3-4
1-2
Driveway
296 - 65
SR
196
208
220
232
244
256
268
280
292
SR
76
88
100
112
124
136
148
160
172
184
Driveway
McIntosh Road
DMDS + PIC (40 gpta)
Berry TIF
DMDS + PIC (40gpta)
+Deep Telone II (18 gpta)
Berry TIF
DMDS + PIC (40gpta)
+Deep Telone EC (18 gpta)
Berry TIF
DMDS + PIC (40 gpta)
+ Deep Shank (no gas)
Berry TIF
DMDS + PIC (40gpta)
+Deep Telone EC (18 gpta)
Berry TIF-only 1 hr

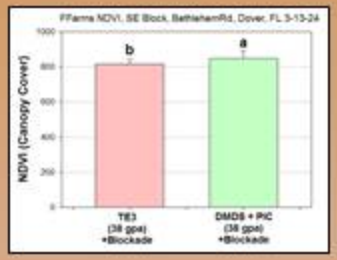
Field and Whole Farm Experimental Units





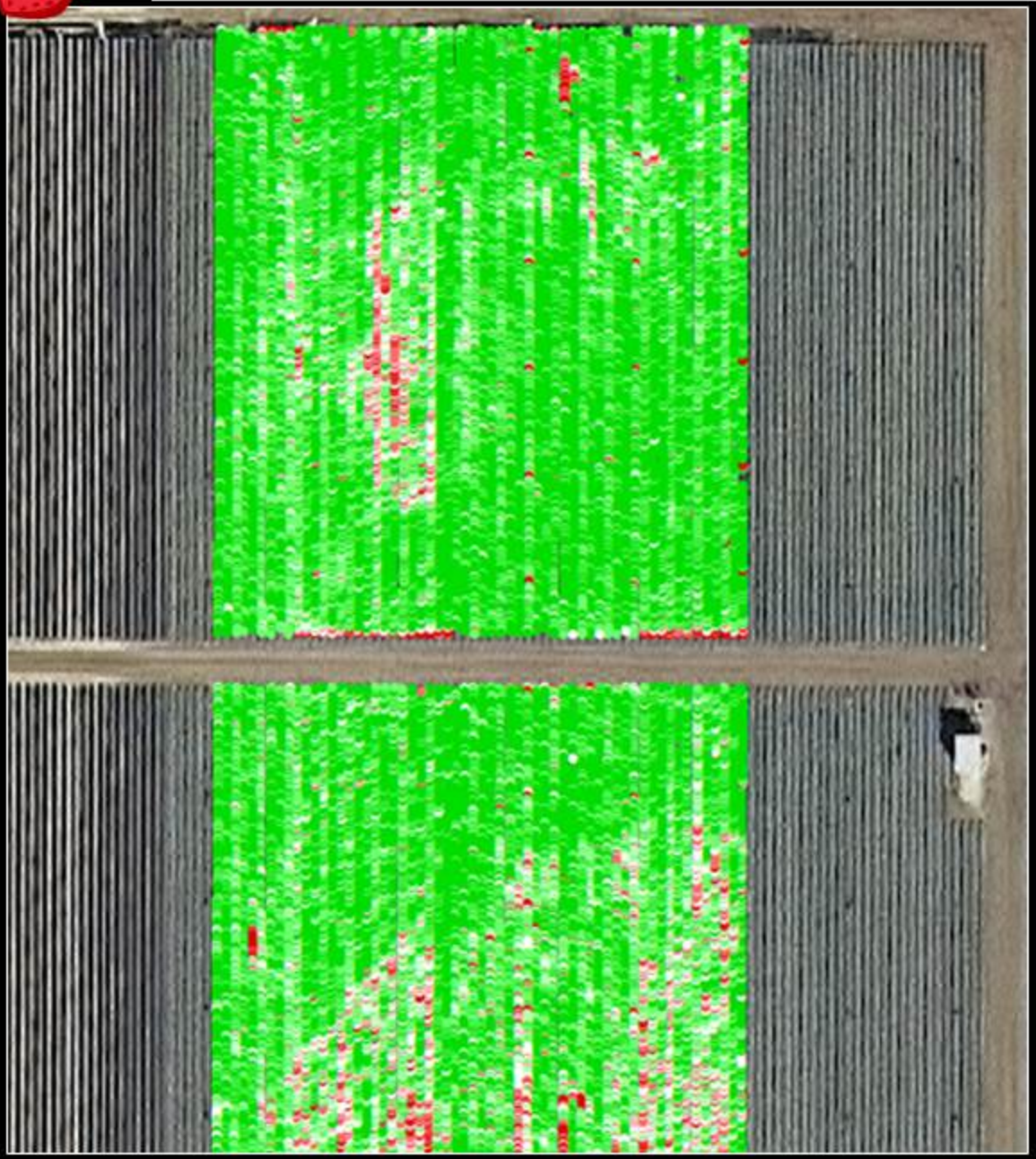






Of the 3 DMDS treatments DMDS +PIC (60 gpta) the Best NONE Solved Nematode Problem

Favorite Farms – North and South Blocks March 2015



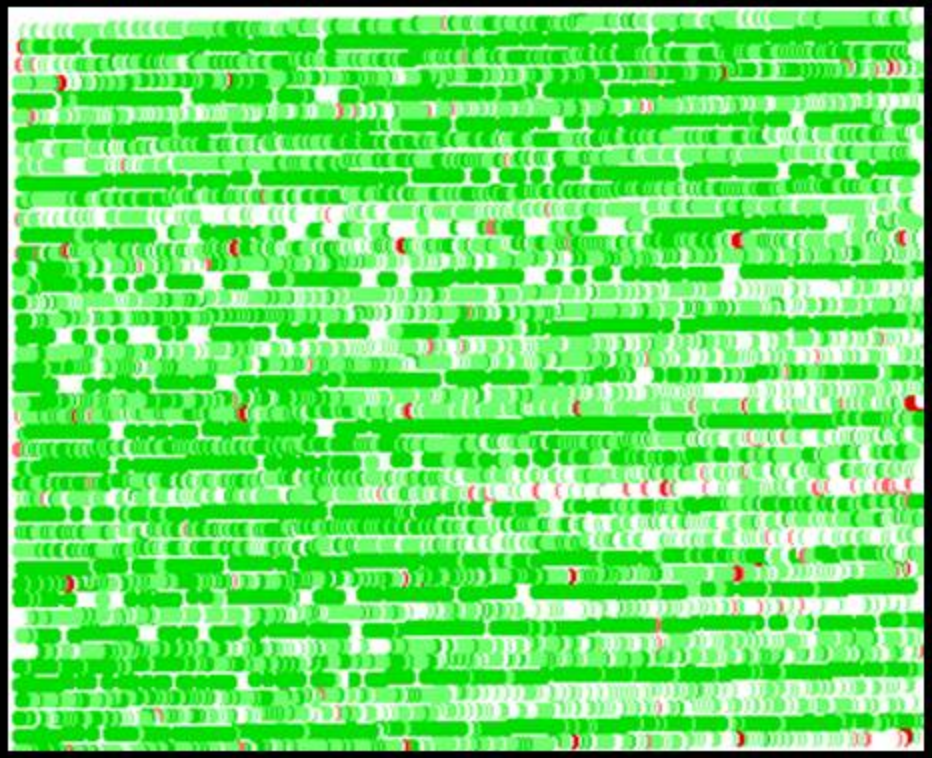
Driscoll Farms – North and South Deep Shank / VaporSafe Blocks March 2015

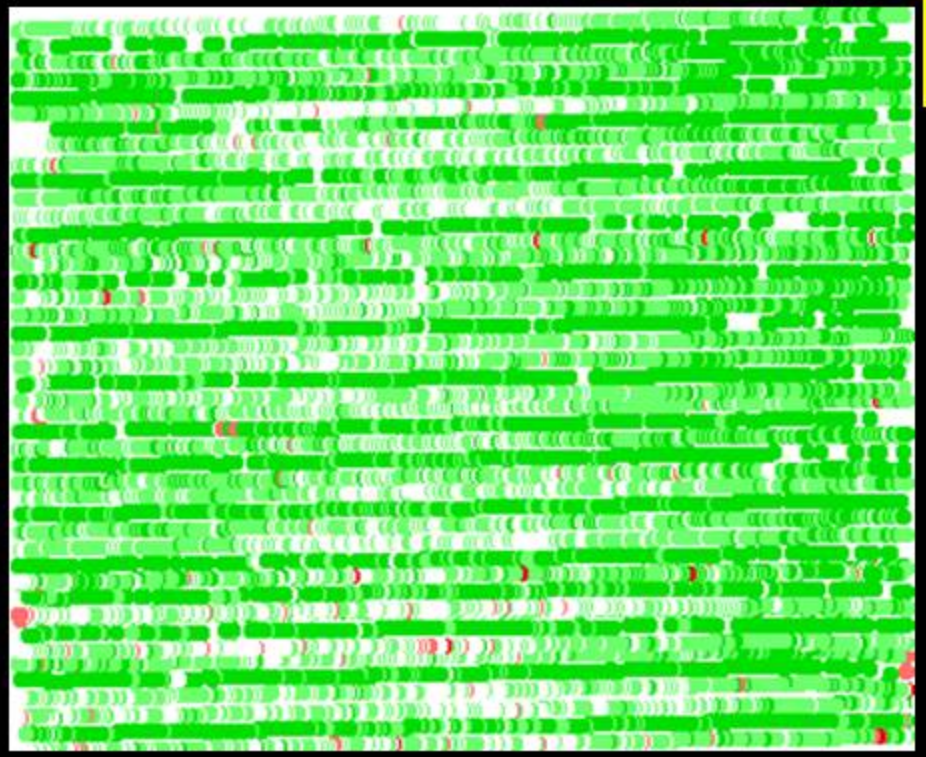
Benefits of Deep Shank (15" Deep-Split Stream) applications of Telone II (18 gpa) could not be discriminated.

Solarization

Whiteside Farm - March 2015
Deep Shank Telone II (18 gpa)
Single Ripper Shank / bed in Split Stream

N



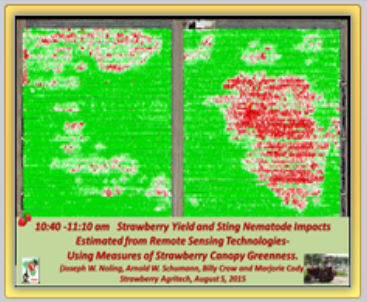


Note every 4th row which was deep shanked
With the single shank w/ wings prior to bedding

Experiment 1- Spring 2014

The Pictures We Got !

Something closer to what we should be after. Some added soft lighting probably required



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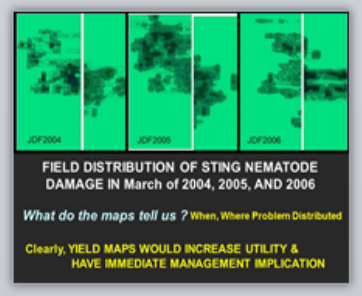

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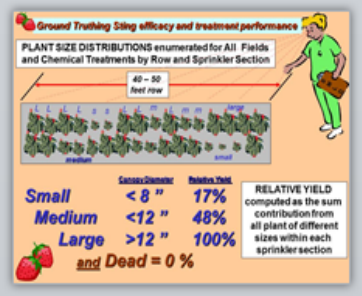

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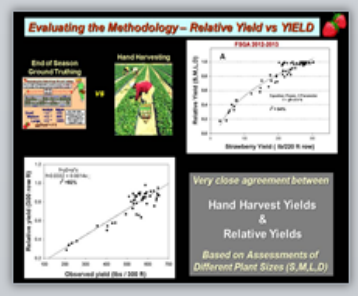

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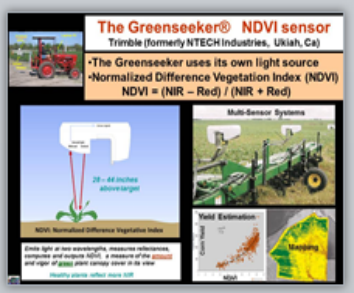

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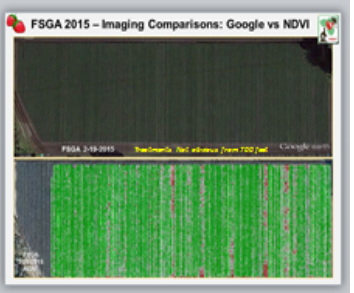

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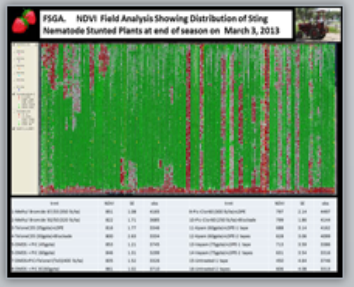

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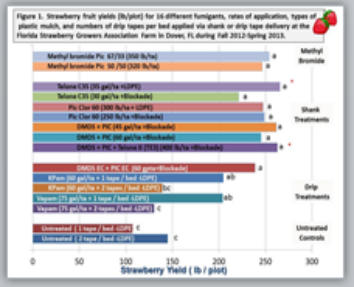

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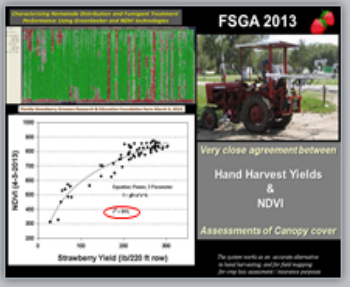

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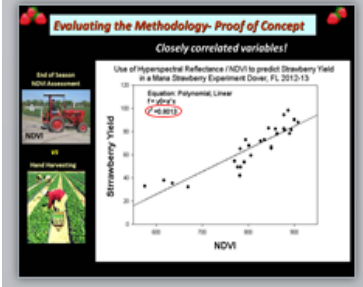

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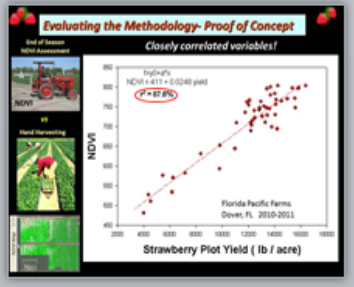

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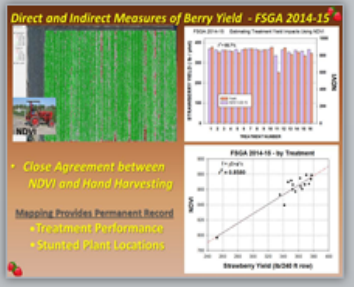

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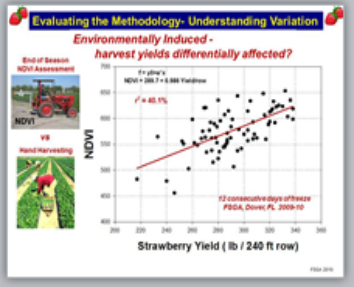

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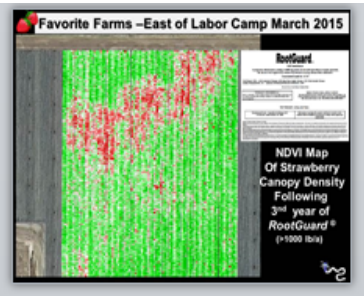

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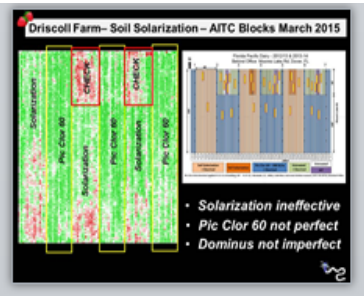

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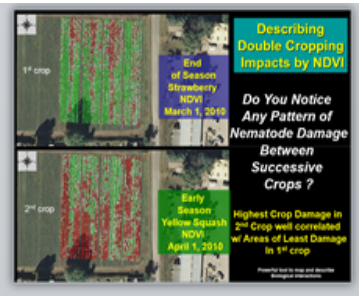

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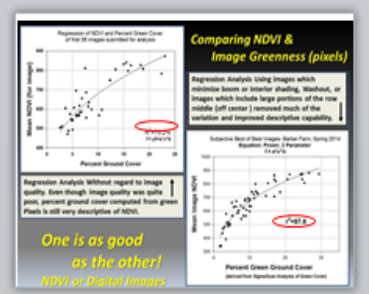

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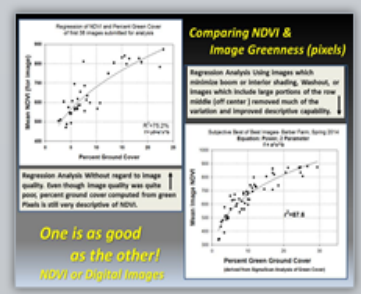

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