PRECISION AG/NEMATODE MANAGEMENT IN S. C.

- **South Carolina**
  - Ahmad Khalilian
  - Will Henderson
  - John Mueller
- **Current Coop.**
  - Terry Kirkpatrick
  - Scott Monfort
- **Others**
  - Al Wrather


A typical production field in the Southeastern Coastal Plain
Sandy Loam
Sand
Sandy Clay Loam

COTTON THRESHOLDS

	Nematodes/100cm^3	
Species	**Low**	**High**
Root-knot	**100**	**250**
Reniform	**250**	**625**
Lance	**75**	**190**

COTTON THRESHOLDS

Low Threshold		**5 to 6 lbs/acre Temik 15G at planting**
	or	**Avicta**
High Threshold		**3.0 gals/acre Telone II preplant + 3 - 5 lbs Temik 15G at planting**
	or	**5 lbs Temik 15G at planting + 5 lbs Temik 15G side dressed**
	or	**Vydate CLV**
	or	**Rotation**

4 Farms – 214 Fields

< Threshold	31%
At low threshold	32%
> High Threshold	37%

Primarily Columbia lance and Root-knot Nematodes

NEMATODE DISTRIBUTION

- Nematodes are not uniformly distributed within fields.
- Distribution is determined by:
  - Soil texture
  - Soil chemical properties
  - Host distribution

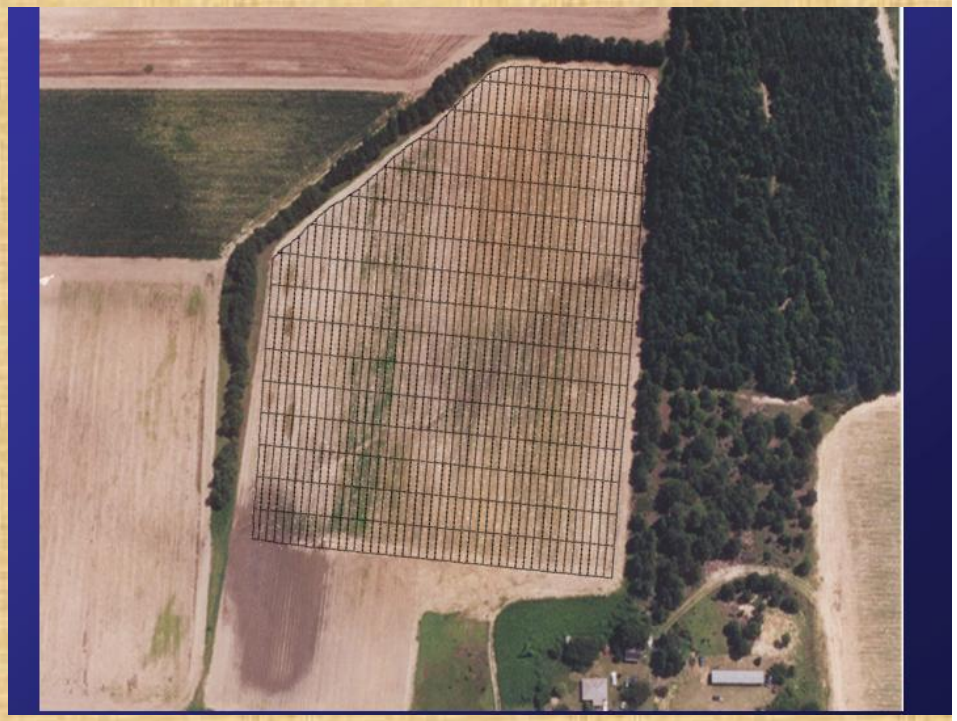
“NEW TOOLS”

- **AVAILABLE**
- **G.I.S./G.P.S.**
- **S.E.C.M.**

- **NEEDED**
- **Variable rate applicator for Temik 15G**
- **Variable rate applicator for Telone II**

OBJECTIVE

- **Determine (predict) for each grid:**
  - **Nematode density**
  - **Yield potential**
  - **Soil texture**
  - **Particle size**
  - **pH**

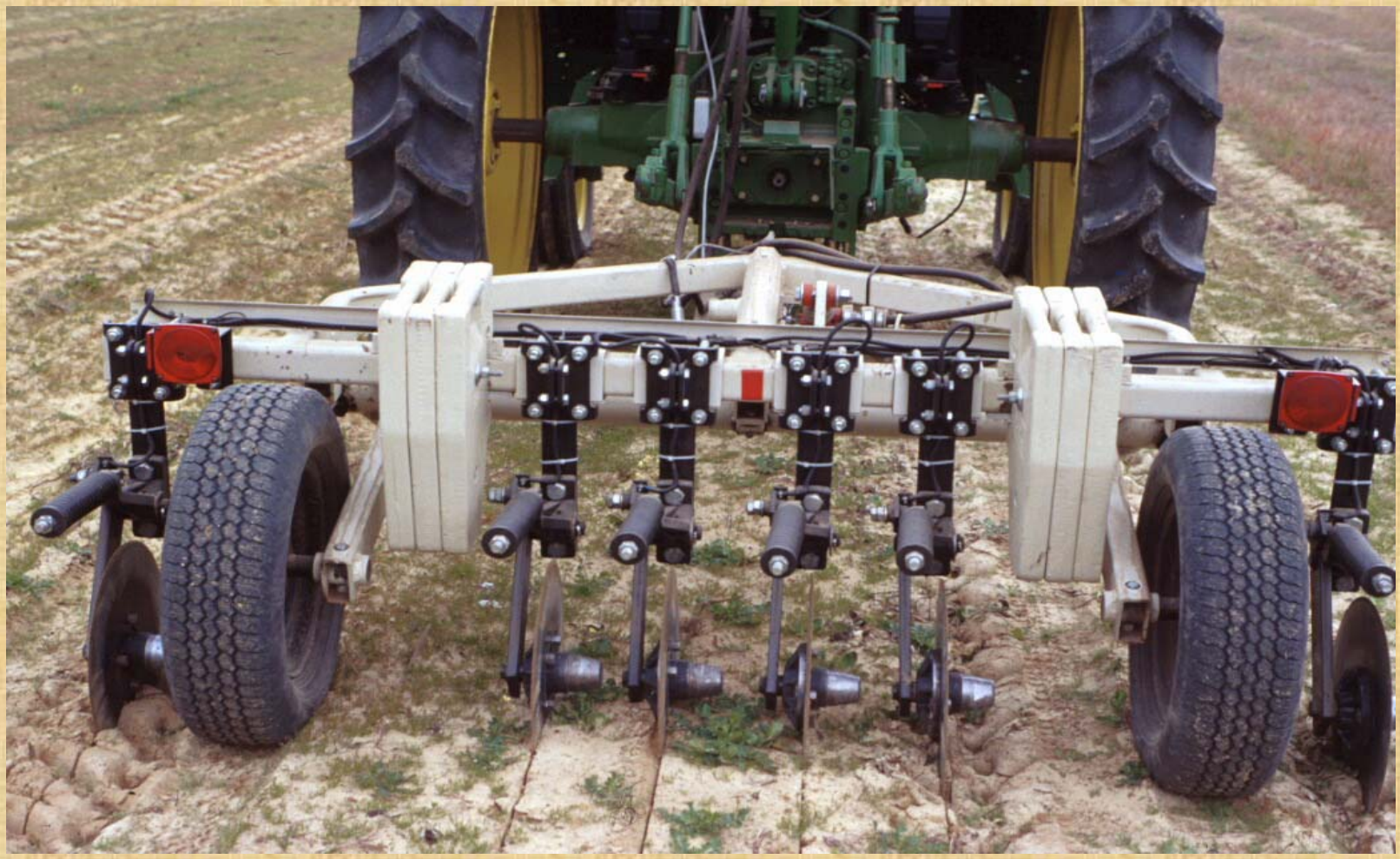



GATOR
6x4


Columbia Lance Nematode

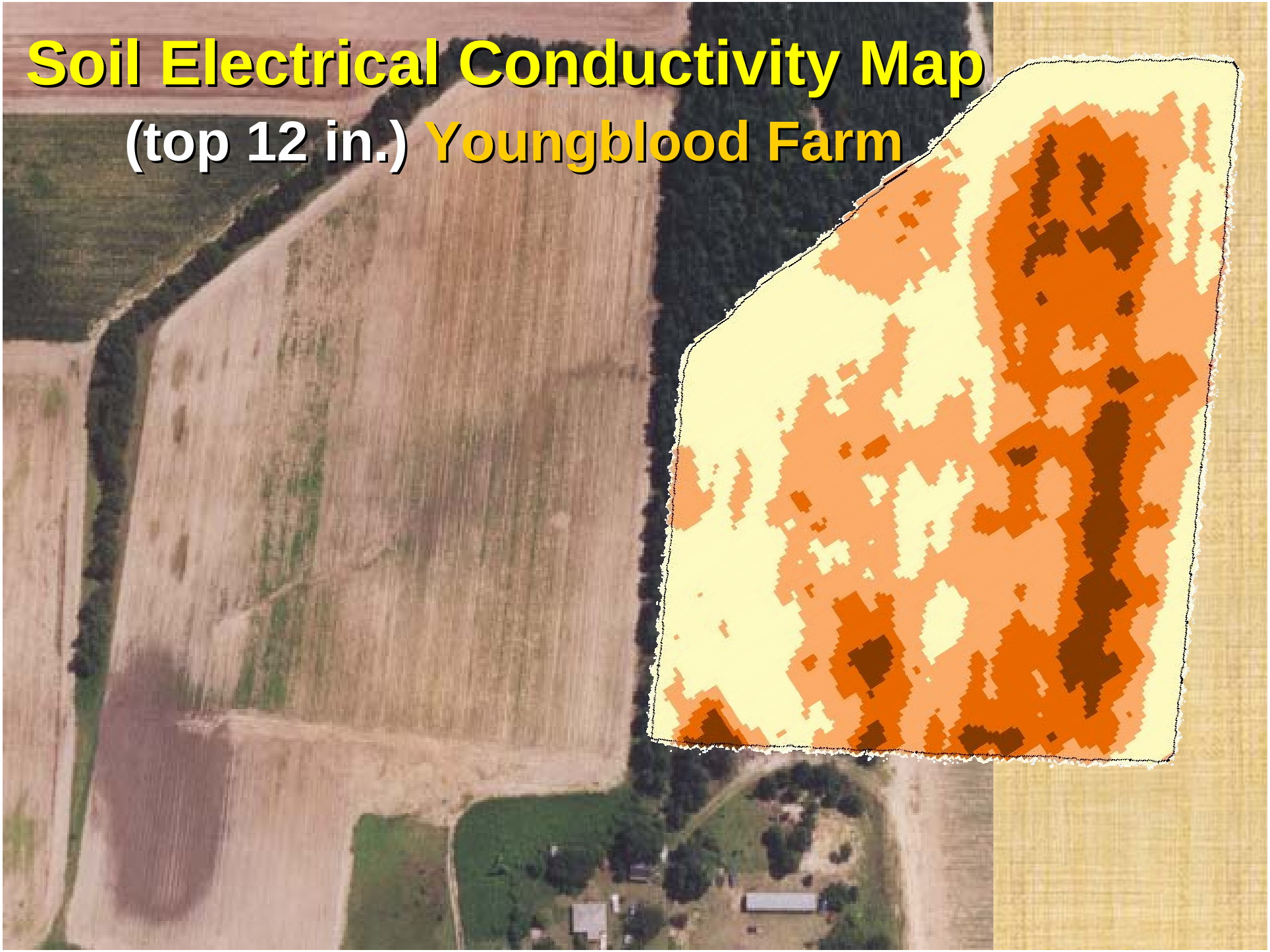
- **Soil texture, especially % sand may be the most important factor in determining the distribution of individual nematode species.**
- **Soil electrical conductivity correlates strongly to soil particle size and texture.**

Determine the potential for predicting nematode distribution and density using soil electrical conductivity.

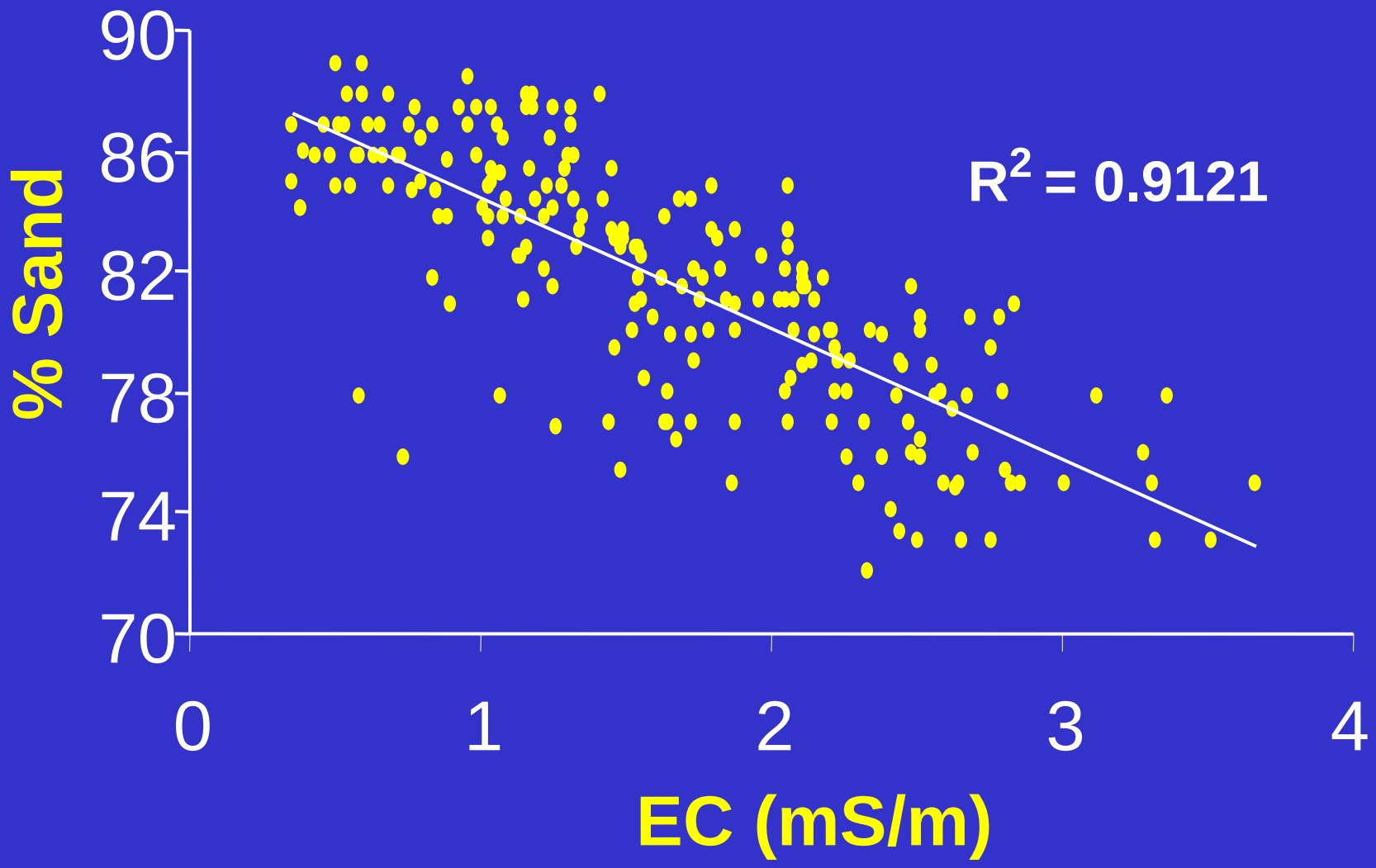


Soil Electrical Conductivity Map

(top 12 in.) Youngblood Farm

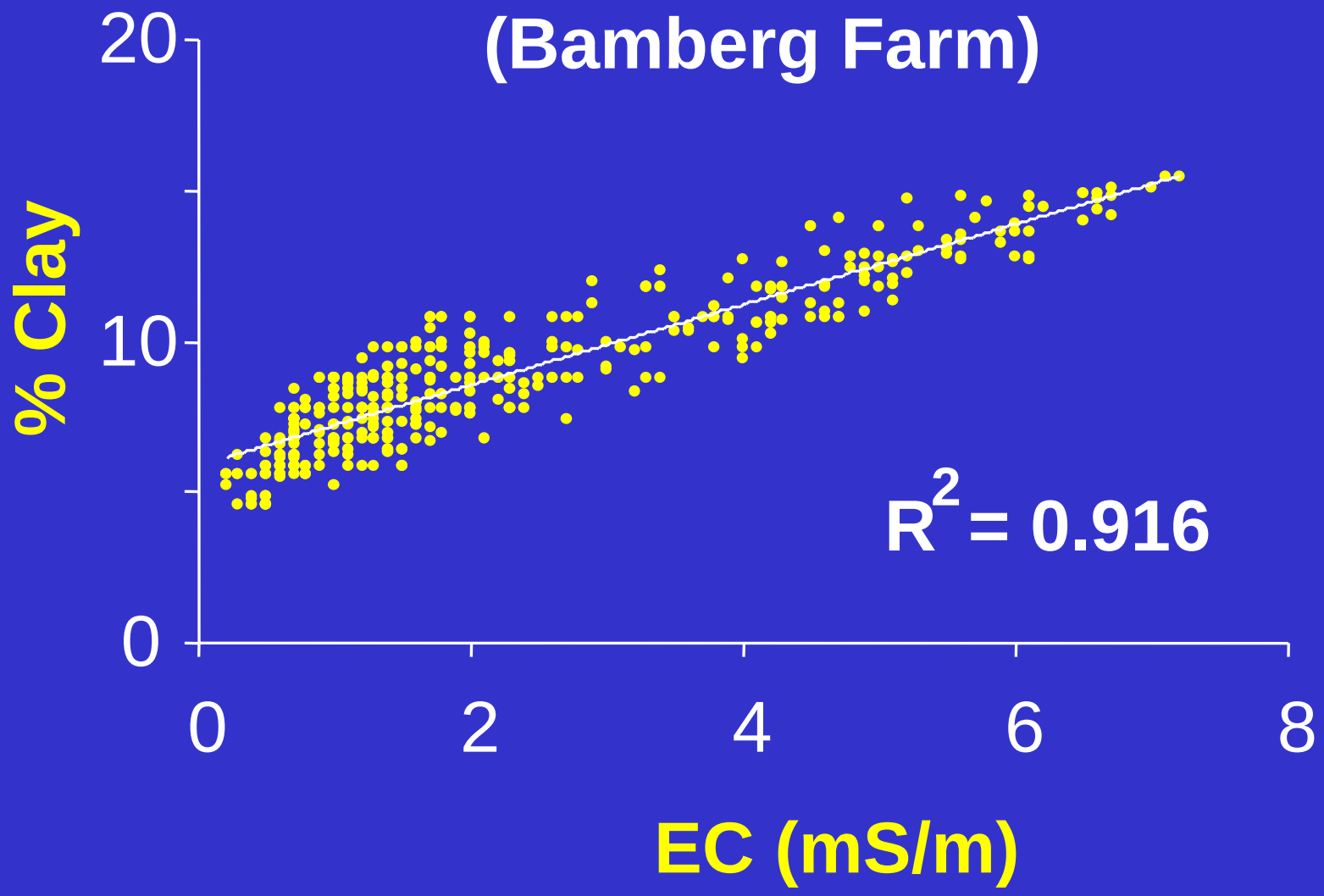


Effects of Soil Texture (% Sand) on Soil Electrical Conductivity

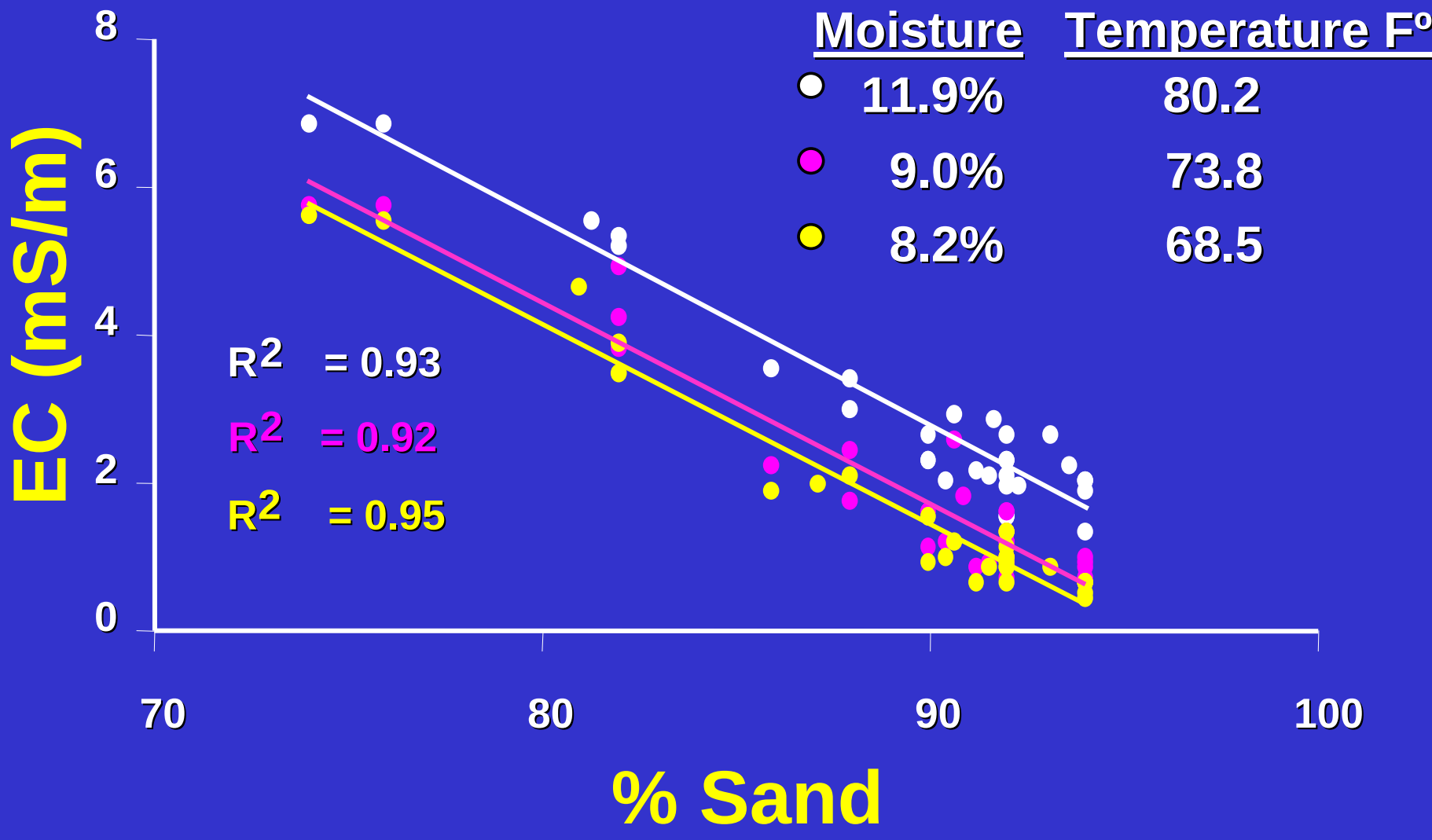


Effects of Soil Texture (% Clay) on Soil Electrical Conductivity

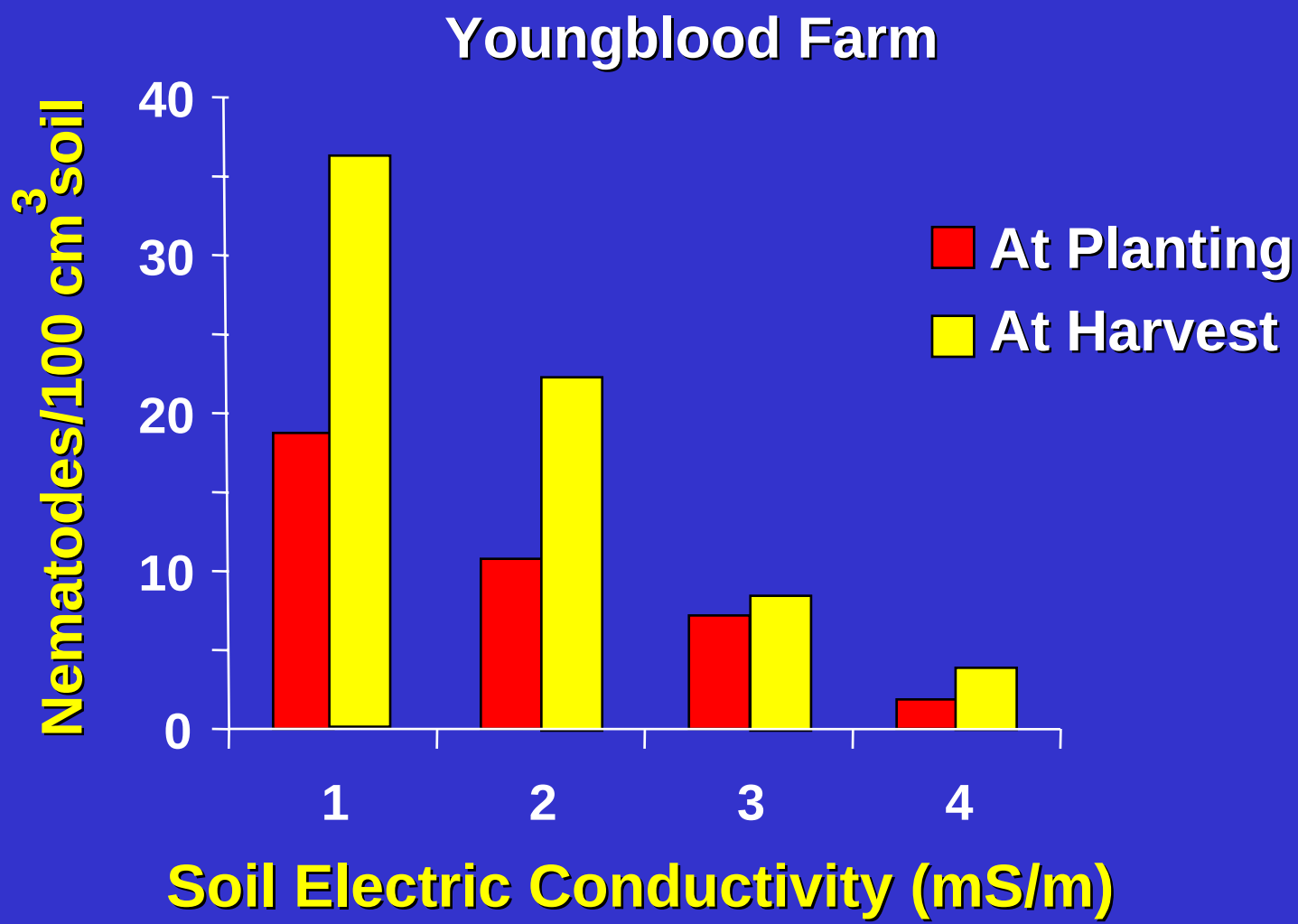
(Bamberg Farm)



Effects of moisture & temperature on soil EC

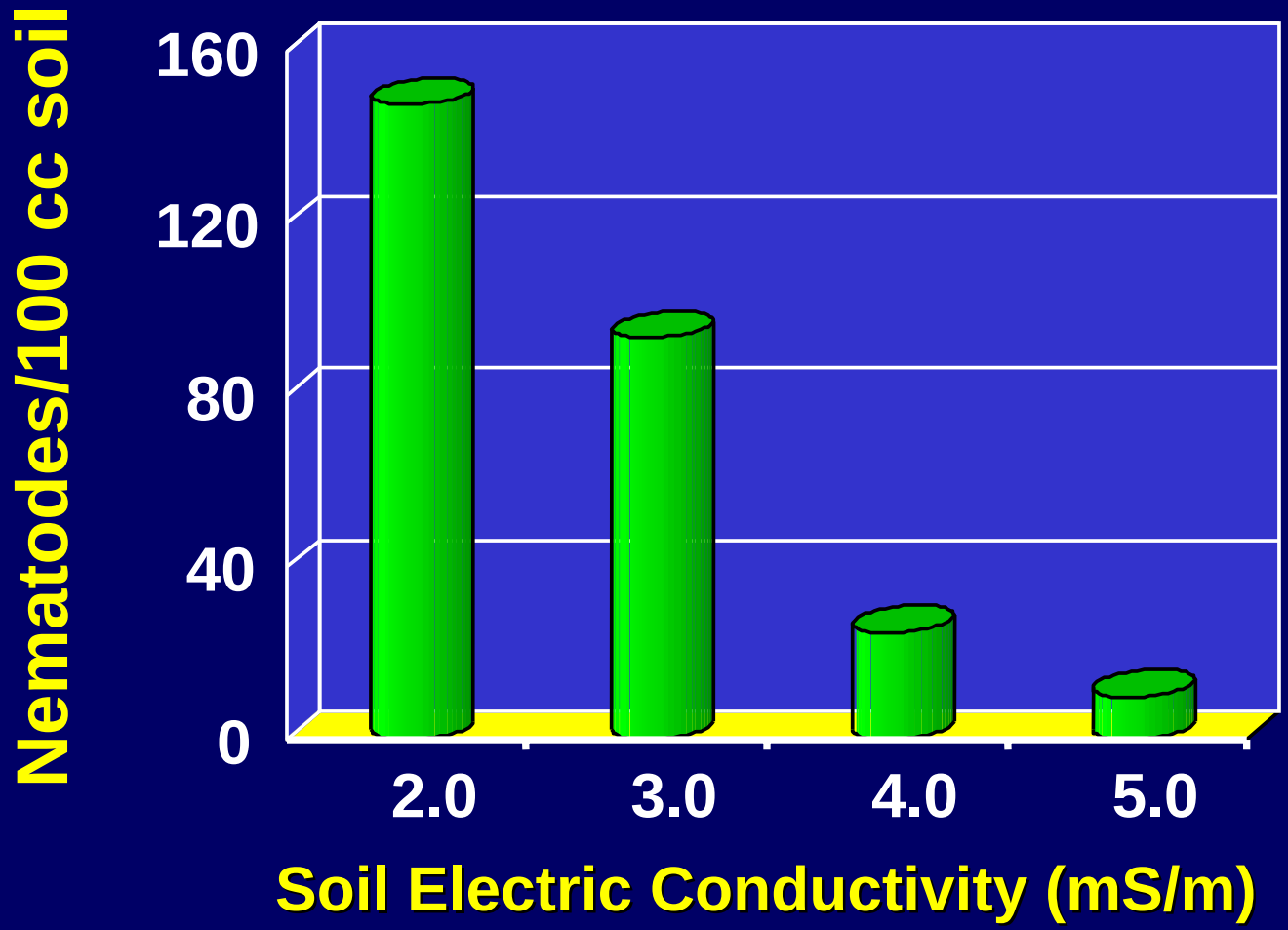


Effects of Soil Texture on Columbia Lance Nematode



Effects of Soil Texture on Columbia Lance Nematode at Harvest

Bamberg Farm



Objective 2

To develop a variable-rate applicator for Telone II & Temik 15G.

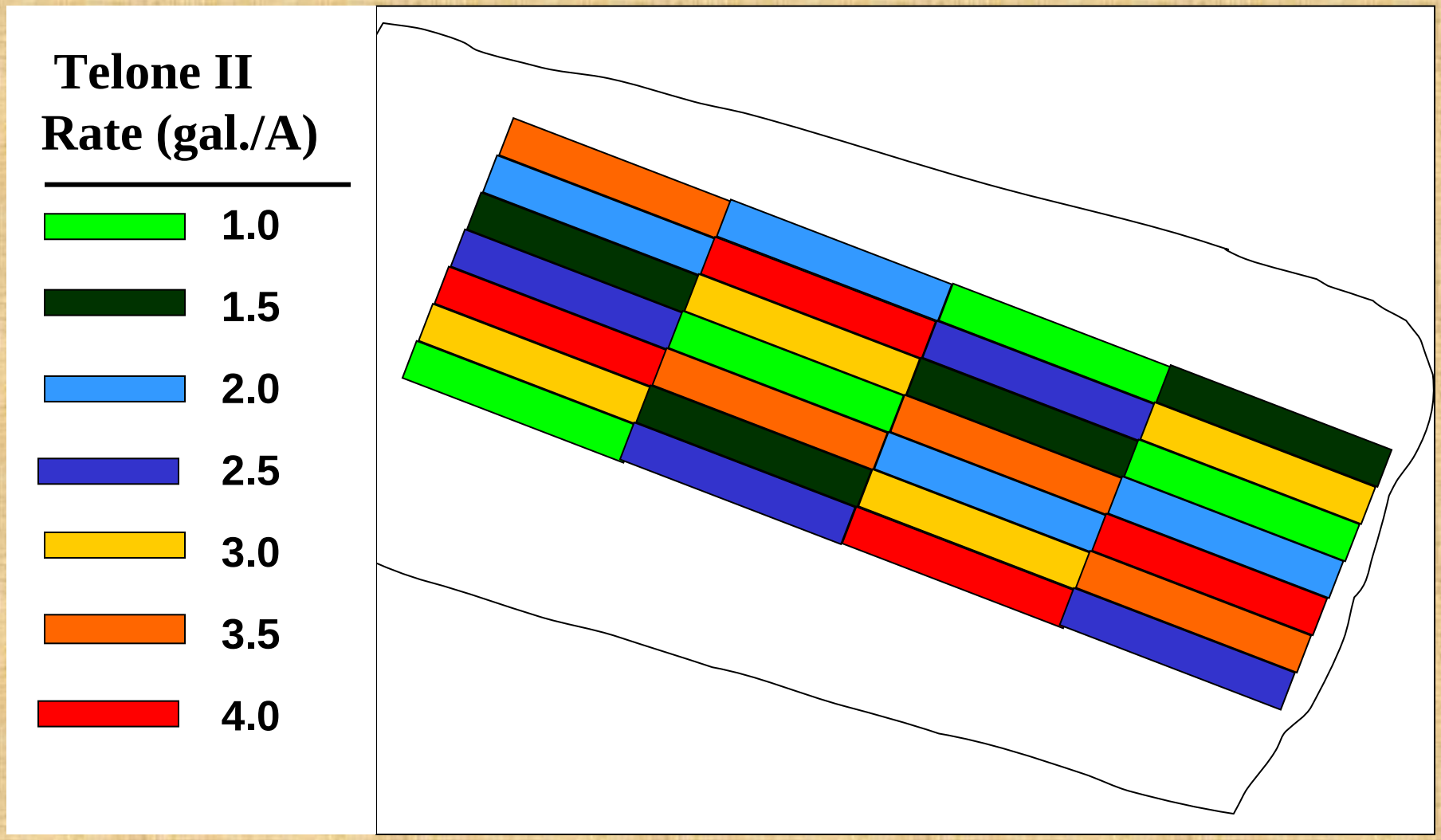

DEERE
7710


HORSTINE FARMERY LTD
MADE IN ENGLAND
Microband
HORSTINE FARMERY LTD
JOHN DEERE

Objective 3

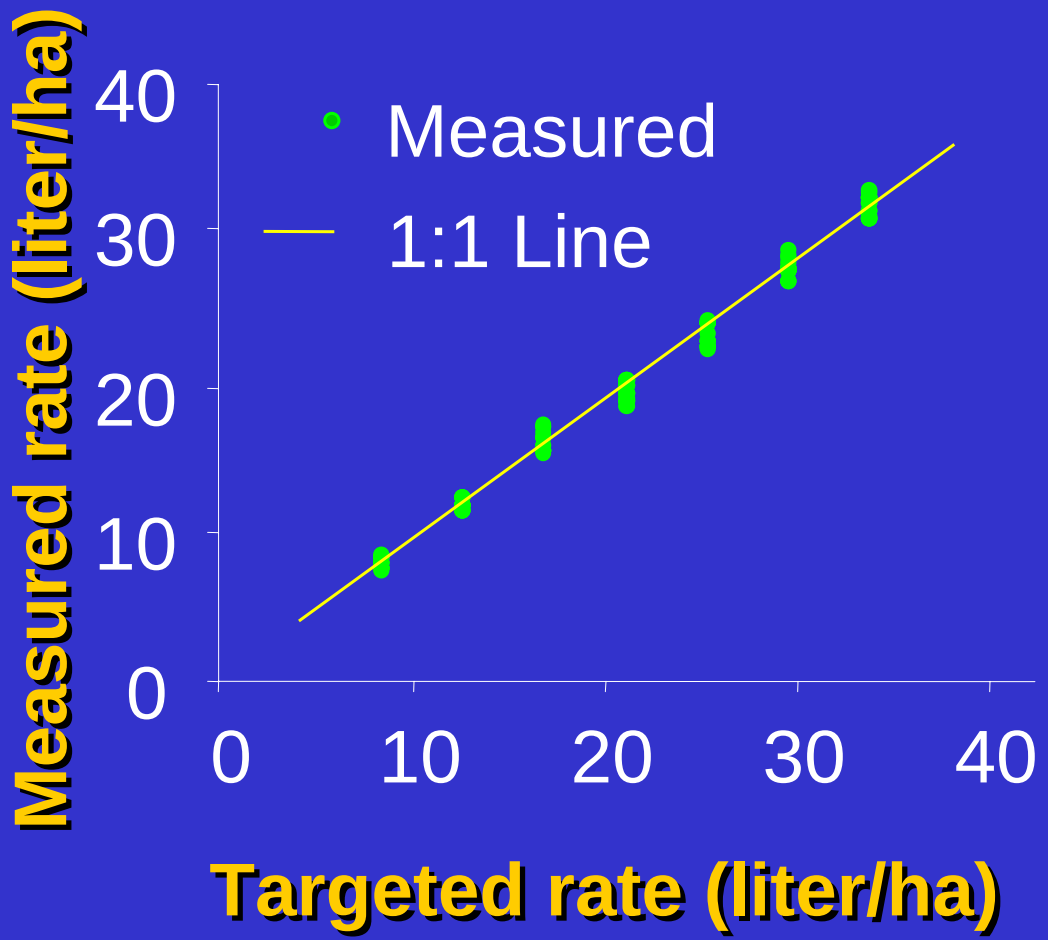
To determine the accuracy of the variable-rate application systems.

Targeted Telone II Rate




CHARLOTTE PIPE
250ml
KIMAX
NO. 14000

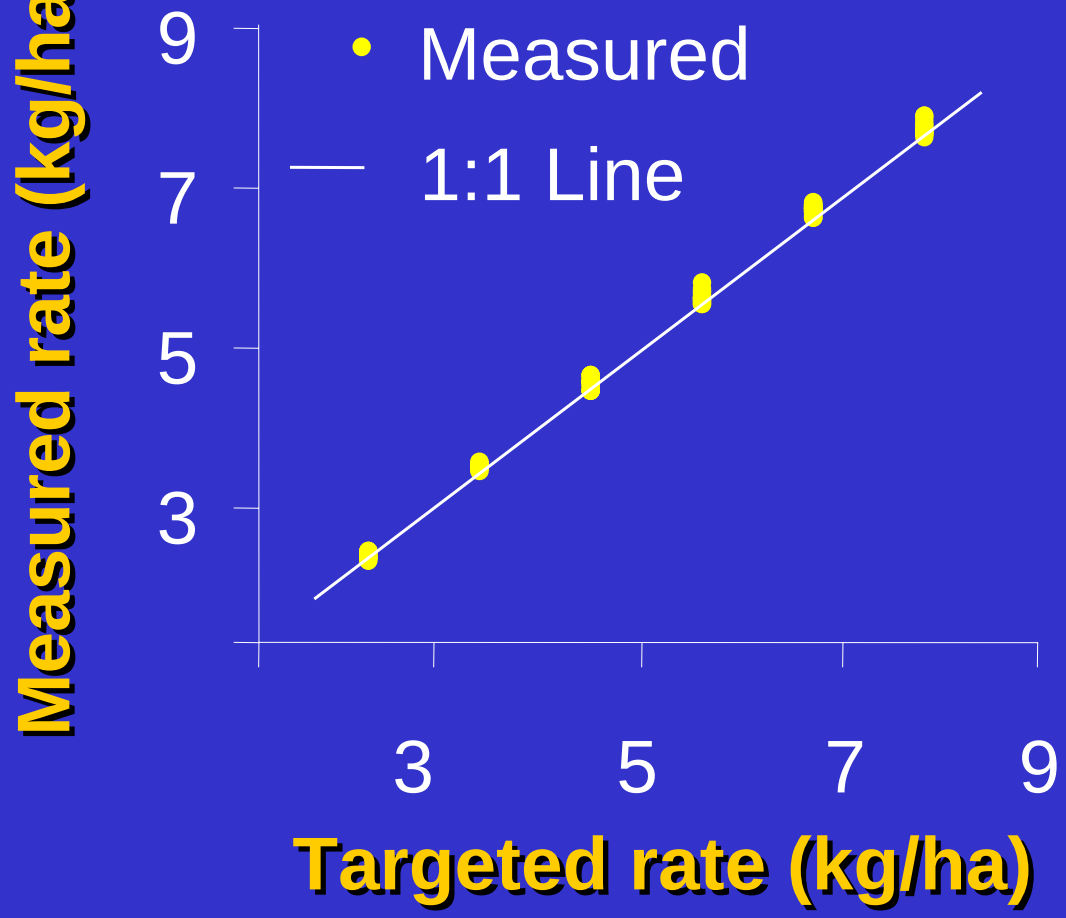
Variable-Rate Telone II Application Equipment Uniformity Test



Average Overall Error = - 2.1 %

Row	% Error Max.	Ave.
1	- 6.7	- 3.3
2	5.5	0.5
3	- 6.7	- 3.5
4	5.3	- 1.9

Variable-Rate Temik 15G Application Equipment Uniformity Test



Average Overall Error = 1.1 %

Row	% Error Max.	Ave.
1	- 3.0	0.5
2	4.2	1.6
3	- 3.0	0.9
4	4.0	1.5

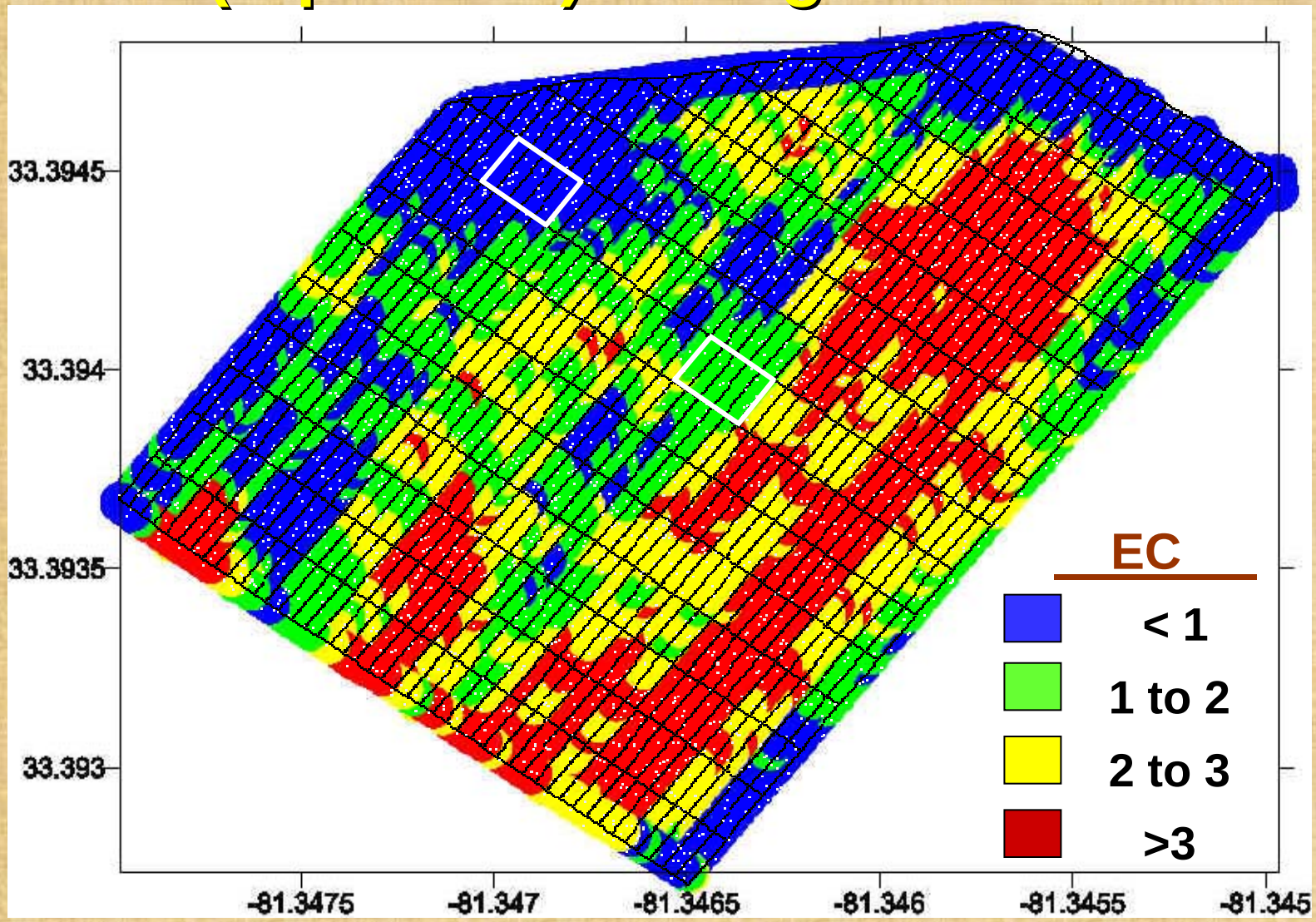
Objective 4

To compare efficacy of variable-rate vs. uniform-rate nematicide application.

Rates Compared

Treatment	Temik (lbs/A)	Telone (gal./A)
STD Temik	6.0	0.0
VAR Temik	3.0 to 7.0	0.0
STD Telone	3.0	3.0
Var. Telone	3.0	0.0 to 3.0
Control	0.0	0.0

Soil Electrical Conductivity Map
(top 30 cm) Youngblood Farm



Variable Rate Nematicide Application Guidelines

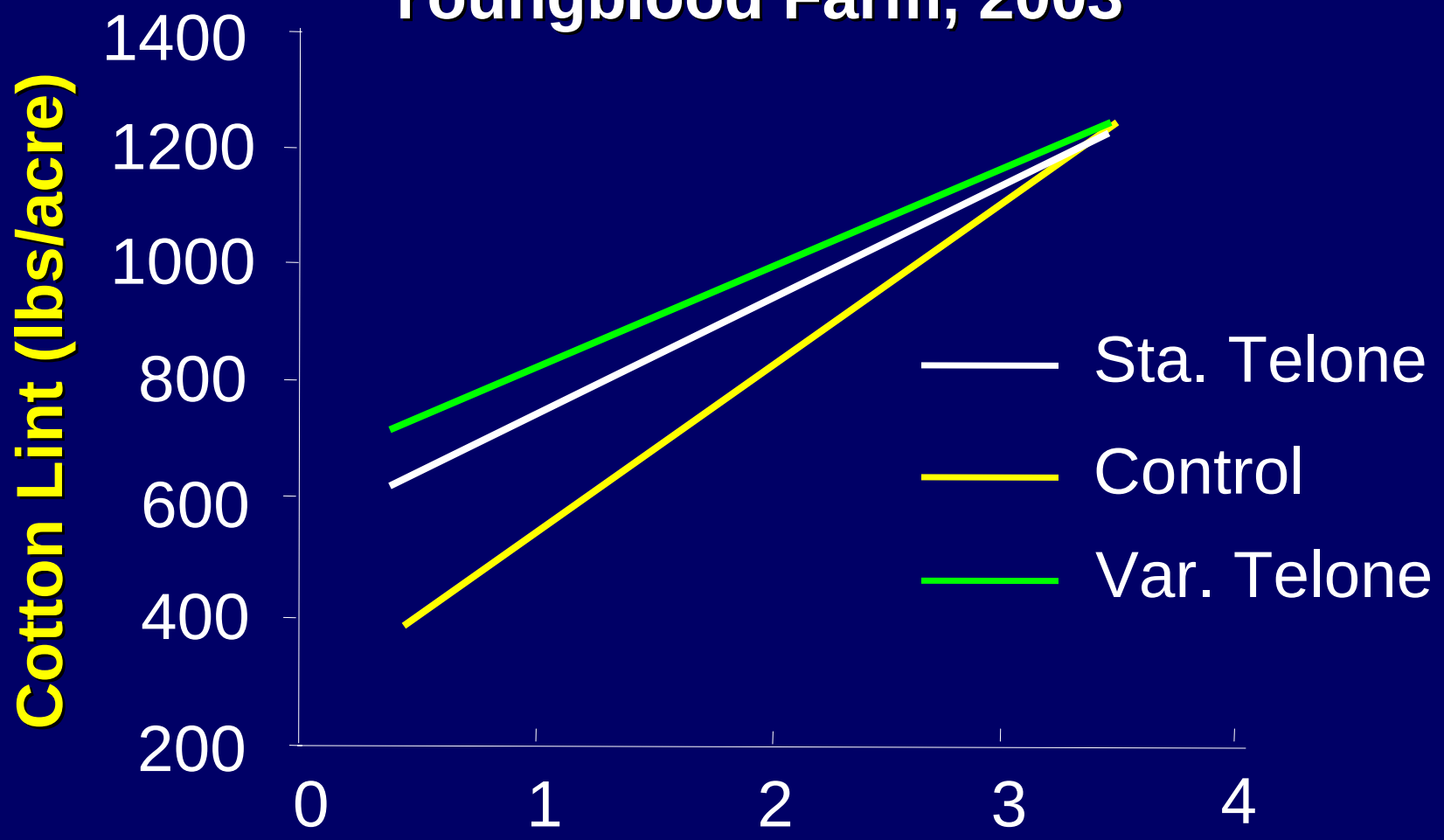
Temik 15 G (lbs/A)	Columbia lance per 100 ml soil
3.0	Less than 51
5.0	51 to 125
7.0	More than 125

Variable Rate Nematicide Application Guidelines

Telone II (gal/A)	Columbia lance per 100 ml soil
0.0	Less than 51
18.7	51 to 125
28.0	125 to 200
37.4	More than 200

Effects of Soil EC and Telone Application Method on Lint Yield

Youngblood Farm, 2003



Effects of Soil EC and Temik Application Method on Lint Yield

Youngblood Farm, 2003

Effects of variable-rate nematicide application on lint yield and chemical use

Treatment	Temik (lbs/A)	Telone (gal/A)	Lint yield (lbs/A)
Sta. Temik	6.0	0.0	650
Var. Temik	4.0	0.0	687
Sta. Telone	3.0	3.0	663
Var. Telone	3.0	0.6	696
Control	0.0	0.0	566

Conclusions

- Var.-rate Temik system resulted in 5% higher yield and 34% lower nematicide usage compared to single rate.
- Var.-rate Telone increased lint yield by 5% with 78% reduction in nematicide usage compared to single rate.

WHERE TO GO??

- CLN was easy, direct relation of % sand to nematode density (size matters).
- Distribution = damage.
- Immense variation in a field. Easy to i.d. where to put Telone II.
- Columbia lance is a “strong pathogen”
- Columbia lance particle size is possibly not an issue.
- Problems will come in “mixture” fields.

Root-knot & reniform

- Much weaker pathogens on a unit basis
- Distribution does not = damage
  - Rely more on stress
  - Particle size more important??
  - Will need data on interaction of
    - Yield potential * nematode density
    - How to predict density or stress??

NEW GRANT FOR SC & AR

Demonstration of Site-Specific Nematicide Placement in Cotton for Water Quality Enhancement, Higher Lint Yields, and Increased Farm Profits.

3 year grant to work with growers to promote the use of site specific application technology.


STOP
830
SN
265.1
AREA
IMPLEMENT
% SLIP
DISTANCE
AREA / H
SPEED
WIDTH
SERVICE
PTO RPM
DIM
CANCEL
ZERO
SET
SAVE
Legacy 6000
Temik
0.00
Target: 0
5.79
mi
25.3
feet
MID-TECH
ESC

Arkansas

- **Investigators: Terry Kirkpatrick, Scott Monfort, and Andy Mauromoustakos**
- **Interrelationship of soil texture and root-knot nematode on yield.**

Spatial Data Evaluation

Field divided into 4 soil-texture classes:

1.) 0-30 % Sand

2.) 31-45 % Sand

3.) 46-60 % Sand

4.) > 60 % Sand

Within Soil classes - plot data averaged based on Telone application:

1.) 0

2.) 1.5 gal.

3.) 3.0 gal.

4.) 4.5 gal.